



Demand Analysis Of Taxi And Public Rental Transportation At I Gusti Ngurah Rai International Airport Bali

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ABSTRACT

I Gusti Ngurah Rai International Airport is one of Indonesia's main air transportation gateways, experiencing a significant increase in passenger mobility following the Covid-19 pandemic. To meet ground transportation needs, Ngurah Rai Airport offers a variety of official transportation options, including conventional and online transportation. Conventional transportation can be booked through the airport's official ticket counter, while online transportation or special charter transportation can be booked directly by passengers through the app. Special charter transportation providers have partnered with conventional airport transportation providers to support fleet availability. The research employs a stated preference technique with a binary logit difference model analysis. Primary data were obtained through surveys of domestic passengers and ground transportation drivers in the domestic arrival area, while secondary data were collected from various relevant agencies. The results indicate that the probability of users choosing a taxi is 2.32% and that of choosing a rental transportation is 3.86%. Consequently, the projected requirements are 27 taxi units and 44 rental transportation units in 2025, 30 taxi units and 51 rental transportation units in 2030, and 35 taxi units and 58 rental transportation units in 2035, based on the demand level of domestic flight passengers. The number of taxis and rental transportations currently available at I Gusti Ngurah Rai International Airport exceeds the projected fleet requirements.

Keywords: Binary Logit Model, I Gusti Ngurah Rai International Airport, Rental Transportation, Stated Preference

1. INTRODUCTION

Efficient transportation plays a crucial role in supporting Bali's economic growth and tourism industry, with I Gusti Ngurah Rai International Airport serving as the primary gateway for both domestic and international visitors. Data from the Ministry of Transportation [1] shows that passenger numbers dropped sharply from 24,169,561 to 6,238,774 during the Covid-19 pandemic, but have since gradually recovered, reaching 23,930,899 in 2024. In line with this recovery, there is a growing need to enhance and optimize land transportation services to ensure smooth passenger mobility in and out of the airport. To address this, the airport collaborates with local conventional transportation providers such as Ngurah Rai Taxi, Loh Jinawi, Sapta Pesona, Bali Segara, and Trans Tuban, as well as private rental and online transportation services like GrabCar and GoCar.

Previous studies have examined airport transportation mode choices in various contexts. Putu [2] used descriptive analysis and binary-logit-difference models to evaluate user characteristics and identify how differences in travel costs influence mode selection. Similarly, Putri [3] analyzed taxi demand at Juanda Airport by estimating taxi choice probabilities, projecting passenger numbers with linear regression, and using peak flight arrival times to calculate required taxi fleets. Research by Hermawati et al. [4] employed the Analytic Hierarchy Process (AHP) to determine that safety (28.8%), speed (25.7%), comfort (23.1%), and cost (22.4%) are the main factors influencing mode choice, with private or rental cars with drivers being the dominant preference. Another study by Hermawati et al. [5] using the Mixed Logit model found the highest choice probabilities for car rental (22.5%), motorcycle rental (20.2%), agent-bus (18.9%), and agent-car (11.7%), while online-based public transportation recorded a low probability of use, at less than 5%.

Raditya et al. [6] applied a Multinomial Logit (MNL) model to compare taxis, minivans, and Grab services at Ngurah Rai Airport, concluding that safety, price, comfort, travel time, and vehicle capacity were the most significant choice attributes. Salsabila and Namara [7] studied Soekarno-Hatta Airport users (Terminals 1 & 2) and found that before the airport train service was introduced, passengers primarily used DAMRI buses (33%), private vehicles (27%), airport trains (25%), and taxis (15%). Wibowo et al. [8] reported that in Jakarta, 95.8% of respondents would be willing to use TransJakarta buses to Halim Airport if such a service were available, and 64.8% felt that existing transport modes (airport taxis, DAMRI, ride-hailing) were inadequate as public options. Similarly, Miharja et al. [9] highlighted that limited landside space at Halim Airport restricts the development of passenger access facilities, including space for taxis and public transport services.

