The Tariff System of Informal Public Transportation in Urban Areas

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Abstract: Ojek transportation or motorcycle taxi represents the alternative public transportation dominating Mamuju city. This research is aimed to investigate the characteristics of ojek transportation, analyse the tariff determining factors, tariff determination based on the vehicle operational cost (VOC), Ability to pay (ATP) and willingness to pay (WTP). The research used the data obtained form the Transportation Ministry, house budget hold and perception method. The collected data were analyzed using the multiple linear regression. The research result indicated that VOC is Rp 1,224,593.28/year, tariff based on ATP is Rp. 4.357, 566/trip and tariff based on WTP is Rp. 4011, 909/trip. The tariff will increase or decrease in line with changes of X variables which affect.

Keywords: ATP, Ojek Transportation, Tariff, VOC, WTP

I. INTRODUCTION

Public transportation in various modes is one of the supporting facilities in carrying out all activities of movement of goods and people from one place to another. In Indonesia there are several alternative modes of public transportation, one of which is ojek transportation. Ojek transportation is an alternative public transport but does not have route legalization from the authorized agency [1].However, ojektransportation can be considered as a tool of public transport because it is a means of transporting people by public transportation [2]. These types of modes are operating in many cities of Mamuju, due to lack of public transport like the conventional microbus (pete-pete) that serve this city. Microbuses only serve sub-districts outside the city Mamuju. In addition, this ojek mode of transportation has been introduced in metropolitans of Indonesia such as Jakarta and Surabaya and also regarded as Indonesian's future sustainable transportation [3].
The geographical condition of Mamuju city in the form of hills also causes other alternative public transportation such as public transport rickshaw to be less than the maximum in serving passengers in this town till ojek transport motorbike has considerable contribution in the Mamuju city's largest travel perpetrators. Ojek can easily be found in cities in Indonesia at places such as public transport modes turn of the terminal, subterminal, stations, airports and major roads into the residential areas of the stops of public transport.

Ojek is also found in border areas between the core city and the surrounding buffer cities, especially near residential development areas. Besides that, ojek is also easily found in places of commercial activities such as markets, shops, and shopping centers as well as places of public facilities such as offices and hospitals. According to PAU UGM Engineering Sciences (2009), the operational characteristics of ojek transportation are a maximum speed of 60 km / h, an average speed of 40 km / h, an ideal range of 5 km and an average range of 3 km [4]. In a research conducted by Edison (2011) in Yogyakarta, it was found that despite the growing quantity of ojek, it is not accompanied by the proper and appropriate tariff setting [5].Ojek transport fare ranges between Rp 5,000 – Rp 6,000 for 2-3 km and Rp 5,000-Rp 10,000 for 3-7 km [6] Public transport fares are costs that must be paid by users of public transport services on the facility received at the prices issued by the service provider that provides the public transport services [7]. The tariffs imposed are intended to encourage the use of infrastructure and means of transport optimally by considering the relevant track [8]. The increase in subsidized oil fuel and spare parts prices has an impact on public transport activities, especially urban transport which is a means of transporting small communities. The operational costs of public transport will increase, of course the public transport entrepreneurs will try to overcome this increment by raising the existing tariffs. As for the community, the users will have objection if the tariff is raised and not according to his/her affordability. To overcome this problem it is necessary to conduct a comprehensive study of the determination of public transport tariffs that are mutually beneficial for both parties [9]. The prevailing rates are also sometimes not adjusted to Ability To Pay (ATP) and Willingness To Pay (WTP) of service users since sometimes tariffs charged to service users cannot be accepted for various reasons. According to Panjaitan&Surbakti (2007), the factors that influence tariff formation based on the WTP especially the toll tariffs are gender, age, income and frequency of toll road usage [10]. For this reason, it is necessary to examine the factors that influence the formation of tariffs based on ATP and WTP, especially ojek tariffs so that users of ojek transportation services are not increasingly burdened if there is no proper tariff determination of the ojek service, where the tariff is most affordable by users, but still can provide reasonable benefits for operators, so that operators as service providers can maintain the continuity of their business. In line with this isssu, this study aimed to analyze the tariff system of ojek (motorcycle taxi) transportation in Mamuju City.

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II. METHODOLOGY

This research was conducted in Mamuju and Simboro Subdistricts, Mamuju City, West Sulawesi. The type of research used is descriptive qualitative and quantitative with the method of using surveys in the field and previous data derived from previous research and related agencies.

The population is all the ojek drivers and ojek users who live in Mamuju City. The sample of ojek drivers as many as 102 people with the number of ojek retrieved in clusters at 13 ojek bases and a sample of users selected as many as 255 people whom are selected by accidental sampling.

