STUDY OF ECONOMIC CLASS PASSENGER RATES FOR PEOPLE TRANSPORTATION TRAVEL IN NORTH KALIMANTAN PROVINCE

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ABSTRACT

Establishing North Kalimantan as the 34th province in Indonesia with the provincial capital located in Tanjung Selor, Bulungan Regency, has influenced the pattern of transportation used by society between regions. Previously, most people traveled to Tarakan city by sea transportation because Tarakan is an island city and has a strategic role regionally as a National Activity Center (PKN) in North Kalimantan. Since January 2020, the North Kalimantan Transportation Service has permitted public transportation routes to Perum DAMRI Tanjung Selor Branch to serve three round-trips (pp) routes, namely: Tanjung Selor-Malinau (TGS-MLN), Tanjung Selor-Tana Tidung (TJS-KTT), and Malinau-Salang (MLN-SLG). This study aims to find the ideal fare for public transportation for people on the route, taking into account the Vehicle Operating Cost (VOC), the ability and willingness to pay (ATP and WTP) of DAMRI Bus users, as well as the user's willingness to pay. Pay more or WTP from Contingency Valuation (WTP-CV) if you get better service during the trip. The current single-trip DAMRI Bus fare is IDR 150,000.00 for the TJS-MLN/MLN-TJS route, the TJS-KTT/KTT-TJS route is IDR 100,000.00, and for the MLN-SLG/SLG-MLN route of IDR 50,000.00. The results of the study based on the VOC obtained one-time trip rates for each route, respectively: IDR 135,633.21, IDR 119,046.86 and IDR 35,186.00. The respondents' ATP analysis results obtained a one-time trip fare for each route in a row: IDR 142,994.05, IDR 119.747.47 and IDR 63.750.00. Meanwhile, respondents' WTP was obtained for each route: IDR 110,519.48, IDR 94,545.45, and IDR 39,107.14. The respondents' WTP-CV values were also obtained on each route, amounting to IDR 14,675.32, IDR 11,409.09, and IDR 8,303.57. Considering the captive rider as an economy class passenger and the benefits of the DAMRI Bus operator, the proposed tariffs for each route are IDR 130,000, IDR 110,000, and IDR 48,000.

Keyword: the transportation of people in traject; ATP; WTP; CVM; the province of north Kalimantan.

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INTRODUCTION

Establishing North Kalimantan, as the 34th province in Indonesia with the provincial capital located in Tanjung Selor, Bulungan Regency has influenced society's transportation pattern between regions. Previously, Tarakan city was the leading destination for community travel by sea transportation because Tarakan is an island city and has a strategic role regionally as a National Activity Center (PKN) in North Kalimantan (Government of North Kalimantan Province, 2017). Before becoming a new province, North Kalimantan was well recognized as Bulungan regency is located in the North area of East Kalimantan. This province has an administration area of about 75.467,70 km^2 consisting of four regencies: Bulungan, Nunukan, Malinau and Tana Tidung Regency and Tarakan city (Government of Republic Indonesia, 2012). Because lack of infrastructure makes transport fares is too expensive, including limited water transportation have influenced accessibility level to the regency and city in North Kalimantan. Bakri, *et al*. (2015) reveal Malinau regency and Tana Tidung Regency have low accessibility comparing with Bulungan, Nunukan regency and Tarakan city. The shift in traveling mode from sea transportation-based to land transportation to the provincial capital requires the provision of public transportation facilities and also driving the dynamics of development, increasing the mobility of goods and services, supporting regional development, so that in line with Sistranas 2005 (Departement of Communicatios, 2005).

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Understanding the society needs for transportation, businessman welcomes this opportunity by providing public transportation facilities by using small transportation capacity with a charter pattern for inter-city/regency routes, such as from Tanjung Selor to Malinau, or from Tanjung Selor to Tana Tidung Regency. This charter public transport does not use fixed routes. Thus, make its cost is too expensive and burdensome for the captive riders who are generally employed economy class transportation (Safitri, 2016)

The increasing transportation needs for inter-city/regency public transportation has prompted the North Kalimantan Provincial Transportation department to release the permits for public transportation routes that Perum DAMRI Tanjung Selor Branch carries out. Since January 2020, DAMRI Bus has operated to serve three routes, namely the Tanjung Selor-Malinau, Tanjung Selor-Tana Tidung/Tideng Pale and Malinau-Salang (MLN-SLG).) round-trip route. The round-trip route is as presented in Figure 1.

