Consumer Choice Decision for Airport Taxi at I Gusti Ngurah Rai International Airport

I Gusti Agung Gede Nanda Raditya[1], Prawira Fajarindra Belgiawan[2]

[1,2] School of Business and Management, Institut Teknologi Bandung, Indonesia

ABSTRACT: A taxi service provided by the I Gusti Ngurah Rai International Airport plays an important role in meeting the transportation needs of travelers, as it provides a convenient and effective means for people to go from the airport to their destination. However, in today's competitive industry, airport taxi service may find it difficult to attract and retain a growing number of passengers. This research aims to identify strategies that can be used by airport taxi service, where this research will focus on identifying significant attributes that influence passengers' decisions to use airport taxi services and determine the most effective strategies in an effort to increase the number of passengers. The research analysis was conducted using a discrete choice model approach to determine individual behavior. Multinomial logistic regression (MNL) model was used for the three alternative mode choices observed between Taxi, Minivan, and Grab. The model uses influential attributes such as waiting time, travel time, price, safety, convenience, capacity, and promotion. The research data was obtained quantitatively with data collection techniques using questionnaires with respondents spread across major cities in Indonesia. Based on the results of the analysis, it shows that the most significant attributes affecting taxi selection are safety, price, convenience, travel time, and capacity.

KEYWORDS: Airport Taxi, Consumer Choice Decision, Discrete Choice Model, Significant Attribute

I. INTRODUCTION

The transportation industry is critical in today society because it allows people and move from one place to another. Even though the transportation industry is very important, the COVID-19 pandemic has caused a number of issues in the last few years. In accordance with the statements made by the Ministry of Transportation of the Republic of Indonesia (2020), the government is implementing several strategies so that consumers can transport safely and healthily, and how transportation companies can survive and operate during this pandemic with a number of health protocol regulations, one of which is imposing passenger capacity restrictions [1]. The pandemic has negatively impacted the global air transportation sector, including Indonesia, where flight passengers have dropped significantly. This situation has a negative influence on overall airport ground transportation, which has a low percentage of passengers using the service. This research aims to address these challenges by examining the current condition of ground transportation at Bali International Airport, particularly taxis, and identifying potential solutions to improve its efficiency in increasing purchasing intention in order to provide recommendations for the development and implementation of effective transportation policies. Quoted from Mandiri Institute research that the tourism industry is starting to recover where the increase in tourism industry activity is due to high vaccination rates and loosening of mobility restrictions. In general, the level of public spending for the tourism sector remains solid amidst rising inflation and COVID-19 cases [2]. Bali is the most visited island in Indonesia and one of the most well-known destinations in the world. Spatially, the level of public spending in the Bali region, which is the main area of tourism, continues to increase. This indicates that the high number of people visiting Bali makes the index of visits to Bali the highest compared to other tourist areas in Indonesia.

The data that was released by the Bali Central Statistics Bureau (2022) revealed that the number of tourist visits in September 2022 reached 291,162, which is an increase of 5.24% compared to the number of visits in August 2022. This total is broken down as follows: 291,115 visitors were counted at the entrance to I Gusti Ngurah Rai International Airport, and 47 visitors from other countries were recorded at the entrance to the harbor. In the meantime, the Bureau of Statistics reported that there were 305,244 visits from tourists from other countries in October 2022. This represents a modest increase of approximately 4.84% when compared to the previous month. The main entrance to the airport was used by 305,152 of the country's visitors from other countries, while the harbor was used by the remaining 92. Airports can play a significant role in the economic development of a region, and can have a positive impact on a country's gross domestic product [3]. I Gusti Ngurah Rai International Airport, also known as Bali Airport,

is located in Badung, which is in the south of the island of Bali. Bali Airport serves as one of the primary entry points into Bali, also known as the "Paradise Island," which plays an important role in the tourism industry.

