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Importance-Performance Analysis in Public Transport Level of Service: A Case Study of The Trans Koetaradja Bus in Banda Aceh

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Abstract – Traffic congestion often occurs in many cities, particularly in developing countries, mainly due to excessive private vehicles instead of public transport. To solve the problem, public transport should improve its level of services to attract more people to use it. Therefore, it is essential to observe to what extent people's satisfaction with public transport regarding its operation. This research aims to analyze the satisfaction level of bus passengers in Banda Aceh City concerning the expected satisfaction and observed performance. The passengers' satisfaction level was analyzed using the important performance analysis (quadrant analysis) method. The results showed that people's perception of the level of service of Trans Koetaradja buses was still acceptable. However, the arrival and departure time still needs to be improved. Further, dedicated bus lane planning is essential to avoid traffic jams so that the travel time can be much shorter. The fleet of operating buses is sufficient, and free-of-charge fares still need to be applied.

Keywords: Bus Performance, Public Transportation, Importance-Performance Analysis

Introduction

Traffic congestion is one of the transport problems in many cities in the world, especially in developing countries. One of the factors causing traffic congestion is the high use of private transport modes. Public transport, the most important element of urban transportation, is commonly neglected in many cities in developing countries (Ansari and Sinha, 2020). Service quality is studied in many research fields. The transport sector emphasizes service quality, as travel is considered an important aspect of daily life; for example, personal car travel competes with public transport in developing countries (Chaisomboon *et al.*, 2020). People use private vehicles rather than public transportation (Nursyamsu, 2018). This impacts increasing traffic volume, causing various effects ranging from congestion, increased air pollution, wasted fuel, and reduced levels of comfort in traffic (Rifai and Fachrul, 2020).

The increasing use of public transport is one solution that people can use to reduce private vehicle use. However, public transports seem less attractive to some people. This condition also happens in many other countries. Rakesh and Shweta did research in Oman, and they found that a majority of people use the car to work instead of public transport (Rakesh and Shweta, 2010). Most people have an unpleasant experience with public transport services, and only a fewer people are known as public transport users. Public transport performance in some big cities in Indonesia is not in accordance with passenger satisfaction. This condition is revealed by the investigation of public transport performance declining continually. This condition causes the number of public transport passengers to decrease and the number of private vehicle users to increase. (Ambarwati and Indriastuti, 2019).

That condition also applies in Banda Aceh city, Indonesia. Most people prefer using private vehicles to public transport modes. Public transport is commonly used by captive people, i.e., those with no private vehicle. A bus is considered one alternative public transport mode to overcome the transport problems (Antono *et al.*, 2018). As a result, the public transport fleet is more than the passenger demand, as proved by Lulusi *et al.* (2015) in Banda Aceh-Indonesia. The research stated that the majority of Syiah Kuala University students (83%) take on private vehicles (motorcycles) to campus, while the remaining students select public transport (Lulusi *et al.*, 2015).

Current public transports with a fixed route in Banda Aceh city are urban public transport (commonly known as Angkot) and bus, called Trans Koetaradja. Angkot is privately-owned public transport, while Trans Koetaradja is a government-owned bus operated at free fares. Although it is free, people are still reluctant to use the bus. The load factors of public transport during peak hours and off-peak hours were as low as 0.5. It was probably due to lower service performance and lack of route accessibility. Therefore, this study analyzes passenger satisfaction with Trans Koetaradja bus performance. It also seeks to find out the level of passenger satisfaction in terms of the suitability between expected satisfaction and observed performance (Mutiawati *et al.*, 2019).

Customer Satisfaction

Zeithaml and Bitner (2003) define satisfaction as a judgment that a product or service feature (or the product or service itself) provides a pleasurable level of consumption-related fulfillment. Choi and Chu (2001) consider satisfaction as an evaluation by customers that the food or service they have received is at least as good as it is supposed to be. According to Hansemark and Albinson (2004), satisfaction is an overall customer attitude towards a service provider, or an emotional reaction to the difference between what customers anticipate and what they receive, regarding the fulfillment of some needs, goals, or desires. The concept of customer satisfaction as a measure of perceived service quality was introduced in market research. In this field, many customer satisfaction techniques have been developed. The most widely applied technique is the ServQual method proposed by Parasuraman *et al.* (1985).

Evaluation of service quality and customer satisfaction is one of the strategies to resolve many problems in public transportation, such as helping to reduce traffic congestion, air and noise pollution, and energy consumption. For this reason, the development of techniques for customer satisfaction analysis is necessary. These techniques allow the critical aspects of the supplied services to be identified and customer satisfaction to be increased (Eboli and Mazzula, 2009; Cuomo, 2000). There is some knowledge of how customers perceive public transport considering aspects such as reliability, frequency, travel time and fare level (Hensher *et al.,* 2003, Tyrinopoulos and Aifadopoulou, 2008), comfort, and cleanliness (Eboli and Mazzulla, 2007, Swanson *et al.,* 1997), network coverage/distance to stop (Eriksson *et al.*, 2009; Tyrinopoulos and Aifadopoulou, 2008), and safety issues (Smith and Clarke, 2000; Fellesson and Friman, 2012). Those aspects are essential factors in customer evaluations of public transport service quality. Valid, accurate measurements of customer quality perceptions are important to successfully implementing the Intermodal Surface Transportation Efficiency Act (ISTEA) (Lawrence *et al.*, 1997). Service quality is closely related to passenger satisfaction (Brady and Cronin, 2001). Service quality is a specific assessment of services provided (Oliver, 1997).

