INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

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ISSN: 2222-6990

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**To Link this Article:** http://dx.doi.org/10.6007/IJARBSS/v11-i7/10436 DOI:10.6007/IJARBSS/v11-i7/10436

***Received:*** *18* May *2021,* ***Revised:*** *19* June *2021,* ***Accepted:*** *30* June *2021*

**Published Online:** 05 July 2021

**In-Text Citation:** (Chalirafi et al., 2021)

**To Cite this Article:** Chalirafi, Murtala, H. R. U. U., & Rahmi, A. (2021). Evaluation of Public Needs for Trans Koetaradja Bus Transport in Banda Aceh City. *International Journal of Academic Research in Business and Social Sciences*, *11*(7), 268–281.

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**Vol. 11, No. 7, 2021, Pg. 268 - 281**

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# Evaluation of Public Needs for Trans Koetaradja Bus Transport in Banda Aceh City

Chalirafi[1], Murtala[2], Hendra Raza[3], Umaruddin Usman[4], Amelia Rahmi[5]

[1,2,3,4]Lecturer of Faculty of Economics and Binsis - Malikussaleh University, Lhokseumawe, [5]Lecturer of Faculty of Economics and Binsis - Serambi Mekkah University, Banda Aceh

**Abstract**

The use of the budget for the trans Koetaradja operations from 2016 to 2018 has spent funds reaching Rp. 13,852,000,000 of that amount is quite large because the function of the Trans Koetaradja as public transport is not optimal. The function of Trans Koetaradja has not been maximized because the first is that many people still use private transportation, then add to road congestion and waste costs incurred by the government (Source, Department of Transportation, 2018). The general objective of this research is to analyze the level of public demand for mass transportation, especially the Trans Koetaradja BUS in Banda Aceh City. This research was conducted in the capital city of Aceh Province on all Trans Koetaradja BUS routes, which currently number three routes, namely Route 1 (Keudah-Darussalam), Route 2a (Keudah-Ulee Lheu), Route 2b (Keudah- Sultan Iskandar Muda Airport). Route 3 serves routes (Pasar Aceh-Mata le) and route 5 serves routes (Pasar Aceh Aceh-Ulee Kareng-Blang Bintang). The data used include: 1). Primary data includes the number of passengers, vehicle frequency, time of departure and arrival at the terminal. 2). Secondary data includes location maps, transportation routes, number of fleets and route lengths. The data analysis method used is the load factor model, vehicle capacity, circulation time, vehicle stop time, intermediate time and the number of fleets. The demand for Trans Koetaradja buses in general shows an excess supply because the average passenger for each trip is still below 30 percent, this condition shows that supply is greater than demand. The time between (headway) Routes Keudah-Darussalam, Routes Keudah- SIM Airport, Routes Keudah - Ule Kareng - SIMs have not met the standards of the Director General of Land Transportation, namely 5-10 minutes, so the headway is too short. The time between (headway) for the Keudah - Ulee Lheue Route has met the standards of the Director General of Land Transportation, which is 5-10 minutes.

**Keywords:** Public Needs of Trans Koetaradja Bus Transportation

## Introduction

As a first step, Trans Koetaradja will build four alternative routes that will serve around the city of Banda Aceh (Aceh Transportation Service, 2013). Of the seven planned routes, the Bus Rapid Transit (BRT) is expected to provide fast, safe, comfortable and

humane public transportation, and it is hoped that private transport users can switch to using public transportation which in turn will reduce traffic congestion. especially the main roads of the city of Banda Aceh. One of them is the route Keudah-Darussalam, a route that passes through many offices, health and education areas where on average, many private vehicles, especially motorbikes, are also used during rush hour.

In line with the increase in the use of private vehicles, there has been a significant decline in the number of mass transit users in Banda Aceh City in recent years. This has an impact on the mobility needs of the lower class people because the majority of them are users of mass transportation. As a result of decline mass transit services within the city, and based on the analysis of the TNP2K poverty data validation survey from Banda Aceh, motorcycle ownership among lower-class households in each district in Aceh Province is between 63-84%. For the lower class, the need for bicycles motorcycles reduce the proportion of spending they have on other primary needs, such as food, clothing and housing. When viewed from a social responsibility perspective, this also emphasizes the importance of public transportation and its significant impact on the economy and community mobility (BRT Kota Banda Aceh, 2017).