An airport that is supported by a reliable access system will operate successfully, and one of the factors that contribute to the success of an airport is the provision of transportation services that are integrated, safe, and run smoothly. When it comes to satisfying the ever-increasing demand for transportation services as a mode of transportation, airport transportation is an extremely important factor. Taxis represent a significant portion of the various modes of transportation that are available at airports. They provide passengers with a convenient and flexible way to get to and from the airport, and can be especially useful for travelers who are unfamiliar with the local area or who have a lot of luggage. Taxis can also be an important source of revenue for airports, as they often pay fees to pick up and drop off passengers at the airport. In general, taxis play an important part in the transportation system at airports, serving as a valuable accommodation to passengers and making significant contributions to the efficient operation of the airport [4]. The taxi service that is offered at the I Gusti Ngurah Rai airport must contend with a wide range of issues and challenges, some of which are internal to the company and others of which are external. Because of the intense competition among providers of transportation services, consumers have less of a desire to make purchases, which has led to a decrease in the number of passengers using airport taxis.

By examining the preferences of consumers and the total number of passengers who arrive at Bali Airport, the purpose of this research was to establish business and marketing strategy for the objective of increasing the number of passengers who use taxis at Bali Airport. Ground transport at Bali Airport provides passengers who arrive at the airport with an accessible access. There are over 200 vehicles that are used for the operation of taxis at the airport. Despite the fact that the number of passengers using Bali Airport reached 4,107,100 by September 2022, ground transport has only been able to secure approximately 587,032 passengers, which is only 14% of the total passengers for both domestic and international flights. Out of the total 14% of people who use ground transportation, taxis make up the smallest portion, contributing only 3% of the total. As the number of tourists who come to Bali continues to rise, there is a significant opportunity to increase the number of passengers who use taxis; however, there are very few initiatives being taken towards achieving this. The objective of this research is to gain a better understanding of Bali Airport ground transport, such as to ascertain in-depth understanding about the application of such tools in knowing consumer decision to use airport transportation service according to the given attributes and propose business strategy to increase the number of passenger on taxi provided by Bali Airport. This research focused on determining consumer preferences in relation to certain attributes of ground transportation that influence their choice. The primary focus of this research will be on consumers' intentions to purchase Bali Airport taxi services. It aims to develop an effective business strategy and action plan for the taxi service managed by the Commercial Marketing division of Bali Airport. The information about the number of visitors and passengers that was gathered from the company and used in this study is valid until the third quarter (Q3) of 2022.

II. LITERATURE REVIEW

Changes in behavior that result from experience are considered as knowledge. Knowledge is defined as information stored in consumers' memories that influences their evaluation of information translation, preferences, and purchasing behaviour [5]. Consumer behavior in purchasing a product is influenced by the consumer's knowledge of the product. Product knowledge is all of the understanding and information that consumers have about product characteristics such as product brands, product specifications, product types, product prices, and product classes. The understanding of the airport taxi by consumers will result in a tendency or purchase intention. Product knowledge is divided into four levels: product class, product form, brand, and model or feature [6]. Consumers will prefer products that offer quality, performance, or the best cutting-edge features [7]. Customer choice decision refers to the process by which a customer decides which product or service to buy, and it is primarily studied in the fields of marketing and economics. This process typically entails thinking about a number of different alternatives, weighing the advantages and disadvantages of each, and ultimately selecting the alternative that most closely satisfies the customer's requirements and preferences. Consumers' preferences are influenced by their satisfaction with available transport modes and their importance to consumers. It is clear that individual perception and aptitude for different modes of transportation vary based on socioeconomic status and the intangible characteristics of modes that cannot be directly observed or measured [8]. Individual's perceptions and unpredicted circumstances can also influence purchase intention [9]. The higher the purchase intention, the more a customer wants to buy a product [10]. According Harvard Business School (2020), the maximum cost that a consumer is prepared to pay for a good

or service is referred to as their "willingness to pay." In many circumstances, it takes the form of a price range representation. Although potential customer may be willing to pay a price that is lower than this threshold, it is essential to keep in mind that, in the vast majority of instances, they will not pay a price that is higher [11]. The willingness to pay isn't just impacted by price, but also by an individual's tastes, preferences, and, ultimately, their perceptions of quality [12].