Important-Performance Analysis

Important Performance Analysis (IPA) is a part of marketing research techniques that involves the analysis of customers' attitudes towards product/service attributes and direct quality-based perceptions for marketing strategies (Silva and Fernandes, 2010; Lewis, 2009; Sampson and Showalte, 1999). IPA has the main function of providing information about service factors that greatly affect satisfaction and loyalty and service factors that, according to consumers, need to be improved (Wahyuni *et al.* 2020). One of the major ways to strengthen customer loyalty is to keep the customer delighted/satisfied with the service (Dabestani *et al.*, 2016; Sum *et al*, 2019).

By using IPA, the company can map what needs to be improved, maintained, and reduced to increase customer satisfaction (Tjitrohartoko and Saraswati, 2020). Satisfaction is a happy feeling that comes from comparing the pleasure of activities and a product with expectations (Prabowo *et al.*, 2019; Nursalam, 2016). Person satisfaction is measured by comparing the level of expectations/importance with perception/performance (Gap Analysis). Importance – Performance Analysis (IPA) can identify gaps in the performance of public transport service attributes relative to their importance (Esmailpour *et al.*, 2020). Importance Performance Analysis (IPA), which was formulated by John A. Martilla and John C. James, is a descriptive statistical method for measuring a person's level of satisfaction with the performance of others. Person satisfaction is measured by comparing the level of expectations/importance with perception/performance (gap Analysis). If the expectation level is higher than perception, the consumer has not reached satisfaction or vice versa. The results of the analysis are set forth (A, B, C, D) in a Cartesian diagram by Martilla and James (1977). The Cartesian diagram of Martilla and James (1977) is as follows:

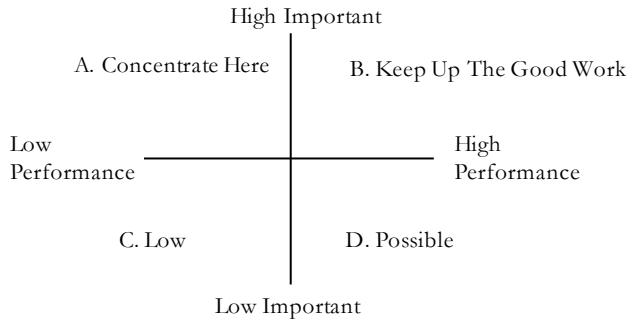

Figure 1. Cartesiuns diagram (Martila and James, 1977).

Quadrant A: The aspects require immediate attention for improvement, and there are major weaknesses related to the aspects. Quadrant B: The aspects indicate opportunities for achieving or maintaining competitive advantage, and there are major strengths related to the aspects. Quadrant C: aspects are minor weaknesses and do not require additional effort. Quadrant D: aspects indicate that business resources committed to these attributes would be overkill and should be deployed elsewhere.

Materials and Methods

Research Samples

Primary data was collected by distributing the questionnaire to respondents. The respondents considered were passengers of the Trans Koetaradja bus. The route map of the Trans Koetaradja bus can be seen in Figure 2. The number of samples of each route can be seen in Table 1.

Table 1. The number of samples.

Routes	Number of Samples (n)	Remarks
1. CBD of Banda Aceh–Bandara Sultan Iskandar Muda	98	Route 1
2. CBD of Banda Aceh–Ulee Lheue	133	Route 2
3. CBD of Banda Aceh–Darussalam	151	Route 3
Total samples	382	

Figure 2. Routes of Trans Koetaradja Bus (Department of Transportation, 2020).

Variables and Scale of Measurement

There are 13 variables utilized in this research, as shown in Table 2.

Table 2. Variables of research.

Code	Variables	Code	Variables
1	Seating availability	8	Travel Time
2	Cleanliness and Neatness	9	Physical Performance of Buses
3	Basic Amenity (e.g. air conditioner)	10	Condition of Bus-Stop
4	Safety from Crimes	11	Punctuality of Arrival and Departure Time
5	Skill in Driving	12	Easiness of getting the bus
6	Safety Kits (e.g., Extinguisher)	13	Cheap fare/free of charge
7	Condition of Route Feeder		

The Trans Koetaradja bus service assessment was based on passenger expectations so that the operator could evaluate the results. The measurement of passenger expectations and observed performance was carried out using a 3-category Likert scale. The assessment on the level of passenger expectations over Trans Koetaradja bus service was scored as follows:

a. The answers which indicated "expected" had a score of 3
b. The answers which indicated "fair/neutral" had a score of 2
c. The answers which indicated "not expected" had a score of 1

The assessment of passenger satisfaction over Trans Koetaradja bus service level was-scored as follows:

a. The answers which indicated "Good, means passengers were satisfied" had a score of 3
b. The responses which indicated "fair/neutral, means passengers were less satisfied" have a score of 2
c. The answers which showed "Worst, means passengers were not satisfied" has a score of 1