Additional studies have emphasized the importance of transportation system integration. For instance, there's a research called for better synchronization between airport trains, feeder buses, rental cars, and taxis to improve passenger mobility [10]. Passenger growth forecasts showing a GDP per capita elasticity of around 2.2–2.3 through 2030 [11], indicate that demand for land transportation such as taxis and rental cars will continue to rise. Mada [12] examined the willingness-to-pay for Adi Soemarmo Airport train access, finding that while taxis and private vehicles remain dominant, many passengers would switch to the train if fares and travel times were competitive. This potential shift suggests that strategic pricing and scheduling could divert a significant share of demand from road-based modes to rail.

Despite extensive research on airport transport in other regions, studies focusing specifically on taxi and chartered transportation demand at Ngurah Rai Airport are still limited. Therefore, the present study aims to fill this gap by analyzing the characteristics of airport users and available transportation services, estimating the probability of mode choice, and determining optimal fleet requirements, with particular attention to comfort as a key factor influencing passenger decisions.

2. THEORY AND METHODS

2.1 Theory Exponential Method

If passenger growth is constant or continuous every day, the exponential formula is used. The equation used in this method used in Gunawan's research on *Prediksi Pergerakan Pesawat dan Jumlah Penumpang di Bandara Betoambari Tahun 2028* [13] is :

$$P_n = P_0 \cdot e^{r \cdot n} \quad P_n = P_0 \cdot e^{r \cdot n} \quad (1)$$

1. Geometric Method

The geometric method applies the principle of compound interest (interest-based growth) to calculate the number of passengers. The formula used by Gunawan [13] is:

$$P_n = P_0(1 + r)^n \quad P_n = P_0(1 + r)^n \quad P_n = P_0(1 + r)^n \quad (2)$$

2. Arithmetic Method

The arithmetic method is used with the assumption that the number of passengers remains the same each year. The equation used by Gunawan [13] is :

$$P_n = P_0(1 + (r \cdot n)) \quad (3)$$

Description :

P_n = number of passengers after n years (persons)

P_0 = number of passengers in the initial year (persons)

e = exponential number with a value of 2,7182818.

r = passenger growth rate (%)

n = calculation period (years)

2.2 Research Methods

The study was conducted at I Gusti Ngurah Rai International Airport, focusing on the domestic arrival terminal. The subjects were arriving domestic passengers, as well as taxi and rental vehicle drivers at Ngurah Rai Airport. The sampling method used was simple random sampling for passengers and proportional stratified random sampling for taxi and rental vehicle drivers. The simple random sampling technique allows all arriving domestic passengers to have an equal probability of being selected, while the proportional stratified random sampling technique was used because the driver population has heterogeneous characteristics and the number of units in each company/cooperative varies.

To determine the number of passenger sample with a 9.15% error rate where the results obtained were 120 samples. The number of samples of taxi drivers and rental transportation was determined from 10% of the total fleet, where the results obtained were 64 samples from conventional transportation drivers and 16 samples from online transportation drivers. Primary data was obtained through questionnaires distributed directly by the surveyor to respondents, namely domestic arrival airplane passengers and airport transportation drivers. The technique used in distributing the questionnaire or survey was the stated preference technique, where respondents were asked for their responses if faced with a situation in real conditions.

The questionnaire consisted of two sections is the first section assessed respondents, socioeconomic and travel characteristics, and the second section, a stated preference section, assessed respondents' preferences for several changes in airport transportation attributes, measured using a Likert-based rating system. The attributes analyzed included cost (X1), travel time (X2), and comfort level (X3). Respondents could select five categories based on their preferences:

1. Definitely choose taxi/rented transportation
2. Probably choose taxi/rented transportation
3. Balanced choice
4. Probably choose other transportation

5. Definitely choose other transportation

The questionnaire used in this study was adapted from previous research, namely research [3].

After the survey results are obtained, the survey data is processed and then analyzed based on the respondents' socioeconomic and travel characteristics, presented in diagrams or graphs. Next, mode choice modeling is performed from the stated preference data using the binary difference logit method, resulting in the following probability equation:

$$P = \frac{1}{(1 + (\alpha + \beta(\Delta CTS)))} \quad (4)$$

Description :

P(B) = Probability of respondents choosing other transportation (*online*)

α, β = Model parameters

ΔCTS = combination of cost, time and comfort level differences

CTS = abbreviation for *Cost, Time, Service* (cost, time, service/comfort level)

Following this, an analysis of the characteristics of airport transportation was conducted based on the results of a survey of airport transportation drivers using descriptive methods. Next, passenger projections were conducted based on a growth factor model. The goal was to predict the need for taxi and charter transportation services to efficiently serve passengers. In the final stage, the number of taxis and charter transportation needed was calculated based on the projected number of arriving passengers, the probability of choosing charter and taxi transportation, and the number of variations in taxi use.