Referring back to the earlier study that was conducted on the mode choice model for public transport with categorized latent variables (2017), the findings showed that latent variable sets, such as service environment and waiting feelings, have a significant impact on the behavior of choosing a mode of transportation. The feeling of waiting incorporates both the anticipated arrival time of the incoming bus as well as the actual amount of time spent waiting [8]. The hypothesis can be formulated as follow: **H1.** Waiting time has a significant impact towards consumer choice decision of ground transport Previous research on the mode choice model of transport users, specifically those who use the LRT in Jakarta, found that based on how each person responded to different travel scenarios, it's clear that price, travel time, and walking time are the most important factors for respondents [13]. Therefore the hypothesis can be formulated:

H2. Travel time has a significant impact towards consumer choice decision of ground transport

Demand for a certain transportation option was influenced by cost [14]. Public transportation and private vehicles are two crucial cost considerations that influence the choice of mode of transportation [15]. The cost of travel is made up of the total direct fares charged for each journey and the value that customers place on their travel time [16]. Therefore, the overall cost of travel is made up of fees and the amount of time spent on a certain trip. Retention is difficult because most taxi users today are sophisticated and price conscious. Taxi fares and other relevant travel-related costs have a significant impact on consumer behavior. Therefore, the following hypothesis can be formulated:

H3. Price has a significant impact towards consumer choice decision of ground transport

On a previous study on the characteristics of urban commuting behavior, a number of factors can influence decisions regarding transportation, particularly shared taxis for women. This is especially true in developing countries like Iran, which have a culture that is patriarchal [17]. Gardner et al. (2017) conducted a literature review on the topics of women's fear of crime and sexual harassment. They also discussed the findings of the literature review on women's perceptions of their own safety while using public transportation [18]. The hypothesis can be formulated:

H4. Safety has a significant impact towards consumer choice decision of ground transport

Excellent service quality significantly affected higher customer satisfaction. The degree of service, the condition of the vehicles, comfort, accessibility to customer care, polite attitude of the driver, and fair fare payment were given priority by these elements. Users' perceptions of service quality vary significantly depending on both journey constraints such as payment method, method of accessing the service, and journey time, as well as socioeconomic characteristics such as ownership of a driving license, reason for trip, or age [19]. In order to foster an attitude that fosters better customer engagement and communication, driver must uphold a better attitude toward customer, one of them through vehicle maintenance [20]. Thus, hypotheses are posed as follows:

H5. Convenience has a significant impact towards consumer choice decision of ground transport

H6. Capacity has a significant impact towards consumer choice decision of ground transport

Promotion entails the process of creating and developing communications that are persuading regarding an offer [7]. When we talk about promotion, we are referring to the careful planning of activities that are used to communicate products and services. Some examples of these activities include brochures, billboards, and newspaper advertisements. Riskarini and Ardianto (2021) conducted a study on how promotion can affect the customer trust. The findings of the study showed that the higher the quality of the promotion that customers felt was being provided by the online motorcycle taxi company, the higher the level of customer trust. On the other hand, if the quality of the promotion is low, the level of customer trust will also be low [21]. Therefore the hypothesis can be posed:

H7. Promotion has a significant impact towards consumer choice decision of ground transport
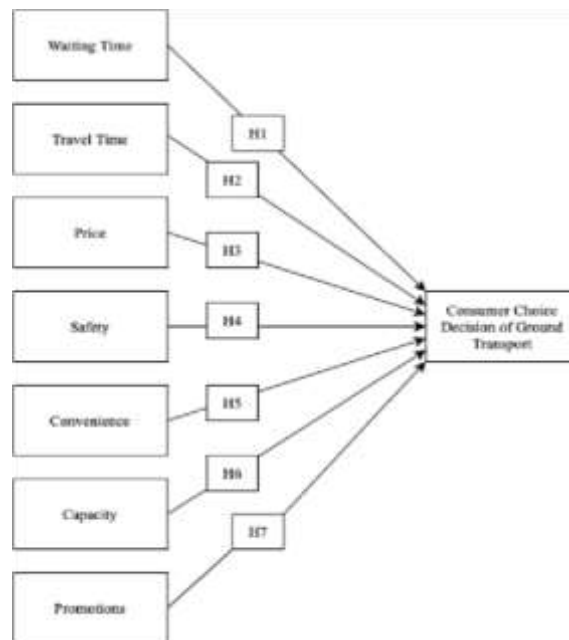
Figure 1. Conceptual Framework