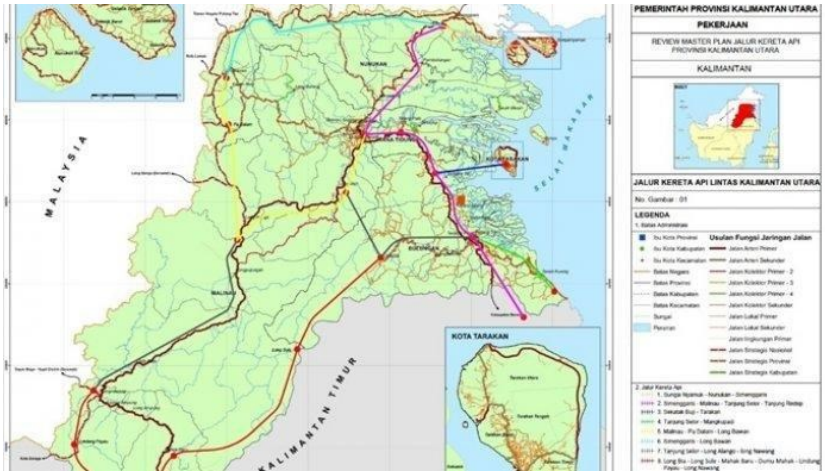

Figure 1. Route map of DAMRI Public Transportation in North Kalimantan

The management of public transportation is often faced with the problem of transportation fares. Transport fares are a sensitive issue in areas with a high proportion of low-income users or passengers. Society expects the government to cover the public against the public transportation fares, but the government often faces no market data or transportation fares benchmarks/comparisons (Meakin, 2011). This matter often creates conflicts between transportation providers, government, and communities as users. It is considering the importance of determining the policy on the tariff or transportation fares for the public transportation system. It is interesting to conduct a study related to this matter.

The main purpose of this study is to obtain the amount of economy class passenger fares for transporting people on routes in North Kalimantan Province. It is expected that the results of the study can provide input to stakeholders regarding the effectiveness of public transportation services that are able to meet the travel needs and are in accordance with the Sistranas targets in the form of affordable fares and low public burdens. The analysis stage of this study starts from an inventory of the tariff or transportation fares that have been applied, then compared it with the tariff or transportation fares based on vehicle operating costs (VOC), the ability and willingness to pay public transportation users using the Ability to Pay (ATP) and Willingness To Pay (WTP) methods. including Contingency Valuation analysis related to the willingness of prospective passengers to pay more in the form of increased safety services in DAMRI Bus operations.

RESEARCH METHODS

Research Setting

The study was conducted in North Kalimantan Province using existing public transportation routes that have been operating, as shown in Figure 1. The study was held from May 2020 to October 2020 by distributing questionnaires. It was filling out the questionnaire with the face-to-face session between the enumerator and the respondents. At the beginning of the study, the researcher faced problems with the outbreak of pandemic covid-19, with the detection of a suspected pandemic in North Kalimantan in early May 2020. However, the study could be carried out in a hybrid manner by filling out a questionnaire offline and online.

Number of respondents

The population size in this study uses passenger data from North Kalimantan Provincial Public Transport (AKDP) for one year, especially in 2019 for the three routes that are the object of this study. The number of samples was determined using the Slovin formula (Basuki & Chuadinata, 2019), as follows:

$$n = \frac{N}{Ne^2 + 1} \quad (1)$$

by:
n = Sample size/number of respondents
N = Population size
E = Percentage of tolerable leeway in sampling accuracy
1 = Constant

This study uses an *e* score of 10% (0.1), and it is the number of total population based on passengers of *Perum DAMRI Tanjung Selor* for all routes. The results of calculations with the Slovin formula were obtained a total sample was 100 respondents. Then, distribution of samples for three routes was calculated as a percentage of the annual number of passengers on each route, as presented in Table 1.

Tabel 1. Number of respondents

No.	Route	Number of Passengers (person /year)	Number of respondents (Slovin formula)
1.	Tanjung Selor-Malinau (round-trip route)	44.151	76
2.	Tanjung Selor-Kabupaten Tana Tidung (round-trip route)	6.222	11
3.	Malinau-Salang((round-trip route)	7.737	13
	Total	58.110	100

Source: Transportation Departement of North Kalimantan Province (2020), and Analysis (2020)

Research flow chart

The steps in this study were carried out with a scheme as shown in Figure 2.