3. RESULTS AND DISCUSSION

Respondents Socioeconomic Characteristics

Socioeconomic characteristics were analyzed to determine the influence of gender, age, occupation, income, and vehicle ownership on mode of travel at Ngurah Rai Airport. The survey results regarding socioeconomic characteristics are presented in Table 1 below.

The survey involved 120 domestic passengers arriving at Ngurah Rai Airport, with 52% being male and 48% female. The survey results in Table 1 indicate that respondents who chose mode A (taxi/rented transportation) were predominantly female.

Table 1. Results of the Survey of Respondents Socioeconomic Characteristics

Characteristics	Category	Number of Respondents				Total Respondents	
		Mode A (Taxi/Rental)		Mode B (Other Transportation)			
Gender	Male	27	23 %	35	29 %	62	52 %
	Female	22	18%	36	30 %	58	48 %
Age	< 15 years	0	0 %	2	2 %	2	2 %
	15–25 years	23	19 %	39	33 %	62	52 %
	26–35 years	13	11 %	17	14 %	30	25 %
	36–45 years	1	1 %	6	5 %	7	6 %
	> 45 years	12	10 %	7	6 %	19	16 %
Occupation	Students	10	8 %	25	21 %	35	29 %
	PNS	11	9 %	14	12 %	25	21 %
	BUMN	17	14 %	25	21 %	42	35 %
	Military/Police	5	4 %	2	2 %	7	6 %
	Not Working/Retired/Other	6	5 %	9	8 %	15	13 %
Income per Month	< Rp 1,5 million	5	4 %	13	11 %	18	15 %
	Rp 1,5–3 million	6	5 %	21	18 %	27	23 %
	Rp 3–5 million	15	13 %	13	11 %	28	23 %

Characteristics	Category	Number of Respondents				Total Respondents	
		Mode A		Mode B			
		(Taxi/Rental)		(Other Transportation)			
Vehicle Ownership	Rp 5–8 million	8	7 %	9	8 %	17	14 %
	> Rp 8 million	15	13 %	15	13 %	30	25 %
	Motorcycle	51	43 %	15	13 %	66	55 %
	Car	11	9 %	2	2 %	13	11 %
	Motorcycle and Car	13	11 %	2	2 %	15	13 %
	There are no	18	15 %	8	7 %	26	22 %

Passengers aged 15-25 years, working as private/state-owned enterprise employees, have a middle to upper income (above Rp 3 million), and on average own a motorcycle. Meanwhile, respondents who chose B were mostly aged 15-25 years, on average came from students and private/state-owned enterprise employees, which is of interest to all groups, especially those with middle to lower incomes (below Rp 3 million), and most owned a motorcycle. Therefore, it can be concluded that vehicle ownership and income factors greatly influence the choice of transportation mode.

Respondent Travel Characteristics

Respondents trip characteristics were analyzed to determine the influence of trip purpose, number of travelers, and reasons for mode choice on travel choices at Ngurah Rai Airport. Based on the survey results of 120 respondents, 59% chose other transportation (online transportation and private vehicles), 24% chose conventional taxis, and the remaining 17% chose chartered transportation. However, in this study, transportation modes were categorized into two categories: taxis/chartered transportation (mode A) and other transportation (mode B). Therefore, 59% of respondents chose mode B and 41% chose mode A. This was done due to similarities in service characteristics and operational systems between taxis and chartered transportation. The survey results regarding trip characteristics are presented in Table 2.

The survey results in Table 2 indicate that vacations or recreation were the most common trip purpose (43%), followed by business or work (23%). Most passengers traveled alone (26%) or with one or two other people (32%). Mode A (taxi/rental) is more often chosen for business/work purposes, while mode B (other transportation) is predominantly used for leisure. The primary reasons for choosing a mode are convenience and mobility (28%), followed by time and speed (22%), and comfort (21%). Cost (12%) and safety (18%), while important, are not the most dominant factors.