Data Collection and Processing

The data were collected by distributing questionnaires to the passengers of Trans Koetaradja buses. The distribution of the questionnaires was carried out in the buses at each different route. The survey was performed from 7.00 AM to 6.00 PM during working hours. The stages of data processing are as follows:

1. Calculate the average value of service levels and passenger expectations of each variable by utilizing the following equation:

$$\bar{X} = \frac{\Sigma xi}{n} \quad (1)$$

$$\bar{Y} = \frac{\Sigma yi}{n} \quad (2)$$

Note:

$\bar{X}$ = Average score of level of observed performance/satisfaction

$\bar{Y}$ = Average score of level of expectation

n = number of respondents

The results are plotted on the horizontal axis (x) for the satisfaction level score while the upright axis (y) for the expectation level score.

2. Calculating the average value of the level of observed performance score or passenger satisfaction (x) and the average value of the score of the level of expectation/importance of all factors that affect the satisfaction of the Trans Koetaradja bus passenger (y) by utilizing the following equation:

The values of $\bar{X}$ and $\bar{Y}$ are perpendicular cross lines and truncated dots $(\bar{\bar{X}}, \bar{\bar{Y}})$

$$\bar{\bar{X}} = \frac{\Sigma_{i=1}^{N} \bar{x}_1}{K} \quad (3)$$

$$\bar{\bar{Y}} = \frac{\Sigma_{i=1}^{N} \bar{y}_1}{K} \quad (4)$$

Note:

K = The Number of attributes/facts influencing the passengers' satisfaction

3. A Cartesian diagram is further produced, divided into four parts/quadrants A, B, C, and D, as shown in Figure 1.
4. The quadrant analysis for the four quadrants can be described as follows:
   a. If the average value of the variable is in quadrant A, it indicates that the variable is a top priority. It is considered important and affects customer satisfaction. However, the operator has not implemented it yet, according to the expectation of the passengers, so it is disappointing/dissatisfied
   b. If the average value of the variable is in quadrant B, it indicates that the variable must be maintained in the future. This is because the variable has been successfully implemented or in accordance with passenger expectations; hence, it must be maintained.
   c. Quadrant C is a low priority. Variables in this quadrant show several less important factors for passengers, in which its implementation is mediocre. Passengers consider it less important, and the results are less satisfactory (low priority).
   d. Quadrant D is excessive. Variables in this quadrant indicate that the variable is less important, but the implementation is excessive. Passengers consider it less important, but the results are satisfactory (excessive).

The assessment of the level of suitability between the implementation (observed performance) and the expectations of Trans Koetaradja bus passengers is performed by calculating the comparison of the given total score value of service and the passengers' expectations on the Trans Koetaradja bus. If the value (%) is less than 100%, the implementation needs to be improved. If the value is the same, the expectation and implementation are appropriate. Nevertheless, if the results are more than 100%, the implementation exceeds the expectations of the Trans Koetaradja bus.

Results

The Characteristics of Passengers

Based on the questionnaire results, the characteristics of Trans Koetaradja passengers were classified based on gender, age, and occupation. It can be seen in Figures 3, 4, and 5.

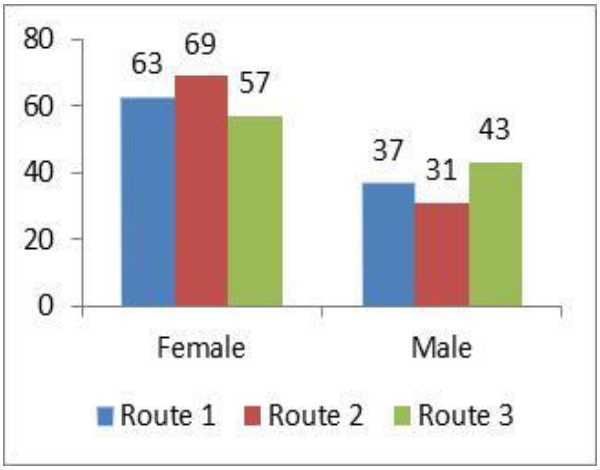

Figure 3. Characteristic of passengers by gender.

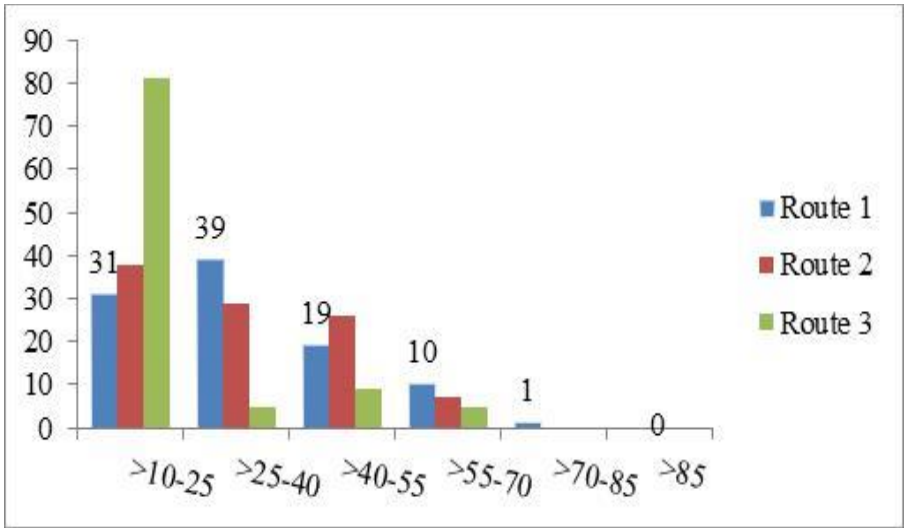

Figure 4. Characteristic of passengers by age.