In 2015, the Banda Aceh City Government conducted a household interview survey and a screenline survey aimed at obtaining the latest information for use in the analysis process regarding urban transportation and for the preparation of further projects. The household interview survey covered about 3,600 families and the number of trips (trip) registered was around 12,000 trips in 9 sub-districts in Banda Aceh. This chapter summarizes the information obtained from the survey in order to provide input on current conditions and to consider the need to improve urban transportation (BRT Kota Banda Aceh, 2017).

Something new for the local government to overcome traffic congestion by developing public transportation Trans Kutaraja, but on the one hand there is another transportation that will receive a negative impact from the government's policy, namely Labi-labi transportation. Therefore, local governments must be wise in making policies by looking at the impact of the policy itself (Muhajir and Muhammad, 2017).

The use of the budget for the trans Koetaradja operations from 2016-2018 has spent funds reaching Rp. 13,852,000,000 of this budget is quite large because the function of the Trans Koetaradja as public transportation is not maximized. The function of Trans Koeta Radja has not been maximized because the first is that the community still uses a lot of private transportation, then it adds to road congestion and waste of costs incurred by the government (Source, Department of Transportation, 2018). Therefore, this condition becomes a problem and needs to be investigated further to find out and evaluate the actual condition of the need for mass transportation, especially the Trans Koetaradja BUS in Banda Aceh City, because in the future the role of this transportation can support the regional economy and reduce congestion.

The economy of Banda Aceh City, this has resulted in a fairly rapid increase in private vehicle ownership. The impact of this trend in the growth of private vehicles coupled with the decline in public transportation services in Banda Aceh City is an increase in the volume of vehicles, especially on main roads. If this is not supported by adequate transportation facilities and infrastructure, it will cause quite complicated traffic problems in the future. Therefore, the Banda Banda Aceh City Government developed a new public transportation, namely the Trans Koetaradja Bus (Muhammad, 2016).

The specific objectives of this study are: (1) to analyze the load factor of the Trans Koetaradja BUS in Banda Aceh City 2) to analyze the vehicle capacity of the Trans Koetaradja

BUS in Banda Aceh City, 3) to analyze the circulation time of the Trans Koetaradja BUS in the City of Banda Aceh, 4) to analyze the stop time of Trans Koetaradja BUS vehicles in Banda Aceh City, 5) analyzing the time between Trans Koetaradja BUS vehicles in Banda Aceh City, 6) analyzing the number of fleets per circulation time of Trans Koetaradja BUS in Banda Aceh City.

## Literature of Related Review

### Trans Koetaradja

Trans Koetaradja is managed by the Aceh Transportation Agency (Dishub) and seeks to separate the regulatory and operator functions. Dishub only acts as a regulator, while services are provided by operators from private companies. Operators provide services in accordance with the minimum service standards (SPM) determined by the Transportation Agency. Operators have been selected through an open tender process. Dishub is in charge of overseeing the quantity and quality of service operators, coordinate with other departments or agencies, and take responsibility for problems.

### Transportation

Stated that transportation is defined as a system consisting of certain facilities along with flow and a control system that allows people or goods to move from one place to another efficiently at any time to support human activities (Djoko, 2013). Sinulingga (2016) states that transportation is said to be good, if the trip is fast enough, does not experience congestion, the frequency of service is sufficient, safe, free from possible accidents and comfortable service conditions. To achieve this ideal condition, it is very much determined by the various factors that become components of this transportation, namely the condition of the infrastructure (roads), the road network system, the condition of the facilities (vehicles) and the mental attitude of the users of the transportation facilities.

### Transportation Planning

Tamin (2010) states that transportation planning is a systematic transportation system planning activity that aims to provide transportation services both means and the infrastructure is adjusted to the transportation needs of the people in an area and other societal goals. Manheim (2015) states that the transportation system is a unit of elements of physical infrastructure, transportation facilities, operating systems and management systems that interact with each other in achieving the movement of physical objects (humans and goods) from a place of origin to a destination.

### Public Transportation

Warpani (2012) is defined as a transportation service to transport passengers from their destination in bulk by using public transportation with a paid system, because due to the mass nature, passengers must have similarities in various things, namely origin, destination, route, and time. According to the UUD No. 14 of 1992 concerning road transport traffic, articles 25 and 26, public transportation is transportation whose use is free of charge. The concept of public transportation arises because not all citizens have private

transportation, so the state is obliged to provide transportation for the community as a whole.