Table 2. Survey Results of Respondents Travel Characteristics

Characteristics	Category	Number of Respondents				Total Respondents	
		Mode A (Taxi/Rental)		Mode B (Other Transportation)			
Purpose of Trip	Business/Work	10	8 %	18	15 %	28	23%
	College/School	4	3 %	11	9 %	15	13%
	Vacation/Recreation	23	19 %	29	24 %	52	43%
	Returning to Hometown	9	8 %	9	8 %	18	15%
	Other	3	3 %	4	3 %	7	6%
Number of Travelers	0 people	9	8 %	22	18 %	31	26%
	1–2 people	16	13 %	22	18 %	38	32%
	2–3 people	10	8 %	11	9 %	21	18%
	4–7 people	9	8 %	9	8 %	18	15%
	> 7 people	5	4 %	7	6 %	12	10%
Reasons for Choosing a Mode	Time and Speed	10	8 %	16	13 %	26	22%
	Safety and Security	11	9 %	10	8 %	21	18%

Characteristics	Category	Number of Respondents				Total Respondents	
		Mode (Taxi/Rental)	A	Mode (Other Transportation)	B		
	Convenience/Mobility	11	9 %	23	19 %	34	28%
	Comfort	11	9 %	14	12 %	25	21%
	Cost	6	5 %	8	7 %	14	12%

Characteristics of Ngurah Rai Airport Transportation

Public transportation at I Gusti Ngurah Rai Airport operates through collaborations with several transportation companies/cooperatives, including Ngurah Rai Taxi, Loh Jinawi Cooperative, Sapta Pesona Cooperative, Trans Tuban Cooperative, Bali Segara Cooperative, GrabCar, and GoCar. Based on PT Angkasa Pura I data (January–October 2024), the conventional fleet—Ngurah Rai Taxi (238 units), Loh Jinawi (150 units), Trans Tuban (125 units), Sapta Pesona (72 units), and Bali Segara (50 units)—recorded a total of 91,973 trips. With a total of 635 units, the average was 9,197 trips per month (~307 per day), equivalent to 0.48 trips per unit per day. Ngurah Rai Taxi averaged one trip per day per unit, while Trans Tuban averaged 0.16 trips, highlighting differences in operational intensity. Meanwhile, online services GrabCar and GoCar recorded 474,501 trips in the same period, or 47,450 trips per month (1,582 daily)—comprising 964 trips for GrabCar and 618 trips for GoCar—equivalent to about two trips per unit daily.

A survey of 80 drivers representing all services found that most had 6–10 years of experience (41%) and that private vehicle ownership was dominant (74%). Conventional drivers generally completed 2–3 trips daily, while online drivers and some conventional drivers completed more than four. Passenger loads per trip averaged 4–5 people, with travel distances ranging from 5 km to over 60 km, and average speeds of 60 km/h (maximum 80 km/h). Fare systems varied: 45% applied a zone tariff, 39% used app-based pricing, 13% used fixed rates, and 4% negotiated fares; taximeters were no longer used. Conventional fares ranged from Rp. 115,000 to Rp. 1,700,000, while online fares ranged from Rp. 108,500 to Rp. 1,400,000 depending on trip distance. Daily driver incomes ranged from Rp. 100,000 to Rp. 600,000, with monthly gross incomes between Rp. 3,000,000 and Rp. 15,000,000. Revenue-sharing systems differed by operator, including percentage-based deductions (e.g., 25% for Ngurah Rai Taxi), deposit/target schemes, and profit-sharing arrangements.

Transportation demand peaks during the holiday season (July–January), on weekends, and Fridays. Survey results showed 61% of respondents experienced difficulty finding passengers on weekdays, while 46% faced similar issues even on holidays. Drivers identified major operational challenges including the less competitive conventional operating systems, high operational costs, traffic congestion, and competition from illegal taxis. To enhance competitiveness, drivers suggested aligning fares with online services, reducing operational costs, increasing promotional activities at taxi counters, and implementing stricter enforcement against illegal taxis operating in the airport area.