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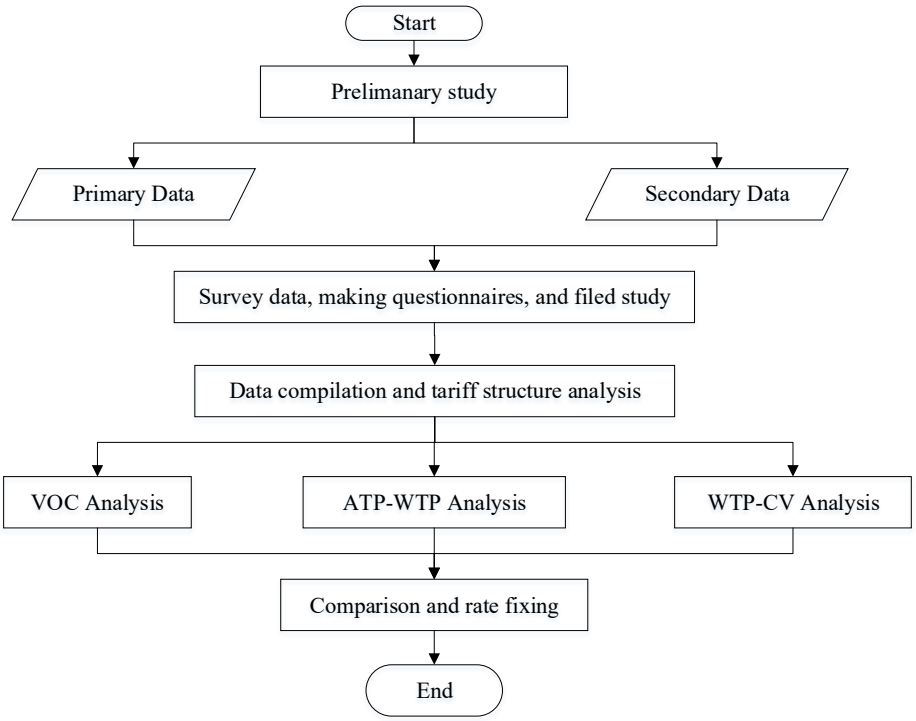

Figure 2. Research flowchat

Data collection, enumerator placement

Primary data were collected through direct surveys to respondents as a sample of public transportation users using a stratified random sampling method. The number of samples was stratified based on the routes that accommodated the entire population on different routes. Enumerators were placed at terminals, namely at Type C Terminal Tanjung Selor, and non-type terminals in Malinau and Tideng Pale (Tana Tidung Regency).

Analysis method

The analytical method in this study uses a three-sided approach (Tamin, *et al*, 1999), namely:

1. The operator as a service provider, where financial considerations with an approach to business continuity factors take into account the costs of each type of transportation service (Anggraini *et al.*, 2019).
2. The community as service users, where socio-economic considerations with an approach to people's purchasing power, take into account the ability to pay (ATP) and willingness to pay (WTP) and willingness to pay more if they get better service (contingent valuation) in terms of safety (Anugrah, *et al*, 2018).
3. The government as the regulator, where national policy considerations emphasize national stability, but still take into account the achievement of the optimum state of resource allocation by taking into account the criteria for efficiency and equity in development and service levels in order to improve the performance of transportation services (Jalil, *et al*, 2018)

Tariff structure analysis based on Vehicle Operating Costs (VOC)

Tariffs for transportation of people using public transportation on routes based on vehicle operations were calculated based on the rules of public passenger transportation rates that apply to economy class inter-city bus services using tariffs between or equal to the upper and lower limit distance fares. The upper limit of the basic tariff for passenger transportation by public buses between cities was

30% above the basic cost (Departement of Communications, 2006), and the lower limit basic tariff was 20% below the basic cost (Depatement of Communications, 2002).

Public transport fares for city passengers result from multiplying the basic fare and the average distance (kilometers) of one trip (BEP fare) and adding 10% for the company's profit services. It was calculated by the following formula (Directorate General of Land Transportation of Ministry of Transportation, 2002).

$$\text{Fares} = (\text{basic fare x average distance}) + 10\% \quad (2)$$

$$\text{BEP fare} = \text{basic fare x average distance} \quad (3)$$

$$Basic\ Tariff = \frac{Total\ basic\ fare}{Charging\ Factor\ x\ Vehicle\ Capacity} \quad (4)$$

$$\text{Km traveled per year} = \text{route distance x number of trips in one day x number of operating days in a month x number of months in a year} \quad (5)$$

The basic production cost is the amount of expenditure incurred to produce one unit of transportation services. The production of passenger transportation can be determined in several forms as follows (Directorate General of Land Transportation of Ministry of Transportation, 2002):

a. Production kilometers traveled by passenger transportation = (number of SO x frequency/day x operating days/month x operating months/year x km/rit) + empty kilometers;
a. Rit production (number of rits) = Number of SO buses x frequency/day x operating days/month x operating months/year;
b. Production of passengers (number of passengers transported) = Number of SO x frequency/day x operating days/month x operating months/year x capacity sold/rit; and
c. Production of passengers Km was the number of seat-km (passenger-km) = Number of SO x frequency/day x operating days/month x operating months/year x mileage/rit x capa city sold/rit.

In terms of transportation business activities, the costs incurred for the production of transportation services that will be sold to service users are divided into three parts, namely those incurred for: (1) company management, (2) vehicle operations, and (3) levy, dues, donations, and those relating to business ownership and operations (Directorate General of Land Transportation of Ministry of Transportation, 2002). To facilitate the collection and analysis process, the cost structures are grouped as in Table 2.

Analysis of tariff structure based on Methods Ability to Pay (ATP) and Willingness to Pay (WTP) Ability to Pay (ATP) is a person's ability to pay for the services he has received based on income that is considered ideal. The approach used in the analysis of ATP is based on the allocation of costs for transportation and the intensity of the user's journey (Pudjianto (2002) in Suryoputro, *et al*, 2015). According to (Suryoputro et al., 2015), the factors that affect ATP are: (1) the amount of income for people transporting passengers per month, (2) cost allocation for transportation from monthly income, (3) the percentage of costs for public transportation from the allocation for transportation costs, (4) transportation intensity, and (5) the number of family members.