III. METHODOLOGY

This research used Ngene software to develop experimental designs for specified or stated choice questionnaires. The minimum number of rows required for the Ngene syntax is calculated by dividing the parameters by the alternatives minus one, which in this case is five. The author creates 28 scenarios based on the output of the Ngene software, which are divided into 4 blocks with 7 questions for task choice. The selection of one alternative by a decision maker from a limited set of options that are mutually exclusive and collectively exhaustive can be analyzed and predicted with the help of discrete choice models [22]. The utility maximization rule asserts that an individual picks the alternative with the greatest utility. Under the observed choice conditions, the individual is certain to choose the highest-ranked alternative. Deterministic utility models predict choice as shown in Eq.1.

$$U_{in} = V_{in} + \varepsilon_{in} \qquad \text{(Eq.1)}$$

where U_{in} is the true utility of the alternative i to the decision maker or person n, V_{in} is the deterministic or observable portion of the utility estimated by the analyst, and ε_{in} is the error or the portion of the utility unknown to the analyst. The utility function for three alternatives can be seen in Eq.2.

$$V_{in} = \alpha_{in} + \beta_{WTi}WT_{in} + \beta_{TTi}TT_{in} + \beta_{PRi}PR_{in} + \beta_{Si}S_{in} + \beta_{Ci}C_{in} + \beta_{CAi}CA_{in} + \beta_{PMi}PM_{in} \qquad \text{(Eq.2)}$$

where α_{in} represent alternative specific constant for person (n) chooses mask (i). β_k is the parameter that defines the direction and importance of attribute (k) on the utility of an alternative i. Attributes (k) in this case are waiting time (WT), travel time (TT), price (PR), safety (S), convenience (C), and promotion (PM). In this case, there is three Alternative (ASC) that consist of the Taxi (ASC1), Minivan (ASC2), and Grab (ASC3). ASC1 as a reference to be compared to ASC2 and ASC3, so ASC1 results is not be estimated. The demand elasticity test predicts how changing this variable will affect an individual's choice and alternative market share. Demand elasticity quantifies the sensitivity of demand changes to changes in a determining attribute [23]. Multinomial Logistic Regression significance levels are used to test demand elasticity using Eq. 3.

$$E_{inX_{kin}} = \frac{\partial P_{in}}{\partial X_{kin}} \cdot \frac{X_{kin}}{P_{in}} = (1 - P_{in}) \cdot \beta_{ki} \cdot X_{kin} \qquad \text{(Eq.3)}$$

Where $E_{inX_{kin}}$ is elasticities of attribute (k) of alternative (i) for person (n). The equation shows that attribute preference determines elasticity number.

If the model includes price variable, then it is possible to perform an analysis on the relationship that exists between any variable and money [24]. This is a reflection of the decision maker's willingness to pay for a modification of another variable in the model. Let C_{in} represent the cost of alternative i for person n and x_{ink} represent an additional model variable. The value of the utility function

is given by $V_{in}(c_{in}, x_{ink})$. Consider the scenario in which the variable of interest has the value $x_{ink} + \delta_{ink}^x$. It can be represented by δ_{in}^c, the additional cost required to get the same utility using Eq. 4.

$$V_{in}(c_{in} + \delta_{in}^c, x_{ink} + \delta_{ink}^x) = V_{in}(c_{in}, x_{ink}) \qquad \text{(Eq.4)}$$

The increased cost per unit of x defines the willingness to pay for an increase in x_{ink} value.

$$\delta_{in}^c / \delta_{ink}^x \qquad \text{(Eq.5)}$$

Therefore, the willingness to pay is equal to

$$\frac{\delta_{in}^c}{\delta_{ink}^x} = \frac{(\partial V_{in} / \partial x_{ink})(c_{in}, x_{ink})}{(\partial V_{in} / \partial c_{in})(c_{in}, x_{ink})} \qquad \text{(Eq.6)}$$

IV. RESULT AND DISCUSSION

The parameters are estimated using PandasBiogeme [24]. The author selected the single item that met all requirements where robust t-test value should be greater than 1.96 or robust p-value should be less than 0.05 [25], as shown in Table I.