Modeling Mode Choice

Prior to the modeling process, the survey data was processed using Microsoft Excel, then the passenger time and comfort values were calculated as the values of the variables to be modeled. The calculation of passenger time values began by projecting Bali Province's 2020 GRDP per capita from the [14]. Based on BPS Bali 2020's report: The 2015–2019 GRDP per capita data was used in this calculation to avoid fluctuations due to the COVID-19 pandemic and thus obtain an accurate growth rate. The average growth rate during that period was 4.63%. Using equation 5, the projected GRDP per capita for 2020 was Rp 39,022,176, compared to Rp 37,297,026 in 2019.

$$PDRB_{2020} = PDRB_{2019} \times [1 + r] \quad (5)$$

Where r is the average percentage of GRDP growth rate.

Referring to Law Number 13 of 2003, Article 77, Paragraph 1, annual working hours are assumed to be 40 hours/week multiplied by 50 weeks (in a year), which equals 2,080 hours, so the per capita income per hour is Rp 18,760.66. Taking 50% as the economic value during the trip, the passenger time value per hour becomes Rp 9,380.33. Thus, the passenger's time value is IDR 32,831.16/hour or IDR 547/minute.

Meanwhile, the comfort value is calculated based on respondents' willingness to pay (WTP) in the questionnaire, which measures the additional cost they are willing to pay for every 10% increase in travel comfort. This question was optional, with 64 respondents willing to answer: 48 chose IDR 5,000 and 16 chose IDR 10,000. The total willingness to pay reached IDR 400,000. Normalized to each 10% comfort level, each 10% increase in comfort is equivalent to IDR 6,250, resulting in a value of IDR 625 per minute. The next step was to calculate the survey data, which was calculated and processed using a binary logit equation of differences calibrated using linear regression. The results of the binary logit model calculation are presented in Table 3 below.

Table 3. Calculation of the Difference Binary Logit Model

Scenario	Difference in Attribute Values			(%) Mode A	(%) Mode B	ΔCTS	$\text{Log}\{ (1-P)/P \}$	$X_i Y_i$	X_i^2	$\exp(A+Bx_i)$	$P=1/(1+\exp(A+Bx_i))$
	ΔX_1 (Rp)	ΔX_2 (minute)	ΔX_3 (%)			X_i	Y_i				
1	-32000	0	0	28%	72%	-32000	-0,944	30222,77	1024000000	0,3070	0,765
2	0	0	0	43%	57%	0	-0,268	0,00	0	0,6167	0,619
3	10000	0	0	47%	54%	10000	-0,140	-1402,29	100000000	0,7668	0,566
4	20000	0	0	56%	44%	20000	0,248	4958,58	400000000	0,9536	0,512
5	-25000	0	0	29%	71%	-25000	-0,879	21981,24	625000000	0,3576	0,737
6	0	10	0	42%	58%	5470	-0,336	-1840,50	29920900	0,6947	0,590
7	0	0	0	30%	70%	0	-0,863	0,00	0	0,6167	0,619
8	0	10	0	41%	60%	5470	-0,385	-2104,17	29920900	0,6947	0,590
9	0	15	0	48%	52%	8205	-0,087	-711,55	67322025	0,7374	0,576
10	0	5	0	39%	62%	2735	-0,468	-1281,02	7480225	0,6545	0,604
11	0	0	0	32%	68%	0	-0,738	0,00	0	0,6167	0,619
12	0	0	10	39%	61%	6250	-0,433	-2708,26	39062500	0,7067	0,586
13	0	0	-10	32%	68%	-6250	-0,769	4807,08	39062500	0,5381	0,650
14	0	0	20	43%	57%	12500	-0,295	-3693,30	156250000	0,8098	0,553
15	0	0	-20	27%	73%	-12500	-1,003	12538,69	156250000	0,4696	0,680
Σ						-5120	-7,363	60767,26	2674269050		
Average						-341	-0,491				
$B = (N \cdot \Sigma X_i \cdot Y_i - (\Sigma X_i \cdot Y_i)^2) / (N \cdot \Sigma X_i^2 - (\Sigma X_i)^2)$										$-\beta$	-0,0000218
$A = (\text{Average } Y_i) - B (\text{Average } X_i)$										$-\alpha$	0,48344

Description :