Tabel 2. Structure classification of cost

Direct costs	Indirect costs
1. Depreciation of productive vehicles	1. Cost of employees except vehicle crew
2. Interest on productive vehicle capital	a. Salary/wages
3. Bus crew (driver and conductor)	b. Overtime pay
a. Salary/wages	c. Social allowance
b. Work allowance	2. Cost management

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	c. Social allowance	a.	Depreciation of office buildings
4.	Fuel	b.	Depreciation of pool and garage
5.	Tire	c.	Inventory/office equipment depreciation
6.	Minor service	d.	Depreciation of garage facilities
7.	Great service	e.	Office administration costs
8.	Checking *(overhaul)*	f.	Office maintenance costs
9.	Adding oil	g.	Pool and garage maintenance costs
10.	Spare parts and body	h.	Electricity and water costs
11.	Washing plugs	i.	Telephone and telegram charges
12.	Terminal levy	j.	Official travel expenses other than vehicle crew
13.	Vehicle registration/ tax	k.	Corporate tax
14.	Vehicle check (Kir)	l.	Route permit
15.	Insurance	m.	Business permit
	a. Vehicle insurance	n.	Marketing costs
	b. Crew insurance	o.	Others

Source: (Directorate General of Land Transportation of Ministry of Transportation, 2002)

The calculation of ATP using the method *household budget* uses the following two methods (Julien & Mahalli, 2014):

$$ATP_{General} = \frac{I_t \, x \, P_p \, x \, P_t}{T_t} \quad (6)$$

by:
I_t = Total family income per month (Rp/Kel/Month)
P_p = Percentage of income for transportation per month of total family income
P_t = percentage for transportation of family transportation income per month
T_t = total length of family trip per month per trip (Trip/Ex/Month)

$$ATP_{resp\,/trip} = \frac{I_{rs} \, x \, P_p \, x \, P_t}{T_{rs}} \quad (7)$$

by:
ATP_{resp} = ATP of respondents by type of work (Rp/Resp/Trip)
I_{rs} = income of respondents per month (Rp/month)
P_p = percentage of income for transportation per month from respondent's income
P_t = percentage for transportation of income for transportation
T_{rs} = total length of trip per month per trip (Trip/Resp/Month)

The calculation of ATP using the method of *travel cost individual* ATP that service users can accept is calculated by the following formula:

$$ATP_{indv} = \frac{I_c \, x \, \%TC}{D} \quad (8)$$

by:
ATP_{indv} = ATP of respondents by type of work (Rp/Resp/Trip)
I_c = income
% TC = percentage of income for *travel cost*
D = frequency of trips

Willingness to Pay (WTP) is the user's willingness to issue a service fee or reward for the facilities he has received. The approach used in the analysis of WTPs is based on user perceptions of tariffs and public transport services (Tamin *et al*., 1999). Willingness to pay is also based on the concept of consumer surplus, which is the difference between the willingness to pay in the form of utility

value obtained from goods or services purchased with the actual price paid. In another part, Tamin *et al*. (1999), suggest factors that influence WTP, among others: (1) user perceptions of the level of service quality; (2) the user's utility for the public transportation used; (3) facilities provided by the operator; and (4) user income.

The WTP value obtained from each respondent is the maximum value of rupiah that the respondent is willing to pay for the tariff for transporting people with public motorized vehicles on the route, processed to obtain the average value of the WTP value, following the following formula (Suryoputro et al., 2015):

$$WTP\ type\ of\ work = \frac{\Sigma(selected\ rate\ x\ number\ of\ respondents)}{total\ number\ of\ respondents\ for\ each\ type\ of\ profession} \quad (9)$$

$$WTP\ type\ of\ work = \frac{\Sigma(selected\ rate\ x\ number\ of\ respondents)}{total\ number\ of\ respondents\ for\ each\ type\ of\ profession} \quad (9)$$

Methods of Valuation Contingency

Contingent Valuation Method (CVM) is a calculation method directly, in this case directly asking the community's willingness to pay with emphasis on the individual preference assess public body which the emphasis is on the standard value of space (Hanley and Spash (1993) in Nwofoke, et al. (2017)).

This method allows all commodities that are not traded in the market to estimate their economic value. Thus the economic value of a public object can be measured through the concept of CVM. The CVM questionnaire includes three parts, namely:

a. Writing details about the object being valued, the perception of the valuation of the public object, the type of ability and means of payment;
b. Questions about the PAPs studied; and
c. Questions about the socio-demographic characteristics of the respondents such as age, income level, education level, and others.