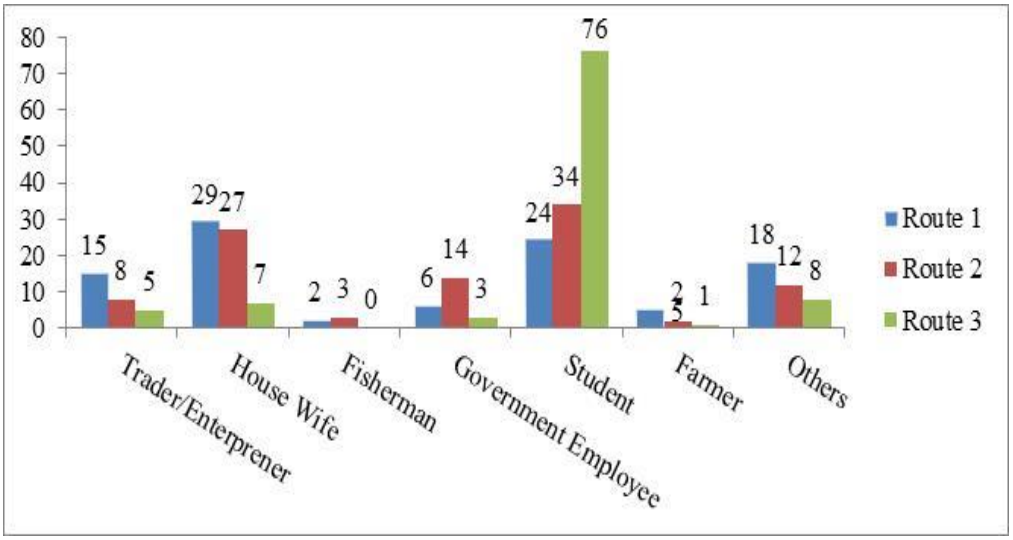

Figure 5. Characteristic of passengers by occupation

Performance and Expectation Rating

The performance of the Trans Koetaradja bus that was measured by 13 variables on three routes regarding respondent perception was "good." Criteria for the average value are as follows, Good (2.67-3.00), Neutral (2.33-2.67), and Not Good (1.00-1.67). Performance ratings and expectations can be seen in Table 3, Table 4, and Table 5.

Table 3. Performance & Expectation Rating (Banda Aceh–SIM Airport of Route 1).

Variables Code	Variables	Mean Performance Rating	Mean Expectation Rating
1	Seating availability	2.88	2,46
2	Cleanliness and Neatness	2.90	2,55
3	Basic Amenity (e.g., air conditioner)	2.97	2,51
4	Safety from Crimes	2.97	2,49
5	Skill in Driving	2.89	2,50
6	Safety Kits (e.g. Extinguisher)	2.92	2,46
7	Condition of Route Feeder	2.37	2,79
8	Travel Time	2.65	2,77
9	Physical Performance of Buses	2.90	2,65
10	Condition of Bus-Stop	2.81	2,63
11	Punctuality of Arrival and Departure Time	2.53	2,73
12	Easiness of getting the bus	2.82	2,63
13	Lower fare/free of charge	2,92	2,49
	Average	**2.81**	**2,59**

Table 4. Performance and Expectation Rating (Banda Aceh – Ulee Lheue Port of Route 2).

Variables Code	Variables	Mean Performance Rating	Mean Expectation Rating
1	Seating availability	2.88	2.93
2	Cleanliness and Neatness	2.99	2.92
3	Basic Amenity (e.g. air conditioner)	3.00	2.91
4	Safety from Crimes	2.92	2.92
5	Skill in Driving	2.95	2.92

Variables Code	Variables	Mean Performance Rating	Mean Expectation Rating
6	Safety Kits (e.g., Extinguisher)	2.99	2.90
7	Condition of Route Feeder	2.44	2.89
8	Travel Time	2.83	2.95
9	Physical Performance of Buses	2.98	2.94
10	Condition of Bus-Stop	2.80	2.93
11	Punctuality of Arrival and Departure Time	2.54	2.96
12	Easiness of getting the bus	2.85	2.93
13	Lower fare/free of charge	2,98	2,96
	Average	**2.86**	**2.93**

Table 5. Performance and Expectation Rating (Banda Aceh – Darussalam of Route 3)