Primary data collection was done using a questionnaire. Before conducting the primary data collection using a questionnaire, a preliminary survey was conducted to observe the existence of an ojek base. The data collected in the questionnaire are data regarding vehicle operating costs (VOC), characteristics of transport trips and ojek users. Secondary data is supporting data to meet the data requirements in the study. Secondary data needed are the population of Mamuju and Simboro Districts in 2012-2016 [11].

Data on the characteristics of ojek transport trips are used to calculate vehicle operating costs (VOC) using the Department of Transportation method. The characteristics of ojek users are used to calculate ATP and WTP of users based on the household budget method and perception method. The VOC, ATP and WTP values obtained were processed using SPSS version 22 in order to analyze the relationship between vehicle operating costs VOC, ATP and WTP among ojek users by applying multiple linear regression analysis. Multiple linear regression is an empirical approach [12].

III. RESULTS AND DISCUSSION

Characteristics of the sample

Table 1 shows that the characteristics of a ojek transport in Mamuju city is dominated by a ojek driver at the age of 30-35 years as many as 39 people (38.24%) and the education level of the majority of the ojek drivers, 48 people (47.06%) are up to junior high school. vehicle brand that is widely used is Honda as many as 74 pieces (72.55%), with 97(95.10%) pieces of the vehicle used manual engines. Most of these ojek driver (54.9%) of them start operating between 06.30-07.00 Western Indonesia Time (WIB) while 40 people (39.22%) finished operating at 16.30-17.00. in terms of distance, 60 ojek (58.82%) have travelled the longest mileage of 1-2 Km and the most travel time is 5-10 minutes per trip as recorded by 64 ojek (62.75%). The average passenger rate per day is Rp. 5,000 with as many as 93 trips (91.18%).

Table 2 shows the characteristics of ojek users in Mamuju City. Based on the table, majority of the users of this mode of transportation are women as many as 147 people (57.65) and out of this, 77 of them are housewives. 45.10% of the oje users were educated till high school. The age of the majority (112) of users is within 20-30 years old. 119 people (46.675) of the ojek users stated that their purpose of travel is to return. Almost half of the respondents(49.02%) took ojek from their house itself. Although 125 users took ojek from their house to their destination but only 118 of them

used ojek to return home. Majority of users as many as 179 people (70.20%) had easy access to ojek. In addition, 149 of the users agreed that it was convenient for them to get ojek to their destination. 129 people (50.59%) travelled the farthest using ojek for 1-2 km while the typical travel duration usually is 5-10 minutes as taken by 142 people (55.69%). 171 of the users (67.06%) stated that the cost per trip is about Rp. 5,000 and 67 of the users have the highest monthly user income of Rp. 500,000.

Table.1 Characteristics of ojek transportation

No	Characteristics	Research results	Total
1	Age	30-35 years	39 people
2	Level of education	Middle school	40 people
3	Vehicle brand	Honda Manual	74
4	Type of vehicle engine		97
5	Mileage	1-2 Km	60
6	Traveling time	5-10 minutes	93

Table. 2 Characteristics of motorcycle taxi users

No	Characteristics	Research result	Total(ppl)
1	Gender	Woman	147
2	Type of work	Housewife	77
3	Level of education	High school	115
4	Age	20-30 years	112
5	Travel Purpose	return	119
6	Origin of travel	home	125
7	Travel destination	home	118
8	Accessibility of ojek transportation	easy	179
9	Accessibility of ojek transportation to the destination	easy	149
10	Mileage	1-2 Km	129
11	Traveling time	5-10 minutes	142
12	One-time fare	Rp. 5,000	171

Multiple linear regression analysis

Table 3 shows that the coefficient of determination (R^2) = 90.3% VOC influenced by the vehicle's engine, fuel consumption cost, the cost of oil consumption, minor servicing costs, major servicing cost, the price of vehicles and vehicle registration fees. Table 4 shows the coefficient of determination (R^2) ATP = 89.6% influenced by the type of work, mileage, travel time, travel frequency in a month using ojek, transportation expenses the average monthly besides ojek transport and transport expenses monthly average to ojek transport. While Table 5 shows the coefficient of determination (R^2) WTP = 88.10% is subjectied to trip purpose, mileage, travel time, travel frequency in a month using ojek, monthly income, monthly expenses besides transportation expenses, transportation expenses monthly average besides the ojek transportation expenses monthly average for the ojek. These variables have significant influence on the VOC, the ATP and WTP (p <0.005).