Table I. Significant Attributes

Attribute	Rob. t-test
Taxi safety	7.39
Taxi convenience	4.7
Taxi capacity	2.62
Taxi travel time	-4.04
Taxi price	-7.09
Minivan safety	7.59
Minivan convenience	3.04
Minivan travel time	-2.35
Minivan promotion	-2.97
Minivan capacity	-2.98
Minivan price	-6.25
Grab safety	5.21
Grab convenience	2.59
Grab travel time	-3.05
Grab price	-5.06

We can see from Table I that there are various attributes that are classified as significant, and the interpretation of these attributes are as follows:

A. Safety

There is significant value in the safety attribute of all three alternatives. The greater the level of safety, the higher the perceived level of safety, and the greater the number of people who feel safe, the greater the number of people who will use taxis, minivans, and Grab. It means that the level of safety provided by the service has an impact on the consumers' ability to make a decision regarding their preferred mode of transportation.

B. Convenience

The results of all available alternatives are significantly affected by convenience. The more the convenience offered by taxis, minivans, and Grab, the greater the number of customers who will use them. It can be said that the level of convenience provided by those three alternatives have an impact on consumers' ability to make decision regarding their mode of transportation. It is possible to say that the degree of convenience offered by each of these three options has a positive effect on the ability of customers to choose their mode of transportation.

C. Capacity

According to the findings, the capacity feature of minivans demonstrates a statistically significant negative value. This means that the more the capacity of a minivan, the less likely that consumers will make a purchase. Whereas the results of the capacity attribute

of taxis indicate a positive significant value, which means that when more capacity is provided, it results in an increase in the number of people who would use taxis.

D. Travel Time

Travel time has a negative significant impact on the performance of all available alternatives. The longer the trip time, the less likely consumers are to utilize taxi, minivan, and Grab. It may be concluded that the travel time delivered by each alternative has a positive impact on consumers' mode of transportation choices.

E. Price

According to the results, the price attribute generates the same negative significant value. This indicates that the higher the price, the less likely people are to utilize taxis, minivans, and Grab. In other words, when consumers choose a mode of transportation, price has a positive influence on their decision-making process.

F.   Promotion

The results indicate that the promotion attribute provides a significant negative value for only one alternative, specifically minivans. This suggests that the greater the promotion, the less likely consumers are to use minivans. In other words, promotion has a positive effect on consumers' mode of transportation choices.

After determining which attributes have significant values, the author conducts a second simulation to determine the elasticity of their demand. Table II provides the simulation findings. If the demand elasticity is greater than 1, the demand is elastic. Conversely, if the elasticity of demand is less than 1, this is referred to as inelastically.

Table II. Attribute Demand Elasticity Result

Attribute	Elasticity	Inelastic/Elastic
Grab convenience	0.479041	Inelastic
Grab price	-1.153541	Elastic
Grab safety	0.514712	Inelastic
Grab travel time	-0.238996	Inelastic
Minivan capacity	-1.418417	Elastic
Minivan convenience	0.556428	Inelastic
Minivan price	-1.389840	Elastic
Minivan promotion	-0.418052	Inelastic
Taxi capacity	1.041115	Elastic
Taxi convenience	0.916815	Inelastic
Taxi price	-1.302776	Elastic
Taxi safety	0.886627	Inelastic
Taxi travel time	-0.362701	Inelastic

There are five significant attributes that have an elastic in demand, and they come from the MNL processing. These attributes are as follows:

A. Price

A negative value for the elasticity of demand was generated as a result of the price attribute of all three alternatives. It is possible to interpret this as meaning that if there is a 10% increase in the price of taxis, minivans, and grab cars, this will result in a 13% reduction in the number of people who choose to take taxis. There has been an approximate 14% decrease in the number of persons choosing for the minivan, while there has been an approximate 11% decrease in the number of people choosing the grab.