Variables Code	Variables	Mean Performance Rating	Mean Expectation Rating
1	Seating availability	2.81	2.89
2	Cleanliness and Neatness	2.94	2.82
3	Basic Amenity (e.g., air conditioner)	2.95	2.93
4	Safety from Crimes	2.89	2.91
5	Skill in Driving	2.84	2.95
6	Safety Kits (e.g., Extinguisher)	2.93	2.76
7	Condition of Route Feeder	2.54	2.88
8	Travel Time	2.48	2.92
9	Physical Performance of Buses	2.92	2.92
10	Condition of Bus-Stop	2.63	2.88
11	Punctuality of Arrival and Departure Time	**1.18**	2.98
12	Easiness of getting the bus	2.73	2.96
13	Lower fare/free of charge	2.92	3.00
	Average	**2.67**	**2.91**

Load factor is defined as the ratio of the number of passengers in a vehicle to the number of seats. The load factor values for each route can be seen in Figures 6, 7, and 8.

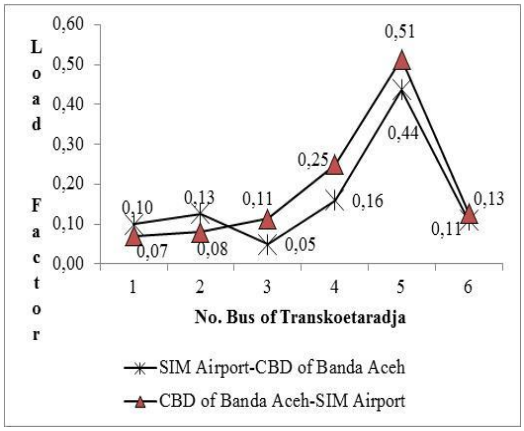

Figure 6. Load Factor values for Route 1

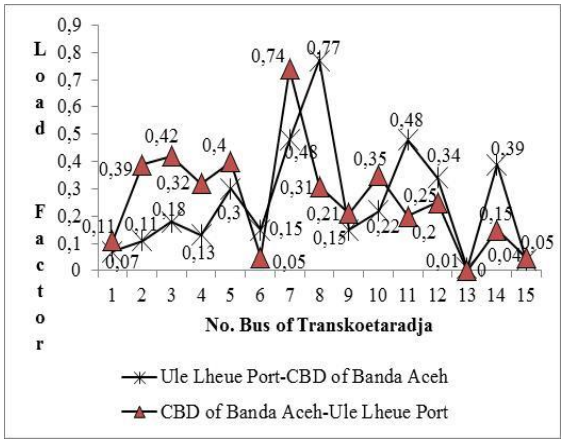

Figure 7. Load Factor values for Route 2

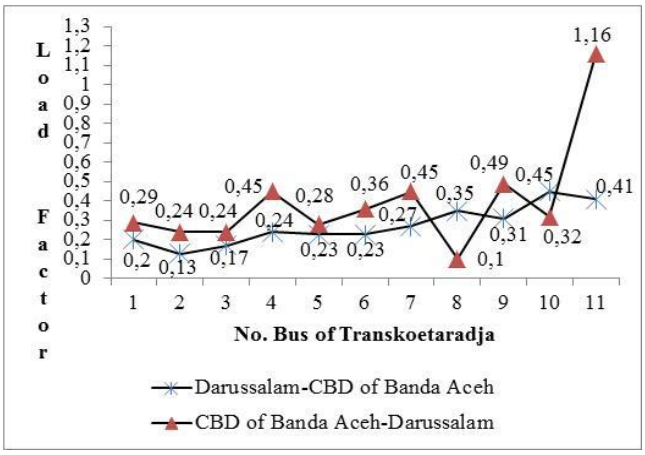

Figure 8. Load Factor values for Route 3

The result of the IPA analysis of the level of service performance and the importance of the Trans Koetaradja Bus was illustrated in Figures 9, 10, and 11.

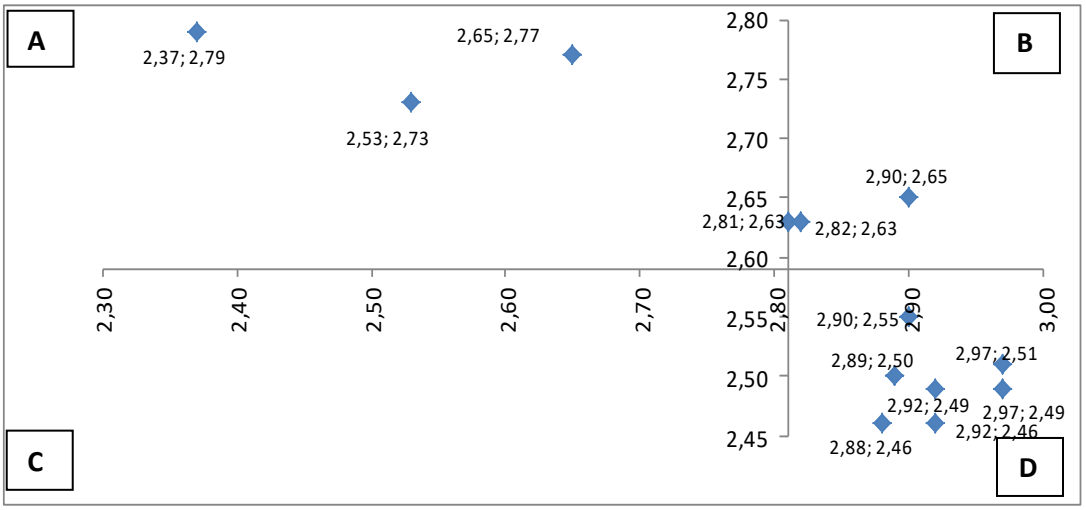

Figure 9. Cartesius diagram of Banda Aceh – Sultan Iskandar Muda Airport of Route 1

