



Performance Analysis and Passenger Satisfaction on Trans Jakarta Bus Services (Cibubur Route – BKN)

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ABSTRACT

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DKI Jakarta has built a BRT (Bus Rapid Transit) transportation system, also known as Transjakarta, which has been operating since January 15, 2004, one of which is serving the Cibubur-BKN route. The purpose of this study was to determine the extent of service performance and customer satisfaction of users of the route. The methodology used is to collect data directly in the field using a questionnaire that refers to the Standards of the Director General of Land Transportation with indicators such as load factor, headway, vehicle frequency per hour, travel time, service time, travel speed and number of vehicles operating. The data were analyzed using the Importance Performance Analysis method which was processed using SPSS software. From the results of the analysis, the results of the quality of the performance of Transjakarta buses have met the standards of the Director General of Land Transportation, and the results of the dimensions of direct evidence of reliability, responsiveness, assurance, empathy and tangibles, the average results of service quality dimensions for the performance of Transjakarta route Cibubur - BKN Cawang reach a value of 3, 15 or the performance of the services provided in each of the service dimensions studied reached a fairly good category. And the average level of satisfaction of Transjakarta passengers on the Cibubur – BKN Cawang route reached a value of 3.13, which is quite satisfied.

1. Introduction

Transportation is an effort to move or divert an object from one place to another, where in another place the object is more useful or can be useful for certain purposes. (Miro, 2012). It can also be interpreted as the activity of moving goods (load) and passengers from one place to another. In transportation, there are two most important elements, namely movement and physically changing the place of goods (commodities) and passengers to other places. (Cervero, 2014). Public transportation is passenger transportation using public transportation and is carried out with a rental or payment system. Public transportation is any motorized vehicle provided for use by the public for a fee. Public passenger transportation, better known as public transportation, is an environmentally friendly transportation and can save fuel use (Kementrian Pekerjaan Umum, 2018), such as paratransit and masstransit.

Cibubur is an area in the east of Jakarta which is directly adjacent to Bekasi and Depok, many of the workers who work in Jakarta live around the area and use different types of transportation. Of the

various types of transportation, land transportation is one of the most widely used by consumers and also experiences problems, namely congestion. According to the World Health Organization (WHO), one million people die every year, three million people are seriously injured in their lifetime and thirty million are injured in road accidents. Road accidents are expected to be the third to add to the global burden of disease and injury by 2020 (Prasetijo et al., 2021). According to data from the Central Statistics Agency, the number of motorized vehicles registered in Jakarta in 2016 was 18,006,404 units and in the last 5 years has grown to 5.35 percent per year, resulting in problems such as congestion because existing infrastructure cannot accommodate existing vehicles. (Isradi, Dwiatmoko, Setiawan, et al., 2020). Therefore, to attract private vehicle users to switch to public transportation, DKI Jakarta Provincial Government has built a BRT (Bus Rapid Transit) transportation system, also known as Transjakarta, which has been operating since January 15, 2004.

Bus is one of the most important modes of transportation and contributes several aspects in daily life, the mode will be an alternative for users to travel (Prasetijo et al., 2016). Transjakarta users have increased from year to year. According to data from the Central Statistics Agency, the passengers transported by the Transjakarta fleet have a total of 155 routes. as many as 188.77 million people in 2018, an increase from the previous years 144.86 million in 2017, and 123.70 million in 2016. In public transportation, negative incidents, such as vehicle delays, lack of information, lost information or rude employees have the highest impact on customer satisfaction. Examples of these negative incidents include vehicle delays, lack of vehicle information, lack of cleanliness, or unfriendly staff attitudes (Handayani, 2018), Behind the increase in the number of passengers, it is hoped that the quality of service provided by Transjakarta to its users will give maximum satisfaction to passengers (Rangkuti, 2003).

2. Method

In every research generally carried out with a "research method" so that every step to be taken can be carried out as expected, so that the research can be completed at the decision-making stage. Data collection techniques were carried out by direct observation, interviews, and distributing questionnaires to obtain primary data (Isradi, Dwiatmoko, Putri, et al., 2020), while the secondary data is obtained from the operator of the Trans Jakarta bus management.

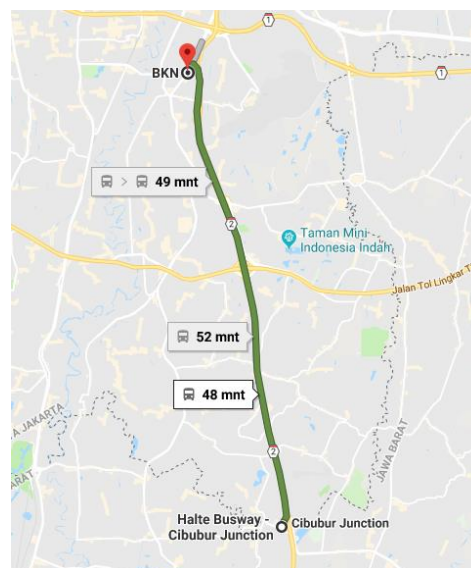


Fig 1. Research location

This data processing and analysis uses questionnaire data and direct observations obtained in the field. This work is intended to obtain results from the analysis of the performance and service of the Transjakarta Bus in accordance with the Standards of the Department of Land Transportation for bus fleet services. Direct data retrieval such as load factor, journey speed, headway time, travel time, service time, vehicle frequency and number of vehicles operating.

The data analysis method used in this research is qualitative and quantitative analysis methods. Regarding the extent to which the quality of the performance and service of the Transjakarta Bus on the level of passenger satisfaction using Importance Performance Analysis (IPA) (Irfan Rifai et al.,

2021). The variable used is variable x which is the level of performance and service based on the performance of the Transjakarta Bus fleet and variable y is the level of importance/satisfaction of passengers on the Transjakarta Bus service. After obtaining the location of the service factors in the quadrant on the Cartesian diagram according to the analysis, then testing the influence between the performance of the operator and passenger satisfaction based on an understanding of the relationship between the two in the quadrant by using the Chi-Square (X^2) formula. (Dermawan et al., 2021). As for the projection of passengers using the geometric method using the assumption that the number of passengers will increase geometrically using the basis of calculating compound interest, the growth rate is considered the same for each year..

3. Results And Discussion

From the data that has been obtained, the bus performance data processing is carried out as follows:

3.1. Load Factor

The results of load factor calculations based on trip passengers can be seen in the following table:

Table.1 Value of load factor

Route Trans Jakarta	Load Factor
Cibubur – BKN (morning)	90,4%
Cibubur – BKN (afternoon)	73,9%
Cawang – Cibubur (morning)	101,3%
Cawang – Cibubur (afternoon)	79,4%
Cibubur – BKN (morning)	82,1%
Cibubur – BKN (afternoon)	76,1%
BKN Cawang – Cibubur (morning)	95,8%
BKN Cawang – Cibubur (afternoon)	93,1%

From table 1 above, the load factor of the Transjakarta Cibubur - BKN Cawang Bus Transjakarta bus has an average value of 86.2% is category B (80-100%)

3.2. Headway

To get the headway time for the Transjakarta bus, the Cibubur – BKN Cawang route, by recording the arrival and departure times of the buses sequentially, can be seen in tables 2 and 3 below:

Table 2. Headway value & frequency of Cibubur and BKN Cawang morning routes

No	Bus stop	Days			
		Monday morning		Wednesday morning	
		Average Headway	Average Frequency	Average Headway	Average Frequency
1	Cibubur stop	7.4	7.5	7.86	7
2	BKN Cawang stop	7.66	7.5	7.06	8
	Total average	7.53	7.5	7.46	7.5

Table 3. Headway value & frequency of Cibubur and BKN Cawang afternoon routes

No	Bus stop	Days			
		Monday afternoon		Wednesday afternoon	
		Average Headway	Average Frequency	Average Headway	Average Frequency
1	Cibubur stop	6.62	8	6.86	8
2	BKN Cawang stop	7.5	7.5	7.92	7
	Total average	7.06	7.75	7.39	7.5

From the table above, the average headway value of 7.3 minutes is category A (<10 minutes) and the average value of vehicle frequency is 7.56 vehicles/hour into category A (>6 vehicles/hour).

3.3. Travel time

The results of the analysis of travel time can be seen in table 4 below:

Table 4. Hasil Analisis Waktu Perjalanan

Days	Jarak Tempuh (Km)	Waktu Tempuh (Menit)		Waktu Tempuh Rata-Rata (Menit)	Waktu Perjalanan (Menit/Km)
		Pagi	Sore		
Cibubur – BKN Cawang					
Monday	13.3	34	28	31	2.33
Wednesday		36	22	29	2.18
Average					30
BKN Cawang - Cibubur					
Monday	13.3	26	30	28	2.10
Wednesday		25	39	32	2.40
Average					30

From the table above, the average travel time is 2.25 minutes/kilometer in category A (<6 minutes/kilometer), while the service time for the Transjakarta bus for the Cibubur – BKN Cawang route is 17 hours in category A (>15 hours/day).

3.4. Travel speed

The results of the calculation of travel speed can be seen in table 5 below:

Table 5. Travel Speed Analysis Results

Days	Travel distance (Km)	Travel speed (sec)		Average of travel distance (Km/hour)
		Pagi	Sore	
Cibubur – BKN Cawang				
Monday	13.3	34	28	25.7
Wednesday		36	22	33.25
Average			35	25
BKN Cawang - Cibubur				
Monday	13.3	26	30	28.9
Wednesday		25	39	24.9
Average			25.5	34.5

From the table above, the average value of travel speed is 28.17 kilometers / hour is category A (> 10 Kilometers / hour)

3.5. Questionnaire data analysis

From the data that has been obtained, questionnaire data processing is carried out on the performance of buses and Transjakarta services, which can be seen in table 6 as follows:

Table 6. Passenger satisfaction level and service performance level

No	Service factor	Peformance assessment	Satisfaction assessment	X	Y
Reliability					
1	Transjakarta bus punctuality and arrival	285	290	2,85	2,9
2	The facilities at the bus stop are functioning properly	246	251	2,46	2,51
3	The facilities on the bus work well	339	331	3,39	3,31
Average of reliability				2.90	2.91
Responsiveness					
4	Officers who are willing to help passengers when they are not comfortable.	383	369	3,83	3,69
5	Easy to get information about bus routes and departure times	288	286	2,88	2,86
6	Transjakarta officers notify passengers about giving priority seats	395	386	3,95	3,86
Average of responsiveness				3.55	3.47
Assurance					
7	Politeness of Transjakarta officers in treating passengers	379	373	3,79	3,73
8	Security inside the Transjakarta bus stop	263	265	2,63	2,65
9	Security on the Transjakarta bus	320	309	3,2	3,09
Average of assurance				3.21	3.16
Empathy					
10	The officer greets you at the beginning of the trip	348	353	3,48	3,53
11	The number of passengers on the bus is in accordance with the available space on the bus	304	290	3,04	2,9
12	Officers say closing greetings at the end of the trip	345	358	3,45	3,58
Average of Empathy				3.32	3.34
Tangibles					
13	There is an information board in the passenger waiting room	258	265	2,58	2,65

14	Availability of facilities at the bus stop	244	243	2,44	2,43
15	Availability of facilities on the bus	334	319	3,34	3,19
Average of tangibles				2.79	2.76
Total Average				3,15	3,13

The level of service performance and the level of passenger satisfaction can be seen in Figure 2 below:

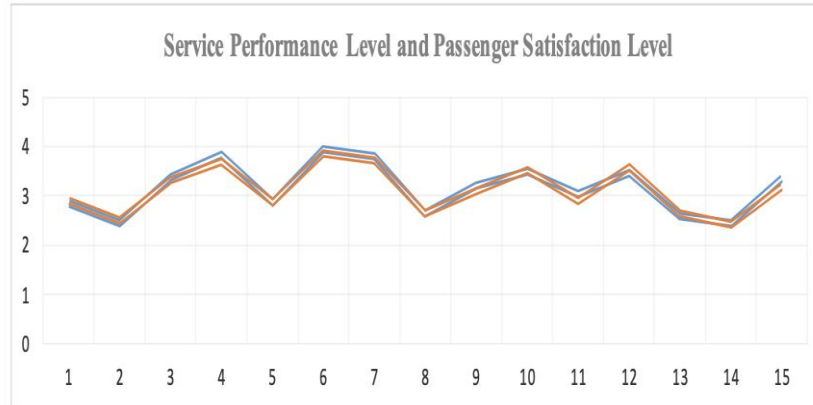


Fig 2. Graph of service performance level and passenger satisfaction level

3.6. Validity test

Validity testing is carried out to test the truth of each question item in measuring the variables. In this study, the degree of freedom (df) can be calculated as $N-2$, N is the number of samples, then $df = 100-2 = 98$ with an alpha of 0.05 obtained R table of 0.197. can be seen in tables 7 and 8

If the calculated R value $>$ R table (0.197), then it is said to be valid.

If the value of R count $<$ R table, then it is said to be invalid.

Table 7. The results of the service performance variable validity test (X)

Variable	R value	R table	Sig. value	Remarks
X1	0.463	0.197	0.000	Valid
X2	0.541	0.197	0.000	Valid
X3	0.672	0.197	0.000	Valid
X4	0.575	0.197	0.000	Valid
X5	0.589	0.197	0.000	Valid
X6	0.599	0.197	0.000	Valid
X7	0.649	0.197	0.000	Valid
X8	0.590	0.197	0.000	Valid
X9	0.590	0.197	0.000	Valid
X10	0.686	0.197	0.000	Valid
X11	0.551	0.197	0.000	Valid
X12	0.589	0.197	0.000	Valid
X13	0.709	0.197	0.000	Valid
X14	0.664	0.197	0.000	Valid
X15	0.648	0.197	0.000	Valid

Table 8. The results of the validity test of the passenger satisfaction variable (Y)

Variable	R value	R table	Sig. value	Remarks
Y1	0.468	0.197	0.000	Valid
Y2	0.585	0.197	0.000	Valid
Y3	0.690	0.197	0.000	Valid