B. Capacity

The elasticity value for the capacity attribute of taxi services is positive. If there is a 10% increase in the capacity of taxis, then this indicates that there may be an equivalent 10% increase in the demand for taxis. In the meantime, it caused a negative elasticity value to be generated for the capacity of the minivan. This value indicates that the number of people who take minivan will decrease by 14% if there is a 10% increase in the capacity of minivan.

In addition, PandasBiogeme has the capability of calculating Willingness to Pay (WTP) for any attribute. Here, the rise in the price of a loss or increase in an attribute is weighed against how much of a price we are willing to pay for that change. The outcome of the calculations regarding willingness to pay that were performed by PandasBiogeme presented in Table III.

Table III. Willingness to Pay Result

Attribute	Taxi	Minivan	Grab
Convenience	-27.970300	-20.379750	-17.596030
Safety	-30.940590	-50.632910	-22.304830
Travel Time	1.621287	1.190830	-5.876350
Capacity	-54.207920	68.73418	-28.092209
Promotion	-1.009901	16.83544	-2.552664
Waiting Time	3.007426	3.696203	3.618340

A. Taxi

When taxi convenience decreases by one level, individuals will be less willing to pay or spend IDR27,970. When taxi safety decreases by one level, customers will be less inclined to pay or spend IDR30,941. People will be willing to pay or spend IDR 1,621 when there is a one-level rise in taxi travel time that makes it faster. When the capacity of a taxi decreases by one level, consumers will be less likely to pay or spend IDR54,208. When taxi promotion is reduced by one level, customers will be less willing to pay or spend IDR1,010. People will be willing to pay or spend IDR3,007 when taxi waiting times decrease by one level.

B. Minivan

When the convenience of minivans decreases by one level, individuals will be less likely to pay or spend IDR20,380. People will be less likely to pay or spend IDR50,633 if the safety level of minivans decreases by one level. People will be willing to pay or spend IDR1,191 for a one-level or one-minute increase in the speed of minivan travel. When the capacity of a minivan increases by one level for one passenger, consumers will be willing to pay or spend IDR68,734. People will be willing to pay or spend IDR16,835 when there is an increase of one level in minivan marketing. When waiting times for minivans decrease by one level, individuals will be willing to pay or spend IDR3,696.

C. Grab

When there is a one-level decrease in grab convenience, people will be less willing to pay or spend IDR17,596. When there is a one-level decrease in grab safety, people will be less willing to pay or spend IDR22,035. When there is a one-level decrease or one minute in grab travel time, people will be less willing to pay or spend IDR5,876. When there is a one-level decrease of one person in grab capacity, people will be less willing to pay or spend IDR28,092. When there is a one-level decrease in grab promotion, people will be less willing to pay or spend IDR2,553. When there is a one-level increase in grab waiting time become shorter, people will be willing to pay or spend IDR3,618.

V. CONCLUSION

Based on the data and analysis that has been carried out in Chapter IV, the author can draw several conclusions to address the research questions of this research. From this research, here are some things that the author found:

1. The significant attributes that play a role in the decision-making process of customers when selecting taxi service are safety, convenience, capacity, travel time, and price
2. Customers' minivan service selection decisions are significantly impacted by safety, convenience, travel time, promotion, capacity, and price.
3. Safety, convenience, travel time, and price have a significant influence in the decision-making process of customers when picking a grab service.

On the basis of the attributes that significantly influence the decision to use a taxi at Bali Airport, it follows that when these significant attributes are executed appropriately, customer purchase intent increases. By examining the significant attributes, it is possible to considerably increase the customer's purchase intention. Among the strategies that can be implemented are the creation of multiple training programs for drivers, develop a strong pricing strategy, the utilization of current technology, and the development of a new booking and payment method system. According to the calculation performed on demand elasticity using PandasBiogeme, there are only two elastic attributes, consisting of price and capacity. In contrast, the remaining taxi attributes are inelastic, meaning that a 10% change in the attributes affect less than 10% the customer's choice.

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