PP No. 41 of 1993 concerning Road Transportation in the section General Provisions defines:

1. Passenger car is any motorized vehicle equipped with a maximum of 8 (eight) driver seats, both with and without luggage transportation equipment.
2. Routes are public transportation routes for services to transport people by bus, which have a fixed origin and destination, a fixed route and a fixed or unscheduled schedule.

**Mass Public Transport System**

Based on Law No. 22 of 2009, Concerning Traffic and Road Transportation, mass transportation is road transportation organized with the aim of realizing road traffic and transportation safely, safely, quickly, smoothly, orderly, and, comfortably, and efficiently. Mass transportation is expected to be able to integrate other modes of transportation and reach all corners of the land area to support equality, growth and stability as a driving force, driving force, and supporting national development at a cost that is affordable to people's purchasing power (Supriyatno, 2003).

Transportation Research Board (2013), states that the Bus Rapid Transit (BRT) System is a road-based mass transportation that utilizes special and exclusive routes. Meanwhile, the Bus Way-based Bus Rapid Transit is a means of mass public transportation using the bus mode where the vehicle will run on a special track on the side of the fast lane. In addition, the system used is a closed system where passengers can get on and off only at bus stops

- bus stops and of course must be equipped with a ticket system, either in the form of a one-way ticket or a subscription with a prepaid mechanism. In order for passengers to be comfortable when going to and leaving the bus stop, facilities for sloping crossing are provided, security guards at each stop, travel time schedules and there are no street vendors either at the stop or at the crossing bridge except at designated places. In addition, in order to make it easy to get to and leave the bus way, from certain locations public transport routes will be provided. The bus way is a special line for bus lines with the aim of increasing the efficiency of the public transportation system, namely shortening travel times and transportation costs.

Rini (2012) explains that from the characteristics that exist in Bus Rapid Transit (BRT), it can be seen that the service specifications provided are very different from other mass public transport systems that currently exist. Following are the characteristics of Bus Rapid Transit (BRT) and service characteristics for passengers which can be described as follows:

1. A special bus line;
2. Boarding and disembarking passengers have been determined;
3. An effective and efficient pre-departure fare collection system;
4. Comfortable stops;
5. Comfortable bus;
6. There is integrity with other modes of transportation.

Service characteristics for passengers:

1. Ease of access for public transportation;
2. Security;
3. The waiting room is comfortable for passengers and protected from the weather;
4. Relatively short waiting time;

5. The quality of service is quite high during the trip;
6. A safe stop and departure station or stop;
7. Availability of information;

**Travel**

**Classification**

Lestarini (2016), states that travel is a one-way movement from the origin zone to the destination zone, including walking movements. Accidental stopping is not considered the destination of the movement even if it is forced to make a change of route. Although movement is often defined as movement back and forth, in transportation science usually the two analyzes must be separated.

Tamin (2010), there are 5 (five) categories of residence-based movement objectives, namely:

1. Movement to the workplace,
2. Movement to school or university (movement with educational goals),
3. Movement to shopping,
4. Movement for social interests,
5. Movement for recreational purposes.

**Mode Selection**

Tamin (2010), in choosing the mode of transportation there may be few or no choices. People who have a choice of mode are called Captive to that mode. If there is more than one mode, the mode chosen usually has the shortest, fastest and cheapest route, or a combination of the three. Khisty (2014) states that the decision to choose a mode is based on the consideration of several factors such as time, distance, efficiency, cost, safety and comfort.

**Research Methodology**

**Sources and Types of Data**

Data yang digunakan mencakup: 1). Data primer meliputi jumlah penumpang, frekuensi kendaraan, waktu keberangkatan dan tiba di terminal. 2). Data sekunder meliputi peta lokasi, rute angkutan, jumlah armada dan panjang rute.

**1) Faktor Muat (*Load Factor*)** Rumus *load factor* adalah: LF =(JPM / K) x 100%

Keterangan :

LF : *Load Factor*

JPM : Jumlah Penumpang

*K : Kapasitas Bus sesuai Izin*

**Sources and Types of Data**

The data used include: 1). Primary data includes the number of passengers, frequency of vehicles, time of arrival and arrival at the terminal. 2). Secondary data includes location maps, transport routes, number of fleets and long routes.