Before compiling the questionnaire, the necessary scenarios are first made in order to build a hypothetical market for public goods that are the object of observation. Furthermore, the proof of the market hypothesis concerns the question of changes in the quality of the environment that is sold or purchased.

RESULTS AND DISCUSSION

Characteristics of respondents

Characteristics of respondents are classified according to age, gender, education, occupation, as shown in Table 3. The results analysis of the number of respondents as shown in Table 3, obtained as many as 100 people. To meet the adequacy of the number of respondents (Arikunto, 2010), this study added the number of respondents to 160 people, with details as many as 77 people for the Tanjung Selor-Malinau route, 55 people for the Tanjung Selor-Tana Tidung route, and 28 people for the Malinau-Salang route. Respondents are generally relatively young in the range of 15-38 years (79%), with a minimum education level of high school (90%). Most of the respondents who were dominated by men (105 people) with a dominant profession as entrepreneurs or worked in the informal sector (73 people).

In the questionnaire form, two parts are made. The first is to record the characteristics of the respondents, and the second is to examine the main issues related to the analysis of *ATP, WTP*, and Contingency Valuation of respondents. The variables studied included: (1) the frequency of using the DAMRI Bus, and or public passenger transportation at least 1 (one) time a year, (2) the type of transportation mode that is often used in traveling between regions/cities, (3) the purpose of the trip, and (4) travel expenses incurred in one trip between regions/cities. The frequency of respondents using the DAMRI Bus or Public Passenger Car (PPC) for inter-city trips in the past year is as presented in Table 4.

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Table 3. Characteristics of respondents by age, sex, education and occupation

Age (Years)	Percentage (%)	Gender	Percentage (%)	Education	Percentage (%)	Profession	Percentage (%)
15-20	25,00			Uneducated	1,88	ASN/Army/Police	11,25
21-26	21,25	Male	65,63	Elementary School	3,13	Students	10,00
27-32	18,75			Junior High School	6,88	Village Apparatus	1,25
33-38	13,75			Senior High School	61,25	Entrepreneur & Private	45,64
39-44	7,50			Bachelor Degree	26,25	Farmer	1,25
45-50	6,88	Female	34,37	Master Degree	0,63	Pastor	1,25
51-56	3,75			PhD.	0	Not yet employed	1,25
57-62	3,13			Others	0	Others	28,13
Total	100,00	Total	100,00	Total	100,00	Total	100,00
Total respondents					160 respondents		

Source: Field survey, 2020

Table 4. Frequency of use of public transportation during the last 1 year

Type of Public Transport	Percentage of use of public transportation for 1 year (%)						
	0-1 time	2-3 times	4-5 times	6-7 times	8-9 times	10-11 times	>11 times
Bus of DAMRI	47,500	30,625	11,250	6,250	1,875	1,250	1,250
Public Passenger Car (PPC)	66,875	22,500	4,375	4,375	0,625	1,250	0

Source: Field survey, 2020

Table 4 shows that 66.875% of respondents stated that they had used PPC for inter-city trips at least once a year, and 47.5% used the DAMRI Bus. The frequency of using public transportation is between 4 and 5 times a year, indicating that the use of DAMRI Bus is more than PPC. This data shows that people use the DAMRI Bus more often than using the PPC for inter-city trips. The largest respondents' travel intentions were vacations or visiting family, which amounted to 52.86%, 12.92% trips for work/outside service, business trips by 21.75%, and other purposes by 12.47%.

Tabel 5. Respondents' travel destination between cities within the province

Respondents by route	Percentage of trips based on travel purposes (respondent/percentage)			
	Vacation/visiting family	Work/Service	Business	Other Purposes
TJS-MLN	43 / 55,84%	16 / 20,78%	10 / 12,99%	8 / 10,29%
TJS-KTT	29 / 52.73%	4 / 7,27%	15 / 27,27%	7 /12,73
MLN-SLG	14 / 50,00%	3 / 10,71%	7 / 25,00%	4 / 14,29%
Average (%)	52,86%	12,92%	21,75%	12,47%

Source: Field survey, 2020

Costs incurred by respondents for 1 (one) trip between cities within the province vary from the lowest of IDR. 50,000.00 and the highest of IDR. 1,200,000.00, as presented in Table 6. The largest amount of transportation costs incurred by respondents was in the range of IDR. 150,001-300,000 (34.59%), and in the range of IDR. 300,001-450,000 (24.86%).

Table 6. Percentage of respondents' travel costs by type of work

Range of respondents' transportation costs/month (IDR)	Percentage of respondents' transportation costs by type of work (%)							
	GE/Army/Police	Students	Village Apparatus	Entrepreneur /Private	Farmer	Spiritual	Not yet working	Others
50.000 – 150.000	-	28,36	-	-	-	-	100	14,55
150.001 – 300.000	34,89	47,76	33,33	15,64	100	-	-	45,07
300.001 – 450.000	33,62	23,88	-	15,06	-	100	-	26,29
450.001 – 600.000	31,49	-	66,67	33,04	-	-	-	14,08
600.001 – 750.000	-	-	-	12,28	-	-	-	-
750.001 – 900.000	-	-	-	11,99	-	-	-	-

900.001 – 1.050.000	-	-	-	8,48	-	-	-	-
1.050.001 – 1.200.000	-	-	-	3,51	-	-	-	-

Source: Field survey, 2020

Existing fares

Perum DAMRI Tanjung Selor has established passenger fares for each route by considering the mileage for one way or per trip. The Tanjung Selor-Malinau route is set at IDR. 130,000, the Tanjung Selor-Tana Tidung route is IDR. 100,000, and the Malinau-Salang route is IDR. 50,000.