ΔX_1 = cost difference between mode A and mode B

ΔX_2 = travel time difference between mode A and mode B

ΔX_3 = comfort level difference between mode A and mode B

$\Delta CTS = X_1 + X_2 + X_3$

$$\begin{aligned}
X_i &= \Delta CTS \text{ (Cost, Time, Service)} \\
&= \text{combination of cost, time, and comfort level differences} \\
Y_i &= \left(\frac{1-P(B)}{P(B)} \right) \\
\left(\frac{1-P(B)}{P(B)} \right) &= \text{mode choice probability} \\
A &= -\alpha = \text{model parameters} \\
B &= -\beta = \text{model parameters}
\end{aligned}$$

The results in Table 3 show that the coefficient values $\alpha = 0.483$ and $\beta = -0.0000218$. The coefficient of 0.483 indicates that the constant in the model has a positive influence on the probability of selecting mode B. Meanwhile, the coefficient value of -0.0000218 for the difference in cost, time, and comfort (ΔCTS) indicates that the difference in these variables between mode A and mode B only has a very small influence on the mode selection decision.

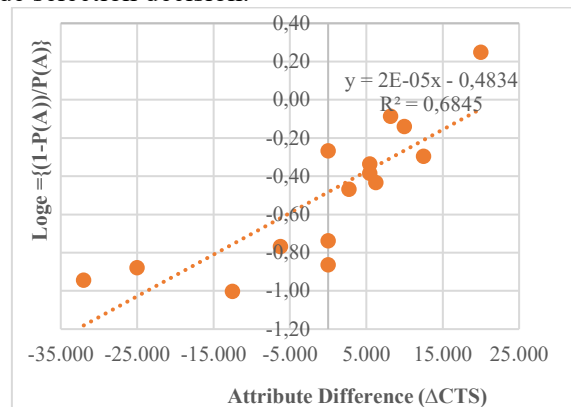


Figure 1. Graph of the Linear Regression Equation in the Difference Binary Logit Model

The result of the coefficient of determination (" R^2 ") in Figure 1 is 0.6845. This determination value indicates that the cost difference between mode A and mode B can only explain about 68.45% of the overall variation in the mode selection decision by users. Then the values of α and β are substituted into formula 4, then the probability of mode B (online transportation) can be formulated as follows.

$$P(B) = \frac{1}{1 + (0,483 - 0,00002180(\Delta CTS))} \quad (6)$$

at $\Delta CTS = 0$, we get

$$P(B) = \frac{1}{(1 + \exp(-0,483))} = 61,86 \%$$

$$P(A) = 1 - P(B) = 38,14 \%$$

Based on 2024 daily passenger arrival data from [15], It is known that there are 859 conventional transportation users and 4,442 online transportation users, for a total of 5,301 users. The basic probability of choosing conventional transportation is then calculated as follows:

Conventional Probability (PK)

$$= \frac{859}{5.301} \times 38,14\% = 6,18 \%$$

Because this probability (6.18%) differs from the results of the difference binary logit model (38.14%), further calibration is performed to adjust the probability of taxis and chartered vehicles. The calculation of the probability of choosing taxis and chartered vehicles is calculated based on the proportion of the conventional fleet multiplied by the PK value as follows.

$$\text{Taxi Probability} = \frac{\text{jumlah armada taksi}}{\text{total jumlah armada konvensional}} \times \% \text{ probabilitas konvensional}$$

$$= \frac{\text{number of taxi fleets}}{\text{total conventional fleet}} \times \% PK$$

$$= \frac{238}{635} \times 6,18 \% = 2,32 \%$$

$$\text{Probability of rent transportation} = \frac{\text{jumlah armada ang.sewa}}{\text{total jumlah armada konv.}} \times \% \text{probabilitas konvensional}$$

$$= \frac{\text{number of rental transport fleets}}{\text{total conventional fleet}} \times \% PK$$

$$= \frac{397}{635} \times 6,18 \% = 3,86 \%$$

Thus, after calibration, the probability of choosing a taxi is 2.32% and the probability of choosing rental transportation is 3.86%.

Projected Number of Domestic Arrival Passengers

Projected passenger arrivals form the basis for calculating the taxi and chartered transportation fleet needs analysis in this study. According to Table 4, the average growth in domestic passenger arrivals from 2014 to 2019 was 2.73%. The data used was not from the 2019-2024 period due to the COVID-19 pandemic, which caused a significant decline in passenger numbers. Therefore, pre-pandemic data was used.