**1) Load Factor** The **load** factor formula is:

LF = (JPM / K) x 100% Description:

LF : Load Factor
JPM : Number of Passengers
K : Bus capacity according to Permit

**2) Vehicle capacity**

| **Trans Koetaradja** | **Vehicle capacity** | | | **Passenger Capacity Per Day / Vehicle** |
|---|---|---|---|---|
| | **Sit** | **Stand up** | **Total** | |

Source: SK Dirjen Perhubungan Darat, 2002

**3) Circulation time**

The vehicle circulation time formula is:

**CTABA = (TAB + TBA) + (σAB + σBA) + (TTA + TTB)**

Information:

CTABA : Circulation time from A to B back to A TAB : Average travel time from A to B TBA : Average travel time from B to A σAB : Deviation of travel time from A to B σBA : Deviation of travel time from B to A
TTA : Vehicle downtime at A.
TTB : Vehicle stop time at B

**4) Vehicle downtime**

For vehicle stopping time at origin or destination, it is set at 10% of the travel time between A and B.

**5) Time between vehicles**

The formula for determining the time between vehicles is as follows: H = (60 x C x LfP) / P

Information:

H : intermediate time (minutes)
P : number of passengers per hour in the densest section
C : vehicle capacity
Lf : load factor, taken 70% under dynamic conditions
H ideal: 5 - 10 minutes
H peak: 2 - 5 minutes

**6) Number of fleets per circulation** time

K = CT / (H x fA)

K : number of vehicles
CT : circulation time (minutes)
H : intermediate time (minutes)
fA : vehicle availability factor (100%)

**Research result**

***Load Factor***

To analyze the operational capability of the Trans Kuta Radja Bus on each route in relation to the supply-demand balance, it is expressed as a load factor. Load factor (LF) is the ratio between existing demand and available supply. Since the review is carried out on the entire length of the route, the request is stated as the demand for existing passengers, both transported and not transported within a passenger zone. Supply is the seating capacity available on all routes.

Currently, the Banda Aceh City government provides Trans Kuta Radja Bus in two categories, namely the Trans Kuta Radja Bus in large sizes with a passenger capacity of 76 passengers and the small Trans Kuta Radja Bus with a passenger capacity of 38 passengers. The load factor is the ratio between public transport seats sold and the available transport capacity. This load factor is expressed in percent (%). Based on the survey that has been conducted, the following calculation results can be obtained:

**1. Route Keudah-Darussalam**

The results of the load factor calculation for the Keudah - Darussalam route. It can be illustrated that the busiest hour on the route to Keudah - Darussalam is between 09.30–011.00 WIB. The result of this research is that the average number of passengers for one Trans Koetaradja Bus is 15 people, while the total passenger capacity for one Trans Koetaradja Bus on this route, both standing and seated is 76 passengers. Currently, the number of buses operated by the Banda Aceh City government has reached 12 units, so with an average of 15 passengers during the busiest hours, the load factor is 19.73 percent.

**2. Route Keudah - Ulee Lheue**

The results of the load factor calculation for the Keudah - Ulee Lheue route during the busiest hours between 011.15–012.10 WIB. The result of this research is that the average number of passengers for one Trans Koetaradja Bus is 17 passengers, while the total passenger capacity for one Trans Koetaradja Bus unit, both standing and seated is 76 passengers. With 2 units of Trans Koetaradja Bus, the load factor is 22.36 percent.

**3. Route Keudah- Airport SIM**

The results of the load factor calculation for the Keudah - SIM Airport route are the busiest hours between 10.25 and 11.55 WIB. The results showed that the average number of passengers for one Trans Koetaradja Bus was 7 passengers, while the total passenger capacity for one Trans Koetaradja Bus unit, both standing and seated was 76 passengers. With 6 units of Trans Koetaradja Bus, the load factor is 9.21 percent.

**4. Route of Keudah- Mata Ie**

The results of the load factor calculation for the Keudah - Mata Ie route at the busiest hours between 10.25 and 11.55 WIB. The results showed that the average number of passengers

for one Trans Koetaradja Bus was 10 passengers, while the total passenger capacity for one Trans Koetaradja Bus unit, both standing and seated, was 38 passengers. With 4 units of Trans Koetaradja Buses, the load factor is only obtained as large as 26.31 percent.

**5. Route Keudah - Ule Kareng - SIM**

The results of the load factor calculation for the Keudah - Ule Kareng - SIM route at the busiest hours are between 10.25 and 11.55 WIB. The results of the research that the average number of passengers for one Trans Koetaradja Bus are currently 8 passengers, while the total passenger capacity for one Trans Koetaradja Bus unit, both standing and seated is 38 passengers. With 6 units of Trans Koetaradja Bus, the load factor is 21.05 percent.