Calculation of tariff structure based on production costs

The calculation of this tariff structure uses parameters according to the Decree of the Director-General of Land Transportation Number: SK.687/AJ.206/DRJD/2002 concerning Technical Guidelines for implementing Public Passenger Transportation in Urban Areas in Fixed and Regular RoutesDirectorate General of Land (Directorate General of Land Transportation of Ministry of Transportation, 2002), with the cost structure grouping as shown in Table 2. The calculation of this production cost is carried out on each route.

a. Characteristics of the vehicles used

Perum DAMRI Tanjung Selor Branch operates a medium bus type vehicle (carrying capacity as many as 19 passengers) Mitsubishi brand production in 2015 with the type of *economy class* service to serve public transportation on all routes.

b. Production of each bus for each route

The results of analysis of cost per seat-km of each route using the calculation parameters as in Table 2 are shown in Table 7.

Table 7. Recapitulation of basic cost per seat-km for each route

Cost Component	IDR/seat-km		
	Route of TJS-MLN / MLN-TJS	Route of TJS-MLN / MLN-TJS	Route of TJS-MLN / MLN-TJS
Direct Cost			
a. Depreciation cost	92,91	130,65	43,19
b. Bus crew fee	96,28	135,40	44,76
Fuel Cost	54,21	54,21	27,11
Tire cost	42,07	42,07	21,04
Vehicle maintenance costs	77,33	92,15	37,39
Terminal fee	2,34	3,29	2,18
Cost of BPKB (STNK)	0,55	0,78	0,26
Kir bus fee	0,26	0,37	0,12
Insurance costs	14,52	20,41	6,75
Indirect costs			
a. Employee costs	33,37	33,37	16,69
b. Management costs	8,13	8,13	4,07
Total costs (at *load factor* 100%)	421,97	520,83	203,56
Total costs (at *load factor* 70%)	602,81	744,04	290,80

DAMRI Bus Operations daily commute on the Tanjung Selor-Malinau route, the Tanjung Selor-Tana Tidung route, and the Malinau-Salang route, each served by 1 bus with a frequency of one cycle per day, operating for 30 days per month and 12 months a year. The Tanjung Selor-Malinau route covers a distance of 225 km in one trip, so that every year there is a bus production of 1,539,000 seat-km. The Tanjung Selor-Tana Tidung Regency route with a distance of 160 km per trip, produces bus production of 1,094,400 seat-km per year. Meanwhile, the Malinau-Salang route, with a distance of 121 km per trip, produces a bus seat-km of 827,640 per year.

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Tariff Structure based on the production cost of each bus for each route

Vehicle operating costs are one of the cornerstones in determining fares because, from this analysis, it can be seen that the lower limit of operational costs must be returned to the transportation service manager. The fare structure based on the production cost of each DAMRI bus for each route by including the distance traveled is presented in Table 8.

Table 8. The tariff structure of each route is based on production cost analysis

No	Route	Basic Tariff Per seat-km (IDR)	Tariff Based on Distance (IDR)
1.	TJS-MLN / MLN-TJS	602,81	135.633,21
2.	TJS-KTT / KTT-MLN	744,04	119.046,40
3.	MLN-SLG/SLG-MLN	290,80	35.186,80

Calculation of tariffs based on people's purchasing power and willingness to pay more

Tariff calculations based on people's purchasing power and willingness to pay were analyzed using *ATP* and *WTP* methods. Meanwhile, the willingness to pay more for service improvement in terms of increasing safety during the trip was analyzed using the Contingency Valuation method.

ATP value of respondents on each route

The ATP value of each route was analyzed based on the frequency of respondents per month taking the DAMRI Bus, average income, percentage of costs for transportation needs, and transportation costs for the DAMRI Bus. The results of ATP calculations for each route are presented in Table 9.