Performance and Expectations of Passengers on the Service of Trans Koetaradja Buses

The level of suitability between the implementation (observed performance) and the expectations of Trans Koetaradja bus passengers was scored as follows (Mahardi *et al.*, 2019; Budiono, 2013):

1. If the value (%) is less than 100%, the implementation needs to be improved.
2. If the value is the same, the expectation and implementation are appropriate.
3. If the results are more than 100%, the implementation exceeds the expectations of Trans Koetaradja bus passengers.

The level of suitability for each route can be seen in Table 6.

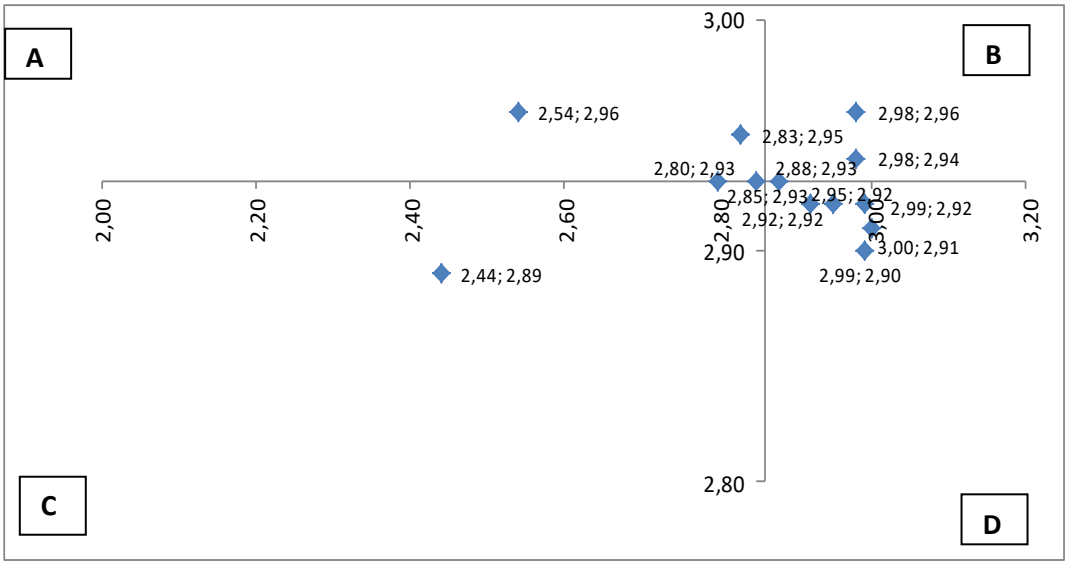

Figure 10. Cartesius diagram of Banda Aceh – Ulee Lheue Port of Route 2

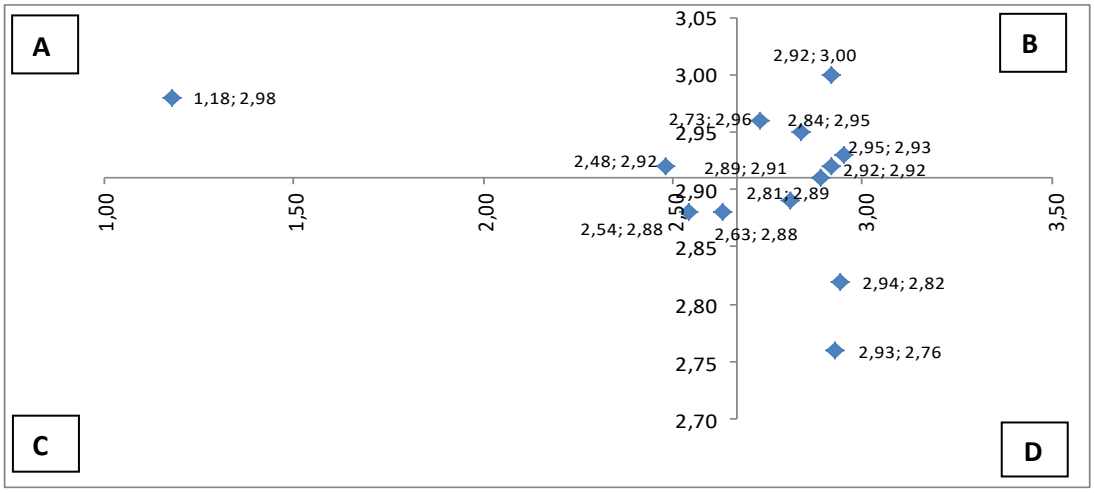

Figure 11. Cartesius Diagram of Banda Aceh – Darussalam of Route 3

Table 6. Performance and Expectation Rating

Variables Code	Variables	The level of suitability/LS (%)					
		Route 1		Route 2		Route 3	
		LS	Gap	LS	Gap	LS	Gap
1	Seating Availability	97	-3	117	17	98	-2
2	Cleanliness and Neatness	100	0	114	14	102	2
3	Basic Amenity (e.g. air conditioner)	100	0	118	18	103	3
4	Safety from Crimes	98	-2	119	19	100	0
5	Skill in Driving	96	-4	116	16	101	1
6	Safety Kits (e.g. Extinguisher)	101	1	119	19	103	3
7	Condition of Route Feeder	88	-12	85	-15	84	-16
8	Travel Time	84	-16	96	-4	96	-4
9	Physical Performance of Buses	100	0	109	9	101	1
10	Condition of Bus-Stop	90	-10	107	7	95	-5

Variables Code	Variables	The level of suitability/LS (%)					
		Route 1		Route 2		Route 3	
		LS	Gap	LS	Gap	LS	Gap
11	Punctuality of Arrival and Departure Time	75	-25	93	7	86	-16
12	Easiness of getting the bus	92	-8	111	11	97	-3
13	Lower fare/ free of charge	104	4	117	17	101	1

Remark: Route 1 = Banda Aceh – Sultan Iskandar Muda Airport
Route 2 = Banda Aceh – Ulee Lheue Port
Route 3 = Banda Aceh – Darussalam

Discussions

Figure 3 shows the characteristics of Trans Koetaradja passengers by gender. It illustrates that the passengers were dominated by women (57% to 69%) on all routes. In terms of ages, the characteristics of passengers were slightly different on each route (see Figure 4). Route 3, which lies from Banda Aceh-Darussalam, was dominated by young people ages>10 to 25 years, while Route 2 (Banda Aceh-Ulee Lheue) was dominated by productive people ages 25 to 40 years.

Figure 5 shows the occupation of passengers. Students dominated Banda Aceh - Darussalam route; the students were around 76%. This route is known as a center of education. Surprisingly, Banda Aceh - Sultan Iskandar Muda Airport route (route 1) was dominated by housewives and students, around 29% and 24%, respectively. It indicates that Trans Koetaradja passengers for this route were not only flighted passengers to the airport, but the passengers were also people living around the route. Banda Aceh - Ulee Lheue route also shows a similar result to the earlier route, in which students and housewives were dominant (about 34% and 27%, correspondingly