**Vehicle Capacity**

To find out the capacity of the Trans Koetaradja Bus vehicle in 1 unit capable of accommodating passengers, it can be seen in Table 1.

**Table 1 Trans Koetaradja Bus Passenger Capacity**

| Trans Koetaradja | Capacity / Vehicle | | | Total Capacity Passengers Per Day |
|---|---|---|---|---|
| | Sit | Stand up | Total | |
| **Route Keudah-Darussalam** | 26 | 50 | 76 | 12 x 76 = 912 |
| **Keudah route - Ulee Lheue (Big Bus)** | 26 | 50 | 76 | 1 x 76 = 76 |
| **Keudah route - Ulee Lheue (Small Bus)** | 13 | 25 | 38 | 1 x 38 = 38 |
| **Keudah route - Airport SIM** | 26 | 50 | 76 | 10 x 76 = 760 |
| **Route of Keudah- Mata Ie** | 13 | 25 | 38 | 4 x 38 = 158 |
| **Keudah route - Ule Kareng - SIM** | 13 | 25 | 38 | 6 x 38 = 228 |

Source: Field Research Results, 2020

Based on Table 1, the capacity of the Trans Koetaradja Bus vehicle for a large size can accommodate a total of 76 passengers with 26 seats in categories and 50 standing passengers. Meanwhile, the small bus can accommodate a total of 38 passengers, with 13 seats sitting and 25 standing passengers. For route 1, the Keudah - Darussalam route has a total of 12 buses operated, capable of accommodating 760 passengers. For the Keudah-Ulee Lheue route, the total number of buses operated is 2 units, with a category of 1 large bus and 12 small units, capable of accommodating 114 passengers. For the Keudah-Bandara SIM route, the number of buses operated is 10 units, capable of accommodating 760 passengers. The Keudah-Mata Ie route has a total of 4 buses, capable of accommodating 158 passengers. The Keudah-Ule Kareng route has a total of 6 buses operated, able to accommodate as many as 228 passengers.

**Circulation Time**

Vehicle circulation time is determined by setting the average vehicle speed of 40 km / hour with a time deviation of 5% of the travel time. The formula for calculating the vehicle circulation time is as follows:

**CTABA = (TAB + TBA) + (σAB + σBA) + (TTA + TTB)**

Information:

CTABA : Circulation time from A to B back toA

TAB : Average travel time from A to B

TBA : Average travel time from B to A
σAB : Deviation of travel time from A to B
σBA : Deviation of travel time from B to A
TTA : Stop time of vehicles in A
TTB : Vehicle stop time at B

**1. Route Keudah - Darussalam**

The circulation time calculation for route 1, namely the Keudah - Darussalam route can be calculated using the following formula: CTABA = (TAB + TBA) + (σAB + σBA) + (TTA + TTB). CTABA = (30 + 30) + (3.5 +4.5) + (11.25 +11.25). CTABA = 90.5 Minutes. The vehicle circulation time for route 1, namely (Keudah - Darussalam) is determined by setting an average vehicle speed of 40 km / h and a time deviation of 5% of the travel time obtained by the circulation time from Keudah to Darussalam and back to Keudah in 90.5 minutes. or about 1 hour 35 minutes.

**2. Route Keudah - Ulee lheue**

The calculation of the circulation time for route 2a, namely the Keudah - Ulee lheue route can be calculated using the following formula: CTABA = (TAB + TBA) + (σAB + σBA) + (TTA + TTB). CTABA = (25 + 25) + (4.5 +5.5) + (4 +5). CTABA = 69 Minutes. The vehicle circulation time for the Keudah - Ulee lheue route is determined by setting an average vehicle speed of 25 km / h and a time deviation of 5% of the travel time obtained by the circulation time from Keudah - Ulee lheue and back to Keudah in 69 minutes.

**3. Route Keudah - SIM**

The calculation of the circulation time for the Keudah - Ulee lheue route can be calculated using the following formula: CTABA = (TAB + TBA) + (σAB + σBA) + (TTA + TTB). CTABA = (35 + 35) + (5 +5.5) + (5 +5.5). CTABA = 90 Minutes. The vehicle circulation time for route 2b, namely (Keudah - SIM) is determined by setting an average vehicle speed of 40 km / hour and a time deviation of 5% of the travel time obtained by the circulation time from Keudah to SIM Airport and back to Keudah in 90 minutes or 1 hour 30 minutes.