Tabel 9. ATP score for Tanjung Selor-Malinau route based on work type of respondents

Type of work (Number of respondents)	Average frequency of increasing DAMRI/ month	Average income/month (IDR)	Percentage of transportation costs/month	Percentage of costs for DAMRI buses /month	ATP (IDR)
(1)	(2)	(3)	(4)	(5)	(6)=[(3)x(4)x(5)]/(2)
Route of Tanjung Selor-Malinau/Malinau-Tanjung Selor					
GE/Army/Police (9)	1,44	5.277.777,78	7,00%	55,64%	142.307,69
Students (8)	1,25	1.562.500,00	16,80%	66,67%	140.000,00
Village Apparatus (1)	2,00	5.000.000,00	12,00%	50,00%	150.000,00
Entrepreneur/Private (35)	2,51	6.097.142,86	8,76%	68,18%	144.886,36
Farmers (1)	1,00	4.500.000,00	6,67%	40,00%	120.000,00
Clergy (1)	1,00	7.500.000,00	6,00%	33,33%	150.000,00
Not yet. working (1)	1,00	1.000.000,00	10,00%	100,00%	100.000,00
Others (21)	1,14	3.242.857,14	9,62%	52,67%	143.750,00
Route of Tanjung Selor-District Tana Tidung/Tana Tidung -Tanjung Selor					
GE/Army/Police (7)	1,29	5.142.857,14	6,39%	50,00%	127.777,78
Students (5)	1,00	1.300.000,00	13,85%	55,56%	100.000,00
Village Apparatus (1)	1,00	4.000.000,00	7,50%	33,33%	100.000,00
Entrepreneur/Private (26)	1,85	5.346.153,85	8,56%	48,32%	119.791,67
Farmers (1)	1,00	3.000.000,00	6,67%	50,00%	100.000,00
Others (15)	1,00	2.133.333,33	8,75%	62,50%	116.666,67
Route of Malinau - Salang/Salang - Malinau					
GE/Army/Police (2)	1,00	5.000.000,00	3,50%	42,86%	75.000,00
Students (3)	1,00	1.166.666,67	4,20%	42,86%	50.000,00

Entrepreneur/Private (12)	1,67	3.958.333,33	6,53%	40,32%	62.500,00
Clergy (1)	1,00	7.500.000,00	2,67%	50,00%	100.000,00
Not yet. working (1)	1,00	1.000.000,00	10,00%	50,00%	50.000,00
Others (9)	1,11	3.000.000,00	4,81%	50,00%	65.000,00

WTP value of respondents on each route

Table 10 shows the results of the analysis of the average WTP value of respondents on each route.

Tabel 10. Average WTP score of respondents on each route

Type of Work Respondents	Route of TJS-MLN / MLN-TJS	Route of TJS-KTT / KTT- TJS	Route of MLN-SLG/ SLG-MLN
GE/Army/Police	107.777,78	105.714,29	35.000,00
Student	76.875,00	82.000,00	28.333,33
VillageApparatus	100.000,00	100.000,00	-
Entrepreneur /Private	126.000,00	102.307,69	42.916,67
Farmers	75.000,00	75.000,00	-
Clergy	100.000,00	-	50.000,00
unemployement	50.000,00	-	15.000,00
Others	101.190,48	101.333,33	40.000,00

The WTP value of respondents based on the type of work on each route is calculated by Equation (9). Furthermore, the WTP value of each route is calculated based on Equation (10) as follows:

The average WTP value of respondents for the Tanjung Selor-Malinau route:

$$= \frac{(107.777{,}78x9) + (76.875x8) + (100.000x1) + (126.000x35) + (75.000x1) + (100.000x1) + (50.000x1) + (101.190{,}48x21)}{(9 + 8 + 1 + 35 + 1 + 1 + 1 + 21)}$$

$$= IDR.\,109.675{,}32$$

The average WTP value of respondents for the Tanjung Selor-Tana Tidung route:

$$= \frac{(105.714{,}29x7) + (82.000x5) + (100.000x1) + (102.307{,}69x26) + (75.000x1) + (101.333{,}33x15)}{(7 + 5 + 1 + 26 + 1 + 15)}$$

$$= IDR.\,100.090{,}91$$

The average WTP value of respondents for the Malinau-Salang route:

$$= \frac{(35.000x2) + (28.333{,}33x3) + (42.916{,}67x12) + (50.000x1) + (15.000x1) + (40.000x9)}{(2 + 3 + 12 + 1 + 1 + 9)} = IDR.39.107{,}14$$

Contingency Valuation of respondents on each route

The survey results show that all respondents stated that they were willing to pay more than the applicable tariff if there was an increase in service in the form of safety in the operation of the DAMRI Bus. The willingness to pay more than the respondent is the WTP value of the Contingency Valuation (WTP-CV), where the average results are as presented in Table 11. It is also known that the minimum WTP-CV value of the respondents is IDR. 5,000, and the maximum is IDR. 25,000.00. The analysis results showed that the average value of respondents' willingness to pay more (WTP - CV) for the TJS-MLN/MLN-TJS route was IDR. 14,025.97, the TJS-KTT/KTT-TJS route was IDR. 11,409.09, and the MLN-SLG/SLG-MLN route is amounting to IDR 8,303.57.