This study shows that the results of multiple linear regression VOC obtained if no variables that affect (all variables is 0) then the VOC rate (Y) is equal to a value of Rp 1,224,593.28 / year. For each additional 1 unit type of vehicle engines (X_4) will reduce tariffs VOC (Y) Rp 12133.032 / year, on the condition of other variables held constant. For each additional fuel usage of 1 rupiah per year (X_9) will add VOC fare (Y) Rp 1 / year, with the condition of other variables held constant. Each additional of oil consumption 1 rupiah per year (X_{11}) will add VOC fare (Y) of Rp 0.872 / year, as long as the condition of other variables were fixed. Each additional minor service charge of 1 rupiah per year (X_{12}) will add VOC fare (Y) of Rp 0.734 / year, on the condition of other variables held constant. Each additional of major servicing costs of 1 rupiah per year (X_{13}) will add VOC fare (Y) of Rp 1,037 / year, on the condition of other variables held constant. Each additional 1 rupiah for the price of the vehicle (X_{15}) will add VOC fare (Y) of Rp 0.160 / year, on the condition of other variables held constant.

Table. 3 Multiple linear regression results from factors that influence VOC

Model	B	Sig
Constant	1224593,28	0,000
X_9	1	0,000
X_{15}	0,16	0,000
X_{11}	0,872	0,000
X_{13}	1,037	0,000
X_{16}	0,998	0,000
X_{12}	0,734	0,000
X_4	-12133,032	0,000
$R^2 = 0,903$		

Table.4 Multiple linear regression results from factors that influence ATP

Model	B	Sig
Constant	4357,566	0,000
X_{10}	1877,836	0,000
X_{11}	-270,193	0,000
X_2	-98,088	0,013
X_{16}	0,170	0,000
X_{12}	82,191	0,000
X_{15}	0,003	0,000
$R^2 = 0,896$		

Table. 5 Multiple linear regression results from factors that affect the WTP

Model	B	Sig
Constant	4011,909	0,000
X_7	-102,177	0,006
X_{10}	1936,390	0,000
X_{11}	-305,354	0,000
X_{12}	74,417	0,000
X13	0,001	0,022
X14	-0,002	0,006
X15	0,005	0,003
X16	0,17	0,000
$R^2 = 0,881$		

Each additional annual vehicle registration fees of 1 rupiah (X_{16}) will add VOC fare (Y) of Rp 0.998 / year, on the condition of other variables held constant. Based on the results of multiple linear regression of ATP, it was found that when there are no variables that affect (all variables is 0), the value of ATP fare (Y) is equal to a value of Rp 4357.566 / trip. Each addition of 1 unit of the type of work (X_2) will increase the rate of ATP (Y) of Rp 82 191 / trip, on the condition of other variables held constant. Whereby the lowest dummy number (1) is civil servants and the highest (8) are farmers. Each additional 1 km distance (X_{10}) will increase the rate of ATP (Y) Rp 1877.36 / trip, on the condition of other variables held constant. Each additional 1 minute (X_{11}) will reduce the rate of ATP (Y) Rp 270.193 / trip, on the condition of other variables held constant. Each additional 1 trip frequency using ojek per month (X_{12}) will increase the rate of ATP (Y) of Rp 82.191 / trip, on the condition of other variables held constant. Each additional 1 rupiah average spending per month besides ojek transportation (X_{15}) will increase the rate of ATP (Y) of Rp 0,003 / trip, on the condition of other variables held constant. Each additional 1 rupiah average spending per month using ojek transport (X_{16}) will increase the rate of ATP (Y) of Rp 0.173 / trip, on the condition of other variables held constant. Based on the results of multiple linear regression WTP obtained, if no variables that affect (all variables is 0) then the value of WTP fare (Y) is equal to a value of Rp 4011.909 / trip. Each additional 1 travel destination (X_7) will add WTP fare (Y) of Rp 102 177 / trip, on the condition of other variables held constant.

Each additional 1 km distance (X_{10}) will add WTP fare (Y) Rp 1936.390 / trip, on the condition of other variables held constant. Each additional 1 minute (X_{11}) will reduce tariffs WTP (Y) Rp 305.354 / trip, on the condition of other variables held constant.

Each additional 1 trip frequency using ojek per month (X_{12}) will add WTP fare (Y) of Rp 74.417 / trip, on the condition of other variables held constant. Each additional 1 rupiah monthly income (X_{13}) will add WTP fare (Y) of Rp 0,001 / trip, on the condition of other variables held constant. Each additional 1 rupiah spending beyond transportation expenses per month (X_{14}) will reduce tariffs WTP (Y) of Rp 0,002 / trip, on the condition of other variables held constant. Each additional 1 rupiah average spending per month outside transport transportation motorcycle (X_{15}) will increase the rate of ATP (Y) of Rp 0,005 / trip, on the condition of other variables held constant. Each additional 1 rupiah average spending per month using the transport motorcycles (X_{16}) will add WTP fare (Y) of Rp 0.17 / trip, on the condition of other variables held constant.

IV. CONCLUSION

The rate based on vehicle operating costs (VOC) is Rp 1,224,593.28 / year, the rate based on the ability to pay (ATP) is Rp 4357.566 / trip, and tariff based on willingness to pay (WTP) is Rp 4011.909 /trip. All three rates will be increased or decreased in line with changes in the variables X affecting.

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