**4. Route of Keudah- Mata Ie**

The calculation of the circulation time for the Ee - Mata Ie route can be calculated using the following formula: CTABA = (TAB + TBA) + (σAB + σBA) + (TTA + TTB). CTABA = (45 + 45) + (5 +5,2) + (5 +5,2). CTABA = 110.4 Minutes. Vehicle circulation time for the Keudah route
- Mata Ie is determined by setting an average vehicle speed of 40 km / hour and a time deviation of 5% of the travel time, the circulation time from Keudah to Mata Ie and back to Keudah is obtained in 110.4 minutes.

**5. Route Keudah - Ule Kareng - SIM**

The calculation of the circulation time for the route Keudah - Ule Kareng - SIM can be calculated using the following formula: CTABA = (TAB + TBA) + (σAB + σBA) + (TTA + TTB). CTABA = (60 + 60) + (4,4 +5,3) + (5 +5,2). CTABA = 139.9 Minutes. The vehicle circulation time for the Keudah - Ule Kareng - SIM route is determined by setting an average vehicle speed of 40 km / hour and a time deviation of 5% of the travel time obtained by the circulation time from Keudah - Ule Kareng - SIM and back to Keudah with a time of 139, 4 minutes.

**Vehicle Downtime**

The stop time for vehicles at origin or destination is set at 10% of the travel time between A and B. Based on the calculation results for route 1 on the Keudah - Darussalam route with 27 stops, the average stop time for vehicles at each stop is the 25 seconds, so that the total time spent at all stops is 11.25 minutes.

The results of the calculation for the route Keudah - Ulee Lheue line number of stops as many as 6 places, the average stop time of the vehicle is 60 seconds, so that the total time spent on all stops is 6 minutes. Keudah Line - SIM Airport with 16 stops, the average stop time for vehicles is 35 seconds, so the total time spent at all stops is 9.3 minutes.

The results of the calculation for the Keudah - Mata Ie route with 24 stops, the average stop time for vehicles is 35 seconds, so that the total time spent on all stops is 14 minutes. The route Keudah - Ule Kareng - SIM with 34 stops, the average vehicle stop time is 35 seconds, so that the total time spent at all stops is 19.8 minutes.

**Time Between Vehicles**

The formula for determining the time between vehicles is as follows:

$$H = (60 \times C \times Lf) / P$$

Information:

H : Intermediate time (minutes)
P : The number of passengers per hour in the most populous section
C : Vehicle capacity
Lf : Load factor, taken 70% under dynamic conditions
H ideal: 5 - 10 minutes
H peak: 2 - 5 minutes

**1. Route Keudah - Darussalam**

The headway for route 1, namely Keudah - Darussalam is 4.80 minutes, this time has not met the standard of the Director General of Land Transportation, which is 5-10 minutes, so the headway is too short.

**2. Route Keudah - Ulhee Lhee**

The time between (headway) for the Keudah - Ulhee Lhee route is 7.06 minutes, this time meets the Directorate General of Land Transportation standard of 5-10 minutes, so the headway is appropriate.

**3. Route Keudah - Airport SIM**

The headway for the Keudah - SIM Airport route is 4.2 minutes, this time has not met the standard of the Directorate General of Land Transportation, which is 5-10 minutes, so the headway is short.

**4. Route Keudah - Mata Ie**

The headway for the Keudah - Mata Ie route is 3.15 minutes, this time has not met the standard of the Director General of Land Transportation, which is 5-10 minutes, so the headway is too short.

**5. Route Keudah - Ule Kareng - SIM**

The headway for the Keudah - Ule Kareng - SIM route is 1.68 minutes, this time has not met the standard of the Directorate General of Land Transportation, which is 5-10 minutes, so the headway is too short.

**Number of Fleets Per Circulation Time**

**1. Route Keudah - Darussalam**

From the calculation result, it can be seen that the busiest time period is 09.30 to 011.00 WIB or for 1.5 hours (90 minutes). The number of vehicles per circulation time (demand) available is 12 units, with the headway for the Keudah - Darussalam route of 4.80 minutes, this time does not meet the standards of the Director General of Land Transportation, which is 5-10 minutes, so it seems 12 units are available, only more than 10 units. Even though this is not the case because the load factor for this route is only 19.73 percent, it can be concluded that there is an excess supply of the Trans Kuta Raja bus, then it is better if the Trans Kuta Raja bus can provide 5-10 minutes of headway according to the standards of the Director General of Land Transportation.