The result analysis of Trans Koetaradja's bus performance indicates that the current level of service is in line with passenger expectations. The facilities in the bus that are equipped with air conditioners and fire extinguishers make passengers feel more comfortable and safe. This result also follows the value of operational performance, in which the Load Factor (LF) for three routes ranges from 0.18 to 0.4 (Mutiawati *et al.*, 2019). Bus Load Factor is the ratio of the number of passengers over bus capacity, where the ideal load factor is <70% (Directorate General of Land Transportation, 2002). If LF is greater than 70%, seat availability is low, and passenger convenience is little. On the contrary, lower LF will not be profitable for the operator. The physical condition of buses and stops is also good; the buses and shelters are still new and have been operating since 2015 for the Banda Aceh-Darussalam route and since 2017 for 2 other routes (Banda Aceh–Bandara Sultan Iskandar Muda and Banda Aceh–Ulee Lheue). The travel time, the time of arrival and departure, and the ease of getting public transportation are also good, especially on the Banda Aceh-Airport route and Banda Aceh-Ulee lheue port route. Conversely, the Banda Aceh-Darussalam route had a low value, even for the value of Punctuality of Arrival and Departure Time variables. The service performance is in bad condition, with an average response value of 1.18. It indicates that the time of arrival and departure of the Trans Koetaradja buses needs to be repaired to meet the expectations of the passengers. According to Mutiawati *et al.* (2019), on the Banda Aceh-Darussalam route, the average headway value is relatively good, at <10 minutes. Department of Transportation (1999) requires a headway value of <10 minutes. However, when viewed from a very low minimum headway value, it was only 1 minute, which is too low. The maximum headway average is>20 minutes, with the highest score of 55 minutes (very long). The value of this headway is very unpredictable, which is probably caused by the fact that public transport does not yet have a special lane, so the obstacles to the presence of other vehicles during the trip are high.

Based on the cartesian diagram of Figures 9, 10, and 11, it could be seen that service variables that-influenced passengers' satisfaction lay on four sections/quadrans. Interpretation of each section of the diagram could be highlighted as follows:

1. Quadrant A

The variables which lay on quadrant A at the routes of Banda Aceh – Darussalam, Banda Aceh – Sultan Iskandar Muda Airport, and Banda Aceh – Ulee Lheue were as many as 2, 4, 2 variables. At present, the performance variables did not meet the expectation of passengers. There were variables of punctuality, arrival, departure, and trip time at those three routes. The factor that brought about this condition was that Trans Koetaradja buses did not have specific lanes. The current lanes were still used by other vehicles, so there were many obstacles on the trip. This obstacle caused a prolonged time consumption, so arrival and departure times became uncertain. In the long run, the government needs to think about providing a particular bus lane so that terms of arrival and departure and travel time would be suited to the expectation of passengers.

