The impact of COVID-19 on the mobility of Transjakarta passengers

Pricilia Jeanned A. V. Mogot¹, Lita S Barus¹* and Lin Yola¹

¹School of Strategic and Global Studies, Universitas Indonesia, 10430 Central Jakarta, Indonesia

*licit_barus@yahoo.com

Abstract. Public transportation functions as an urban hub are designed to help the mobility of urban communities. But today, different things happened. When the COVID-19 virus invades the world and been a pandemic ever since March 2020. In DKI Jakarta implementing Large-scale Social Restrictions policy, it directly reduced the people's mobility, so that the number of Transjakarta users also declined. Transjakarta is a type of Bus Rapid Transit (BRT). This study aims to analyze what supporting facilities are needed to increase Transjakarta users' confidence in using Transjakarta as a mode of transportation in daily mobility. This study used a quantitative approach. In this study data analysis was performed using the Importance Performance Analysis model. The study results are the COVID-19 pandemic followed by the Large-Scale Social Restriction policy resulted in a significant reduction in the number of Transjakarta passengers, so it is necessary to provision of public supporting facilities needed by Transjakarta passengers when using Transjakarta in daily mobility to stay safe during this pandemic. The level of importance indicates that the facilities related to health protocols are a priority in the Transjakarta service. Especially in keeping physical distancing. In addition, utility facilities like toilets are needed by passenger.

1. Introduction

Transportation is the activity of transporting, moving goods and services from one place to another. There are mobility activities inside. Transportation has an important function in people's daily activities, especially in urban areas. With the existence of transportation, urban activities which include economy, health, services, and logistics can run well. Transportation exists to connect cities even over long distances.

Mobility can be seen from a person's ability to move or move places and can be measured by the transportation costs they can pay [1]. The mobility referred to by Tamin is closely related to accessibility. If accessibility to a place is high, people's mobility to that place is also high as long as the cost of accessibility to that place can be met.

According to the Jabodetabek Transportation Management Agency, the number of public transport users in Jabodetabek increased from 2015 by 47.5 million per day to 88 million per day in 2019. This illustrates how important the role of public transportation is in connecting cities from one point to another point.

A different situation today is that people use Transjakarta less. It started when the COVID-19 virus invades the world and been a pandemic ever since March 2020. Then on March 2, 2020, the first positive case of COVID-19 was found in DKI Jakarta. Large-scale Social Limitations are a policy implemented by the DKI Jakarta government to reduce the spread of the COVID-19 virus. This policy
came into force in DKI Jakarta from 10 April 2020 to 24 April 2020, then extended to 04 June 2020. This policy is regulated in DKI Jakarta Governor Regulation No. 33 Of 2020.

This Governor Regulation regulates social restrictions in the community, both restrictions on activities outside the home, but also restrictions on the use of transportation. One type of public transportation that is widely used by the people of DKI Jakarta is Transjakarta. Transjakarta serves various routes and corridors in various regions in DKI Jakarta.

Transjakarta is public transportation with a rapid transit system. Lloyd Wright (2005) states that Bus Rapid Transit (BRT) is public transportation in the form of buses that provide services with a faster system to streamline time, bus conditions with comfortable facilities, and offer lower costs [2]. With a special lane on the right side of the road which is provided as a service to customers, BRT actually follows an easier way of working and services provided by modern public transport, but at a lower cost.

In urban areas there are two kinds of society based on their choice of transportation modes, which can be seen from the economic aspect, namely people who do not have private vehicles, so they have to use public transportation for mobility, and people who have private vehicles but also use public transportation [3]. People who have a choice of private vehicles and public transportation, including the middle to the upper class of society [4]. This affects the aims and objectives of public transportation to attract private vehicle users to use public transportation. BRT's case in Beijing with its functions and impacts, namely increasing the number of public transport users to 12.4% [5].

Until the end of 2017, