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Performance Analysis Of Trans Patriot Bus Impact Covid-19 (Terminal Bekasi - Harapan Indah Route)

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Abstract

As the population of the former city grows, the movement of the people in it increases. Provision of mass transportation or Trans Patriot buses is needed to anticipate the congestion that will occur by providing a cheap, fast and safe bus type that can be an alternative. Therefore, it is necessary to conduct research on the performance and quality of service to determine the level of passenger satisfaction with the performance of the Trans Patriot bus on the Bekasi - Harapan Indah Terminal route. From the comparison of the operational performance of the Trans Patiot buses before Covid 19 and the adaptation of new habits, the Comparison of the performance of the Trans Patriot bus for the Bekasi Terminal - Harapan Indah route before Covid 19 and the adaptation of new habits has increased in load factors, headway, travel time and travel speed, This increase is very good in providing services for Trans Patriot bus users. From the results of the questionnaire service performance level obtained from Trans Patriot bus users for the Bekasi Terminal - Harapan Indah route, which stated that the Trans Patriot bus performance was very good at 9%, good at 33%, good enough at 44%, less good at get 11% and not good at 4% and the level of user satisfaction states Very Satisfied at 9.9%, Satisfied at 41.4%, Quite Satisfied 39.6%, Less Satisfied at 8.9% and Not Satisfied 0.4%. This research is expected to be a reference or material for the Bekasi city government to take a policy so that the performance and service of Trans Patriot buses will increase in reducing congestion in the city of Bekasi.

Keywords
Importance Performance, Performance and Service of Trans Patriot buses Importance Performance.

1. Introduction

As the population continues to increase, the number of activities of the population in an effort to meet the needs of each day implies a journey / movement from one place to another. In carrying out human movement activities using transportation facilities and infrastructure, the increase in population and private vehicles makes public transportation increasingly abandoned by the community.

The purpose of writing this research is want to know service satisfaction and service performance as well as find out operational performance before covid 19 and adaptation of new habits.

2. Theoretical basis

Bus Rapid Transit is a customer-oriented form of transportation that combines stops, vehicles, planning and elements of the transportation system into a guided system that has a unique identity. Bus Rapid Transit has a number of conveniences compared to other modes of transportation, including those related to routes

According to Miller et al., (2008) BRT routes can be tailored to the needs of users, government policies and other dynamic conditions. BRT systems in general include:

a. Pick up and drop passengers fast.
b. Efficient fare collection.
c. Convenient stops and sta.tions
d. Clean bus technology.
e. Mode integration.
f. Modern marketing identity.
g. Excellent user service.

2.1. Service

According to Haksever, (2000) states that service or service is defined as an economy that produces time, place, form and psychological use. According to Gray & Mirza, (1979)Service quality is a condition or characteristic of the transportation expected by users, which consists of elements such as:

a. Safety.

b. Comfort.
c. Convenience.
d. Reliability.
e. Comparison of costs.
f. Efficiency.

2.2. Public Transport Performance

Public transportation performance is the performance result of public transportation serving all community activities for traveling or doing activities. To determine the level of public transport services, it is necessary to have indicators regulating the performance of these public transports. Based on the decision of the Director General of Land Transportation No. SK. 687 / AJ.206 / DRJD / 2002, the performance of public transport services can be assessed from the following indicators:

a. Load factor

It is the ratio between the number of passengers carried in the vehicle to the total seating capacity of passengers in the vehicle for a certain period of time.

$$LF = \frac{Psg}{c} x\ 100\% \quad \text{.....(1)}$$

Where:

Psg : The number of passengers carried
C : Passenger seating capacity
Lf : Load factor (%)

b. Time Between (Headway)

Headway is the time between one vehicle and another vehicle that is loaded behind it on one route or the difference in arrival time between one vehicle and the next vehicle.

$$H\ \frac{60}{Q} \text{.....(2)}$$

Where:
H: Headway (minute)
Q: frequency (vehicles per hour)

c. Travel Speed

Travel speed is the average vehicle from the starting point of departure to the end point of the route.

$$travel\ speed = \frac{the\ distance\ between\ the\ terminals}{travel\ time\ between\ terminals} \text{..... (3)}$$

d. Travel time

Travel time is the time it takes for a vehicle to pass through the observed road segment, including stopping time to raise and lower passengers and delay due to obstacles, travel time is calculated with a stopwatch from the initial departure to the destination.

e. Service time

This is the time during which vehicles on a route are still operating. The time is calculated from the start of the vehicle operating in the morning to the last operation in the afternoon or evening.

f. Service frequency

This is the number of bus vehicle departures that pass at one point (for example a bus stop) in units of vehicles per hour.

$$Q\ \frac{n}{T} \text{..... (4)}$$

Where:
Q= frequency
n = number of vehicles
T = time per hour (60 minutes)

g. The number of vehicles in operation

The number of operating fleets is the number of public passenger vehicles on each route that operate during service time.

2.3. Minimum Service Standards for the Directorate General of Land Transportation

To find out the performance of public transportation services, there are several elements that can be used as a reference and describe the characteristics of the expected transportation as determined by the government or the PO Perum PPD (Directorate General of Land Transportation) in terms of minimum service standards for users of the Trans Patriot public transport bus, both from in terms of quantity and quality of transportation, it can be assumed as in the table below:

Table 1. Assessment Criteria

No.	Criteria	Weight
1	A	3
2	B	2
3	C	1

Source: Directorate General of Land Transportation

Table 2. Service Standards According to the Directorate General of Land Transportation

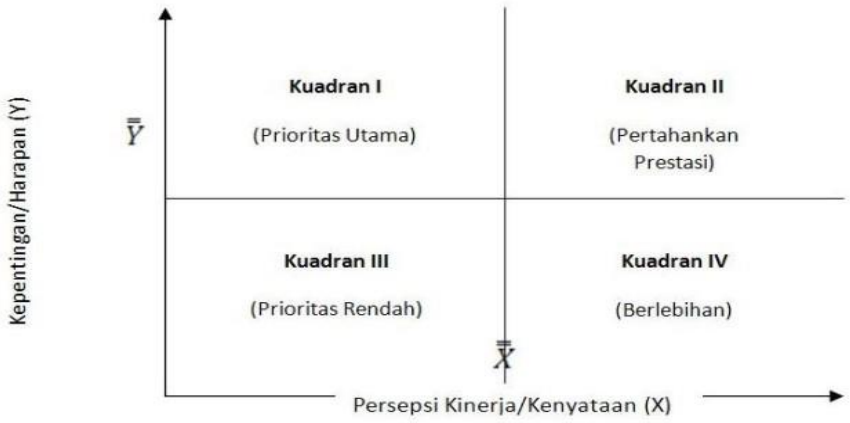
No.	Indicator	C	B	A
1	Load factor during peak hours	> 1	0.8-1	<1
2	Travel speed (km / h)	<5	5-10	> 10
3	Headway time (minutes)	> 15	10-15	<10
4	Travel Time (minutes / km)	> 12	6-12	<6
5	Service time (hours)	<13	13-15	15
6	Frequency	<4	4-6	> 6
7	Number of operating vehicles (%)	<82	82-100	> 100
8	Passenger waiting time (minutes)	> 30	20-30	<20

Source: Directorate General of Land Transportation

2.4. Importance Performance Analysis Method

IPA (Importance Performance Analysis) is used to map the relationship between performance and the importance of each attribute offered and the gap between performance and expectations of the attributes that have been determined.In this technique, respondents are asked to rate the level of performance and importance of the services provided by the service provider.

Figure 1. A Cartesian Diagram of the Natural Science Method



Source: (Nengkoda et al., 2011)

The explanation of the Cartesian quadrant diagram is as follows:

a. Quadrant I (Top Priority)

In this quadrant, there are things that are considered important and expected by service users, but the performance provided by service providers to users is not satisfactory, so the performance needs to be improved to satisfy service users.

b. Quadrant II (Maintain Achievement)

In this quadrant there are things that are considered important and expected by service users and have high performance so that it needs to be maintained by service providers.

c. Quadrant III (Low Priority)

In this awareness there are things that are considered to have a low level of performance and are less important or not really expected by service users so that service providers do not need to prioritize or pay more attention to these things.

d. Quadrant IV (Excessive)

In this awareness, there are things that are considered not too important and that are not really expected by service users so that service providers are better off diverting things included in these factors to factors that have a higher priority level.

3. Methodology

This research method uses quantitative methods. The data obtained by using a survey of load factors, headway, travel speed, travel time, service time and number of operating vehicles and by distributing questionnaires. The number of samples used in distributing questionnaires is 100 respondents using the formula Lemesshow for the unknown population

$$n\frac{Z^2\ x\ P(1-P)}{(1+N(e)^2)} \quad (6)$$

Where :
n = Number of samples
Z = z score at 95% confidence = 1.96
p = maximum estimate = 0.5
d = Alpha (0.10) or sampling error = 10%

4. Results and Analysis

4.1. Operational performance adaptation to new habits

This analysis will identify the level of operational performance during the Covid-19 pandemic on the trans patriot bus at the Bekasi-Harapan Indah terminal. The following are the results of the data during the survey:

a. Load Factor

From the results of field observations for the route under review, it has been obtained the average number of passengers on the trans patriot public transport bus. The load factor calculation is carried out for 2 days on Monday and Saturday.

Table 3. Load Factor

No.	Route	Day	Time	Average Load factor
1	Bekasi Terminal - Harapan Indah	Monday	Morning	0.81
2	Bekasi Terminal - Harapan Indah	Monday	Noon	0.31
3	Bekasi Terminal - Harapan Indah	Monday	Afternoon	0.75
4	Harapan Indah - Bekasi Terminal	Monday	Morning	0.69
5	Harapan Indah - Bekasi Terminal	Monday	Noon	0.30
6	Harapan Indah - Bekasi Terminal	Monday	Afternoon	0.68
7	Bekasi Terminal - Harapan Indah	Saturday	Morning	0.64
8	Bekasi Terminal - Harapan Indah	Saturday	Morning	0.23
9	Bekasi Terminal - Harapan Indah	Saturday	Noon	0.24
10	Harapan Indah - Bekasi Terminal	Saturday	Morning	0.45
11	Harapan Indah - Bekasi Terminal	Saturday	Noon	0.30
12	Harapan Indah - Bekasi Terminal	Saturday	afternoon	0.20
	Average			0.47

In terms of the standard used, the ideal load factor for public transport is 0.8. While the results obtained, the average load factor is 0.47, so the value of the trans Patriot bus load factor on this route shows a good criteria value.

b. Time Between (Headway)

The average headway for transpatriot buses is 17 minutes, if you look at it from the headway point of view of the level of public transport services, the trans Patriot bus is in the bad category because based on the standard it is used more than> 15 minutes.

c. Travel time

The result of the average obtained from the research for the trans-patriot bus travel time is 3.5 minutes / km, based on the standard indicators used, it is known that the trans-patriot bus vehicle travel time is still in good condition, because the value is smaller than the standard used. used that is <6 minutes / km.

d. Travel Speed

The results of the average travel speed of the Trans Patriot buses obtained 46 km / hour, this result shows that the service level of the Trans Patriot public transport buses is in good condition because based on the standards used, if> 10 km / hour is categorized as good.

e. Frequency

The average frequency of trans patriot buses is 3 vehicles / hour. From these results, it can be seen that the frequency of trans-patriot bus vehicles on this route is in poor criteria because it is in accordance with the standards used when the category is lacking, namely in the value range <4 vehicles / hour.

f. Service Time

The service time of the Trans Patriot public transport bus for the Bekasi terminal route - Harapan Indah is 15 hours / day. The criteria for service time can be said to be in good status if the public transport service lasts> 15 hours. So that the trans Patriot public transport bus service if the value of the service time for the Bekasi-Harapan Indah terminal route is still in quite good condition.

g. Number of Operating Vehicles

Based on field observations, the number of trans patriot bus vehicles operating on the Bekasi-Harapan Indah terminal route is 9 buses and 9 buses operating. Based on the standard of public transport services used, the number of vehicles operating for trans patriot buses is 100% percent, so the criteria are still quite good.

h. Beginning and End of Service Time

The service time of all Trans Patriot buses for the Bekasi-Harapan Indah terminal route in one day starts at 05:00 WIB and ends at 21:00 WIB (15 hours / day). Based on the standards used, the assessment of the service level of the Trans Patriot bus from the start and end of the service time includes good criteria.

Table 4. Recapitulation of performance levels of trans patriot public transport buses

No.	Indicator	Big	Unit	Assessment criteria			Results Criteria	
				Well (3)	Moderate (2)	Less (1)		
1	Load factor on	0.47	%	<0.8	0.8-1	> 1	3	Well
2	Time Between / headway	15	Minute	<0.10	10-15	> 15	1	Less
3	Travel time	3.52	Minutes / hour	<6	6-12	> 12	3	Well
4	Service Time	15	Hour	> 15	13-15	<13	2	Moderate
5	Frequency	3	Vehicle / hour	> 6	4-6	<4	1	Less
6	Travel Speed	46	Km / hour	> 10	5-10	<5	3	Well
7	Number of Operating Vehicles	100	%	> 100	85-100	<82	2	Moderate
8	Beginning and End of Service Time	05-21		05-21	05-20	05-18	3	Well
		Total					18	Well

Source: Secondary Data, 2020

4.2. Comparison of Operational Performance Before Covid and Adaptation to New Habits

This analysis is to compare the operational performance of the Trans Patriot bus before Covid 19 with the adaptation of new habits. The details are as follows:

Table 5. Comparison of operational performance before Covid and adaptation of new habits

Variable	Before covid	Adapt new habits	Information
Load Factor	15-20%	35-40%	To increase
Headway (minutes)	20	17	To increase
Frequency (vehicle / hour)	3	3	Permanent
Service time (hours)	15	15	Permanent
Travel Time (minutes)	75	65	To increase
Bus Fleet	9	9	Permanent
Travel Speed (km / h)	46	46	Permanent

Source: Secondary Data, 2020

From the results of the comparison above, the operational performance of the Trans Patriot bus has increased from before Covid 19, the increase in the Trans Patriot bus is quite good, seeing that the Trans Patriot

bus load factor has started to increase which indicates the Bekasi community has trusted the Trans Patriot bus as a good public transportation.

4.3. Questionnaire Data Analysis

4.3.1. Validity test

The validity test is used to measure whether a statement is appropriate to be used in measuring a certain aspect. Validity is indicated by the value of the correlation. A question item is declared valid if the calculated correlation value> table correlation value (r count> r table). In this study, the number of respondents (n) was 100 respondents with a confidence level of 95% (r table) = 0.195. based on the results of each indicator to the total construct score of each variable shows significant results, namely r count> r table. So it can be concluded that all. The question item is declared valid.

Table 6. Validity Test Results

Variable	R count	R table value	Sig value.	Decision	Variable	R count	R table value	Sig value.	Decision
X1	0.609	0.197	0	Valid	Y1	0.518	0.197	0	Valid
X2	0.563	0.197	0	Valid	Y2	0.575	0.197	0	Valid
X3	0.379	0.197	0	Valid	Y3	0.510	0.197	0	Valid
X4	0.740	0.197	0	Valid	Y4	0.570	0.197	0	Valid
X5	0.640	0.197	0	Valid	Y5	0.682	0.197	0	Valid
X6	0.576	0.197	0	Valid	Y6	0.519	0.197	0	Valid
X7	0.450	0.197	0	Valid	Y7	0.627	0.197	0	Valid
X8	0.675	0.197	0	Valid	Y8	0.695	0.197	0	Valid
X9	0.578	0.197	0	Valid	Y9	0.602	0.197	0	Valid
X10	0.595	0.197	0	Valid	Y10	0.695	0.197	0	Valid
X11	0.679	0.197	0	Valid	Y11	0.657	0.197	0	Valid
X12	0.684	0.197	0	Valid	Y12	0.602	0.197	0	Valid
X13	0.624	0.197	0	Valid	Y13	0.695	0.197	0	Valid
X14	0.700	0.197	0	Valid	Y14	0.564	0.197	0	Valid

Source: SPSS Processing Results

4.3.2. Reliability Test

Reliability test is used to measure the consistency of the construct / research variable. A variable is said to be reliable if the respondent's answer to the question is consistent or stable over time. The level of reliability of a research variable construct can be seen from the results of the Croncbach Alpha (α) statistic. A variable is said to be realistic if the Cronbach Alpha value is ≥ 0.60.

Based on the results of the calculation of all variables, it can be said to be reliable, namely having a Crinbach Alpha (α) ≥ 0.60, so it can be concluded that the questionnaire will provide consistency of the same measurement results if carried out in a different time context. Therefore, each variable concept is suitable for use as a measuring tool.

Table 7. Reliability Test Results

Variable	Reability Coefficient	Cronbach Alpha	Information
X (Performance)	14 question items	0871	Reliable
Y (Satisfaction)	14 question items	0.857	Reliable

4.3.3. Importance Performance Analysis

Analysis of the questionnaire data in this study using the IPA method. This was done to find out the respondent's opinion regarding the performance and level of user satisfaction with the condition of the object in question. The respondents referred to in this study were users of the Trans Patriot Bus Terminal Bekasi - Harapan Indah route. From the results of respondents' assessment of the questionnaire, the level of performance and level of satisfaction was obtained. in the form of a Cartesian diagram as follows:

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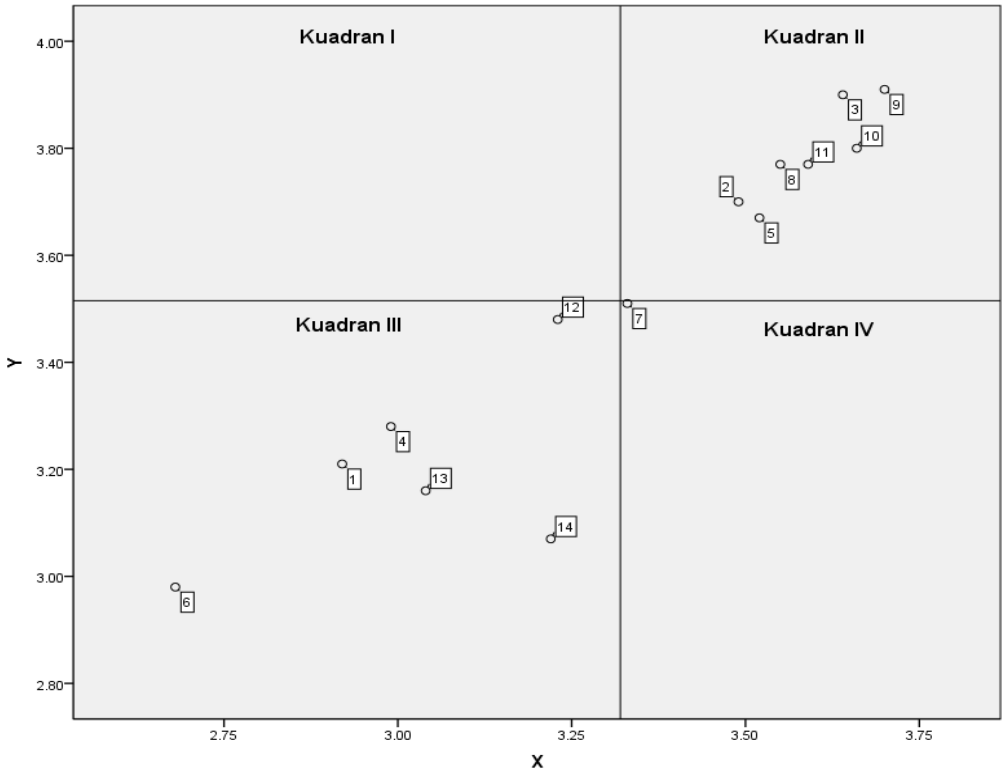
Table 8. Level of Conformity Between Performance Level and Satisfaction Level