The variables lying on quadrant A for each of the routes could be described as follows:

a. Route of Banda Aceh – Darussalam
   - Time of arrival and departure (11)
   - Fast travel time (8)

b. Route of Banda Aceh – Sultan Iskandar Muda Airport
   - Condition of Route of Feeder Transportation (7)
   - Fast travel time (8)
   - Time of arrival and departure (11)
   - Condition of the bus stop as a good waiting space (10)

c. Route of Banda Aceh – Ule Lheue Port
   - Time of arrival and departure (11)
   - Fast travel time (8)

2. Quadrant B

The variables lying on quadrant B at Banda Aceh – Darussalam, Banda Aceh – Sultan Iskandar Muda Airport, and Banda Aceh – Ulee Lheue Port were as many as 5, 2, 2 variables. The variables showed that the operation of the buses of Trans Koetaradja suits the expectation of passengers, and passengers were satisfied. This condition needs to be maintained by the operator in the future. The variables were as follows:

a. Route of Banda Aceh – Darussalam
   - Ease of getting buses (12)
   - The free of charge price (13)
   - Facilities for coolness like Air Conditioner (3)
   - Driver's skill in driving (5)
   - Condition of physical performance of buses (9)

b. Route of Banda Aceh – Sultan Iskandar Muda Airport
   - Condition of physical performance of buses (9)
   - Ease of getting buses (12)

c. Route of Banda Aceh – Ule Lheue Port
   - Condition of physical performance of buses (9)
   - Cheap fares or free of charge (13)

The variable of cheap buses or free-of-charge buses that are being applied by Trans Koetaradja buses needs to be maintained in the future. Similarly, the ease of getting buses also needs to be maintained. The number of buses available caused this to cover the people's needs, and the headway did not take long. Both of the variables could be found in the two routes of the three routes investigated.

3. Quadrant C

The variable lying on quadrant D on the route of Banda Aceh – Darussalam, Banda Aceh – Sultan Iskandar Muda Airport, and route Banda Aceh – Ule Lheue Port consecutively had 2, 0, 3 variables. The variables showed that their operations were less satisfied. The passengers assumed that variable was less important, so it was expected that operators did not prioritize the variables to be perfect. The variables consisted of:

a. Route of Banda Aceh – Darussalam
   - Condition of the route of the feeder (7)
   - Condition of bus-stop/a good waiting space (10).

b. Route of Banda Aceh – Sultan Iskandar Muda Airport
   - No variables lay on C quadrant

c. Route of Banda Aceh – Ule Lheue Port
   - Condition of the route of the feeder (7)
   - Condition of bus-stop/a good waiting space (10)
   - Ease of getting buses (12)

The variable of bus-stop condition was found at the three routes. This indicated passengers felt that it was not important that the variables needed to be improved in the future. The route of the feeder was not also assumed to be important to its service. However, at present, the buses of Trans Koetaradja do not have a good feeder. Probably, passengers of Trans Koetaradja were the people who live near the Trans Koetaradja lane or other public transportation areas. The aforementioned condition could cause the low load factor (generally < 0.5) of Trans Koetaradja (Mutiawati *et al.*, 2019).

4. Quadrant D

The variable lying on D quadrant at the route of Banda Aceh – Darussalam, Banda Aceh – Sultan Iskandar Muda Airport and route of Banda Aceh – Ule Lheue Port. Each of the routes had 4, 7, and 6 variables. The passengers assumed that the variables were less important. However, the operation was better than the expectation of passengers. The variables consisted of:

a. Route of Banda Aceh – Darussalam
   - Seating availability (1)
   - Cleanliness and neatness (2)
   - Being safe from crimes (4)
   - Facilities for safety like APAR (6)

b. Route of Banda Aceh – Sultan Iskandar Muda Airport
   - Price of charge (3)
   - Seating availability (1)
   - Cleanliness and neatness (2)
   - Facilities of coolness like air conditioners (3)
   - Being safe from crimes (4)
   - Driver's skill in driving (5)
   - Facilities for safety like APAR (6)

c. Route of Banda Aceh – Ule Lheue Port
   - Seating availability (1)
   - Cleanliness and neatness (2)
   - Facilities of coolness like Air Conditioner (3)
   - Being safe from crimes (4)
   - Drivers' skills in driving (5)
   - Facilities for safety like APAR (6)

Conclusion

This research showed that Trans Koetaradja bus performance was acceptable. However, travel time and punctuality for arrival and departure time should be improved. The alternative solutions to the weaknesses are bus lane planning and feeder routes planning. Bus lane planning is necessary to avoid traffic congestion so that the travel time can be much shorter. The feeder-routes currently, in addition, the feeder routes were not available, but passengers perceived that feeder routes planning was less important. The perception was probably because the current passengers lived around the Trans Koetaradja route instead of people demanding a feeder route to reach the Trans Koetaradja services. It is expected that the increasing feeder routes can increase the passenger demand on public transport, and hence will also improve the road performance.

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