Y4	0.526	0.197	0.000	Valid
Y5	0.689	0.197	0.000	Valid
Y6	0.551	0.197	0.000	Valid
Y7	0.649	0.197	0.000	Valid
Y8	0.700	0.197	0.000	Valid
Y9	0.568	0.197	0.000	Valid
Y10	0.591	0.197	0.000	Valid
Y11	0.559	0.197	0.000	Valid
Y12	0.544	0.197	0.000	Valid
Y13	0.693	0.197	0.000	Valid
Y14	0.664	0.197	0.000	Valid
Y15	0.651	0.197	0.000	Valid

From the test results, it can be seen that each question item has an R count > from R table (0.197). Thus the question item is valid

3.7. Reliability test

Reliability testing is to test the instrument only once. Then analyzed using Cronbach's alpha method. To test the reliability of a questionnaire there is a basis for making decisions first, it can be seen in table 9:

1. If the value of R count < R table, then it is said to be invalid.
2. If Cronbach's Alpha value < R table, then it is not reliable / inconsistent.

Table 9. Reliability test results

Variable	Cronbach's Alpha (α)	R table value	Remarks
Service Performance (X)	0.876	0.197	Reliabel
Passenger Satisfaction (Y)	0.876	0.197	Reliabel

From the test, it can be seen that the value of Cronbach's Alpha as R count is 0.890, so that the value of Cronbach's Alpha (0.876) > from R table (0.197). Thus the questionnaire is reliable/consistent.

From the results of the two indicators used as field dividers in the Cartesian diagram with an explanation of the fields in the Cartesian diagram Importance-Performance Analysis can be seen in Figure 3 as follows:

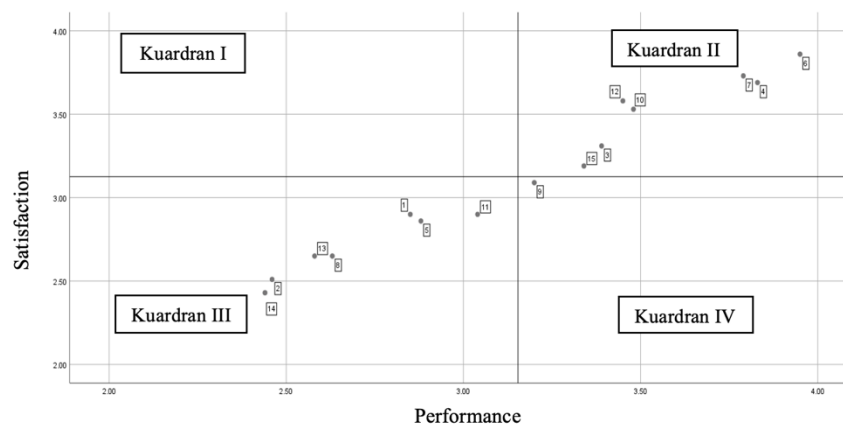


Fig 3. Diagram Kartesius Importance Performance analysis

Based on the picture above, according to the quadrant group, each question can be described as follows:

1. Service performance factors that are in quadrant II do not affect the level of passenger satisfaction.
2. Service performance factors that are in quadrant III affect the level of passenger satisfaction.
3. Service performance factors that are in quadrant IV affect the level of passenger satisfaction.

4. Conclusions

Based on the results of the analysis that has been carried out on the Transjakarta corridor 7C Cibubur – BKN Cawang, it can be concluded that :

1. The operational performance of the Transjakarta fleet from the indicators of load factor, headway, hourly vehicle frequency, travel time, service time, travel speed and number of operating vehicles get good overall results or the quality of Transjakarta bus performance meets the standards of the Director General of Land Transportation.
2. Based on research and analysis that is viewed from the dimensions of direct evidence / reliability, responsiveness, assurance, empathy and tangibles, the average passenger of Transjakarta corridor 7C Cibubur - BKN feels that the performance level of Transjakarta services on the Cibubur - BKN Cawang route reaches a value of 3.15. the services provided in each service dimension studied reached a fairly good category, and the average level of satisfaction for Transjakarta passengers on the Cibubur - BKN Cawang route reached a value of 3.13, it can be said that the level of passenger satisfaction on the dimensions of service examined reached the category quite satisfied..
3. To overcome Transjakarta problems in terms of service and performance of the Cibubur - BKN bus route is to make improvements to several service factors that are still below passenger expectations because they affect passenger satisfaction. The factors that need to be improved are:
 - a. Transjakarta bus punctuality and arrival
 - b. The function of the facilities at the bus stop is not good
 - c. Ease of getting information about Transjakarta bus routes and departure timesKeamanan di dalam halte Transjakarta
 - d. The number of passengers on the bus does not match the available space on the bus
 - e. The existence of a clear information board in the passenger waiting room
 - f. There are no facilities inside the bus stop, such as seats, trash cans, queue lines and roof coverings

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