No.	INDICATOR	Rating Score		Level of Conformity
		Performance	Satisfaction	
1	Availability of safety facilities (APAR, glass breaking equipment, and emergency exits)	292	321	90.97%
2	The Trans Patriot Bus door can be closed perfectly	349	370	94.32%
3	Availability of surveillance cameras (CCTV) on the bus	364	390	93.33%
4	Availability of information (in the form of stickers) including the telephone number and SMS of the complaint	299	328	91.16%
5	The lights on the bus are functioning properly	352	367	95.91%
6	Adjust the time of arrival and departure to the schedule	268	298	89.93%
7	Friendliness and honesty of the bus conductor in providing service.	333	351	94.87%
8	Clean seating and cabin areas are available	355	377	94.16%
9	The availability of an air conditioning system that maintains room temperature	370	391	94.63%
10	Availability of handrails for standing passengers	366	380	96.32%
11	Availability of Trans Patriot bus route maps	359	377	95.23%
12	Availability of information on the nearest Trans Patriot Bus stop	323	348	92.82%
13	The availability of a special room for passengers who bring wheelchairs	304	316	96.20%
14	Availability of priority seating	322	307	104.89%

Source: Questionnaire Processing Results

Figure 2. Kartecius Diagram of Performance Level and Satisfaction Level



Source: SPSS 2020 processing

After obtaining the results from the Kartecius diagram shown in Figure 1, it can be determined the level of performance and level of satisfaction, among others, as follows .

Quadrant II (Maintain Achievement)

The indicators contained in Ku Awareness II include:

a. Trans patriot bus door can be closed perfectly.
b. Availability of surveillance cameras (CCTV) on the bus.
c. The lights on the bus are functioning properly
d. Friendliness and honesty of the bus conductor in providing services.
e. The availability of an air conditioning system (AC) that maintains room temperature.
f. Availability of handrails for standing passengers
g. Availability of trans patriot bus route maps

Quadrant III (Low Priority)

The indicators contained in Ku Awareness III include:

a. Availability of safety facilities (APAR, glass breaking equipment, and emergency exits.
b. Customizable arrival and departure times with schedules.
c. Availability of information on the nearest trans patriot bus stop.
d. The availability of a special room for passengers who bring wheelchairs.
e. Availability of priority seating.
f. Availability of information (in the form of stickers) including the telephone number and text of the complaint

Quadrant IV (Excessive Priority)

The indicators contained in Ku Awareness IV include:

a. The availability of a clean cabin area.

5. Conclusion

Based on the results of the analysis and calculation of data and observations made during data collection, it can be concluded as follows:

1. The performance of the Trans Patriot bus for the Bekasi - Harapan Indah Terminal route which refers to the minimum service standard indicator of the Directorate General of land transportation, shows that the average result for performance is good. In other words, the quality of the Trans Patriot bus service performance has met the standards set by the Directorate General of Land Transportation.
2. Service performance improvement is carried out by fixing services that are not in accordance with service standards, such as intermediate time and frequency.
3. From the results of the cartesis diagram formed, there is something that needs to be done to improve the service level which is still below the expectations of the trans patriot bus service user, so that it matches the desired expectations at the service level located in quadrant III, such as: availability of safety facilities, availability of information that includes telephone numbers and text of complaints, according to the time of arrival and departure with the schedule, availability of information on the nearest trans patriot bus stop, the availability of a special room for passengers carrying wheelchairs and the availability of priority seats. Which must be fixed again to suit the wishes of the passengers.
4. The impact of covid-19 when new habits have increased from before Covid-19 on indicators such as: load factor, headway, travel time and travel speed.

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