Table 4. Domestic Passenger Arrival Growth

Year	Number of Passengers (people)	Growth Rate (%/th)
2014	4.489.048	-
2015	4.139.706	-7,78
2016	4.977.673	20,24
2017	4.928.000	-1,00
2018	5.531.125	12,24
2019	4.974.558	-10,06
Average		2,73

The projection of the number of domestic passenger arrivals at Ngurah Rai Airport is calculated using a geometric model (formula 2):

$$P_n = P_0(1 + r)^n$$

with $P_0 = 4,974,558$ people (number of passengers in 2019), $r = 2.73\%$ per year (average growth rate for the 2014-2019 period), and n = the difference in years after 2019. Thus, the projected number of passengers for 2025, 2030, and 2035 is presented in Table 5.

Table 5. Results of Projected Number of Passengers

Year	Projection P_n (people)
2025	5.846.281
2030	6.688.324
2035	7.651.647

Taxi and Chartered Transport Needs Analysis

The calculation of taxi and chartered transport fleet requirements at Ngurah Rai Airport's Domestic Terminal is carried out using the following steps:

1. Multiplying the average daily passenger arrivals (number of passengers per year divided by 365 days) by the probability of mode choice (taxi 2.32%; chartered transport 3.86%).
2. Then, dividing the resulting daily passenger usage by the average passenger capacity per trip (3.5 people) to obtain the total daily trips.

3. Finally, dividing the total daily trips by the ideal assumption of 4 trips per fleet per day.

Tables 6 and 7 show that in 2025, 27 taxis and 44 chartered transport units will be needed. In 2030, this will increase to 30 taxis and 51 chartered transport units, and in 2035, it will reach 35 taxis and 58 chartered transport units. However, these calculations are lower than the actual fleet size of 238 taxis and 397 chartered transport units. This shows that the number of operating fleets exceeds the number of taxi and rental transportation needs based on the level of user demand, so further evaluation is needed regarding adjusting the number of fleets to be more optimal.

Table 6. Taxi Needs Calculation Results

Year	Number of Passengers per Day	Taxi Users with P =2,32 % (people)	Number of Trips Per Day	Taxi needs with (Unit)
2025	16.017	371	106	27
2030	18.324	425	121	30
2035	20.963	486	139	35

Table 7. Rental Transportation Needs Calculation Results

Tahun Rencana	Number of Passengers per Day	Pengguna Angkutan Sewa dengan P =3,86 % (people)	Number of Trips Per Day	Rental transportation needs (Unit)
2025	16.017	619	177	44
2030	18.324	708	202	51
2035	20.963	810	231	58

CONCLUSIONS

Based on a survey of domestic arrival passengers at Ngurah Rai Airport, it shows that taxis and rental transportation are mostly chosen by passengers aged 26-45 years with middle to upper income, while online transportation is more preferred by the 15-25 year old age group who prioritize flexibility and affordable costs. The characteristics of airport transportation show that the average daily trip of conventional transportation is less than one trip per unit and online transportation is around two trips per unit, with the number of conventional transportation fleets being 635 units. The results of the survey of airport transportation drivers show that the majority of drivers have 6-10 years of experience, use a zone system, fixed price, online, or negotiation with the highest demand for services during the holiday season (July to January). The difference binary logit modeling, after being calibrated with actual data, shows that the probability of choosing a taxi is 2.32% and rental transportation is 3.86%, confirming the role of cost, travel time, and comfort in mode choice.

Based on the projection of the number of domestic arrival passengers and the results of binary logit modeling, the optimal need for a taxi fleet is 27 units (2025), 30 units (2030) and 35 units (2035), while the need for rental transportation is 44 units (2025), 51 units (2030) and 58 units (2035). The results of this calculation of needs are lower than the number of taxis and rental transportation available at I Gusti Ngurah Rai International Airport. Therefore, this study concludes that efforts to adjust the number of fleets to the level of passenger demand need to be considered to avoid fleet overload and improve operational efficiency. Suggestions for further research are to add convenience/mobility attributes to the mode choice survey variables and use a multinomial logit model to make the analysis results more representative.

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