Table 11. The average value of WTP-Contingency Valuation of respondents on each route

Type of Work Respondents	Route of TJS-MLN / MLN-TJS	Route of TJS-KTT / KTT- TJS	Route of MLN-SLG/ SLG-MLN
GE/Army/Police	18.666,67	11.428,57	7.500,00

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Students	12.500,00	10.000,00	8.333,33
Apparatus Village	10.000,00	10.000,00	-
Entrepreneur /Private	15.285,71	11.634,62	8.125,00
Farmers	15.000,00	10.000,00	-
Clergy	20.000,00	-	10.000,00
unemployment	10.000,00	-	5.000,00
Others	10.476,19	11.666,67	8.888,89
Proportional Mean	14.025,97	11.409,09	8.303,57

Proposed fare size

To ensure that the data obtained from respondents who have given opinions about their ability and willingness to pay (ATP and WTP) and willingness to pay more if they get more services in terms of safety during the trip (WTP-CV) are evenly distributed or distributed regular, data normality test is required. The normality test of the data uses software MiniTAB, considering the existence of small category data (less than 30), then the normality analysis of the data uses the Ryan-Joiner method. The results of the data normality test, as presented in Table 12, show that R-value is close to 1, and P-Value > 0.05. This shows that the data is normally distributed, so that the opinion of respondents regarding value of ATP, WTP and WTP-CV can be used as a basis for consideration of setting rates for this study.

Table 12. Data Normality of Test Results

Testing	Route	Results			
		R	P-Value		R
ATP	TJS-MLN	0,9880	ATP	TJS-MLN	0,9880
	TJS-KTT	0,9808		TJS-KTT	0,9808
	MLN-SLG	1,0000		MLN-SLG	1,0000
WTP	TJS-MLN	0,9847	WTP	TJS-MLN	0,9847
	TJS-KTT	0,9790		TJS-KTT	0,9790
	MLN-SLG	0,9802		MLN-SLG	0,9802
WTP-CV	TJS-MLN	0,9846	WTP-CV	TJS-MLN	0,9846
	TJS-KTT	0,9849		TJS-KTT	0,9849
	MLN-SLG	0,9874		MLN-SLG	0,9874

The recapitulation of the fare based on Vehicle Operating Costs (VOC), ATP-WTP and WTP-Contingency Valuation is shown in Table 13. The results of the ATP-WTP analysis show that respondents for the three routes can afford to pay higher than the prevailing fare, but respondents for the TJS-MLN/MLN-TJS route and the MLN-SLG/SLG-MLN route tends to pay lower than the fare. Meanwhile, respondents on the TJS-KTT/KTT-TJS route are willing to pay higher than the applicable tariff if they get services in the form of safety on the DAMRI Bus trip.

Table 13. Recapitulation of Tariff

Jenis Tarif	Value of each route (IDR)		
	TJS-MLN/MLN-TJS	TJS-KTT/KTT-TJS	MLN-SLG/SLG-MLN
Base on VOC	135.633,21	119.046,40	35.186,80
Base on ATP	142.994,05	119.747,47	63.750,00
Base on WTP	109.675,32	100.090,91	39.107,14
Base on WTP-CV	123.701,30	111.500,00	47.410,71
Applicable Tariff (Existing Tariff)	130.000,00	100.000,00	50.000,00

Based on the comparison and average of the overall fare value of the analysis above, and taking into account the group captive rider, which is a passenger in the economy class category, and taking into account an additional 10% profit for the DAMRI Bus operator (service provider) according to Directorate General of Land Transportation of Ministry of Transportation (2002), then the proposed applicable fare for one trip on TJS-MLN/MLN-TJS is IDR. 130,000.00, IDR. 110,000.00 for the TJS-KTT/KTT-TJS route, and IDR. 48,000.00 for the route MLN-SLG/SLG-MLN.

CONCLUSION

The current fare for the single-trip DAMRI Bus is IDR. 150,000.00 for the TJS-MLN/MLN-TJS route, the TJS-KTT/KTT-TJS route is IDR. 100,000.00, and for the MLN-SLG/SLG- MLN of IDR. 50,000.00. The results of the study based on the VOC obtained a one-time fare for each route in a row: IDR. 135,633.21; IDR.119,046.86 and IDR. 35,186.00. Based on the analysis of ATP respondents, the fare value for one trip per route was obtained in a row: IDR. 142,994.05, IDR. 119.747.47 and IDR. 63.750.00. Meanwhile, respondents' WTP was obtained for each route: Rp. 110,519.48, Rp. 94,545.45, and Rp. 39,107.14. It was also found that respondents' willingness to increase the cost of tariffs if the service provider provides increased safety services in general transportation operations, respectively, is IDR. 14,675.32, IDR. 11,409.09, and IDR. 8,303.57. Taking into account the group captive rider as economy class passengers and the additional 10% profit for the DAMRI Bus operator (service provider), it is proposed that the tariff for one trip on TJS-MLN/MLN-TJS is IDR. 130,000.00, to IDR. 110,000.00 for the TJS-KTT/KTT-TJS route, and IDR. 48,000.00 for the MLN-SLG/SLG-MLN route.

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