**2. Route Keudah - Ulee Lheue**

From the calculation results, it can be seen that the busiest time period is 11.15 to 12.10 or 58.5 minutes. The number of vehicles per circulation time (demand) available is only 2 units with the intermediate time (headway) for the Keudah - Ulee Lheue route is 7.06 minutes, this time meets the Directorate General of Land Transportation standard of 5-10 minutes, with an intermediate time (headway) 5-10 minutes according to the standards of the Director General of Land Transportation, this route can add 3 more vehicles. However, if you look at the number of vehicles that are already available 2 units with a load factor for this route only 22.36 percent, it is better if the city government does not need to increase the number of vehicles to be operated first, but enough with the existing ones.

**3. Route Keudah - SIM**

From the calculation results, it can be seen that the busiest time period is 10.25 to 11.55 WIB or 1.5 hours (90 minutes). The number of vehicles per circulation time (demand) available is only 10 units, with the intermediate time (headway) for the Keudah - SIM Airport route is 4.2 minutes, this time has not met the standards of the Director General of Land Transportation, namely 5-10 minutes, so the number of vehicles already available is 10 units showing an excess supply, because the load factor for this route is only 9.21 percent, therefore it is better if the Trans Kuta Raja bus is reduced to 2 units.

**4. Route Keudah - Mata Ie**

From the results of the calculation, it can be seen that the busiest time period is 11.15 to 12.10. The number of vehicles per circulation time (demand) available is only 4 units with the headway on this corridor is 1.68 minutes, this time does not meet the Dirjen Transportation Land standard of 5-10 minutes, so it seems that the number of vehicles already provided 4 units are not sufficient must be added to 12 more units. Even though this is not the case because the load factor on this corridor is only 26.3 percent, therefore it is better if the Trans Kuta Raja bus must provide a headway of 5-10 minutes according to the standards of the Director General of Land Transportation.

**5. Route Keudah - Ule Kareng - SIM**

From the calculation results, it can be seen that the busiest time period is 11.15 to 12.10. The number of vehicles per circulation time (demand) available is only 4 units with the headway on this corridor is 3.15 minutes, this time does not meet the standard of the Directorate General of Land Transportation, which is 5-10 minutes, so it is impressed that the number of vehicles available 6 units are not enough, must be added to 1 more unit. Even though this is not the case because the load factor on this corridor is only 21.05 percent, therefore it is better if the Trans Kuta Raja bus must provide a headway of 5-10 minutes according to the standards of the Director General of Land Transportation.

## Conclusion and Suggestion

### Conclusion

1. The current demand for Trans Koetaradja buses shows an excess supply because the average passenger for each trip is below 30 percent, this condition shows that supply is greater than demand.
2. The time between (headway) Routes Keudah-Darussalam, Routes Keudah- SIM Airport, Routes Easiest - Ule Kareng - SIM has not met the standards of the Director General of Land Transportation, namely 5-10 minutes, so the headway is too short.
3. The time between (headway) for the Keudah - Ulee Lheue route has met the Dirjen standard Land Transportation is 5-10 minutes.

### Suggestion

The solution that can be given regarding the needs of the Trans Koetaradja fleet is the Trans Bus Koetaradja must apply an intermediate time according to the rules of the Director General of Land Transportation, namely 5- 10 minutes, so that the load factor can be optimized for each vehicle. Because this rule is not implemented properly, it seems that the need for this Trans Koetaradja Bus on each route is deficient even though it has an excess supply.

Supervision is required for the implementation of the Trans Koetaradja Bus in the field in providing services to the public, both in terms of timeliness and the facilities provided. Therefore, the government through the Aceh Transportation Agency must establish a Technical Implementing Unit or UPTD (Technical Implementation Unit) to oversee the implementation of the Trans Koetaradja Bus in the field to achieve the level of use of Trans Koetaradja by the public in reducing congestion in Banda Aceh City. With the hope that it will increase the Load Factor. And it is necessary to review the route on each route, because passengers are not fully filled, only one third of them are filled during less busy hours.

For further research, in order to be able to examine more deeply how the transportation in Banda Aceh City, especially in other cities in Aceh topromote and provide new ideas.

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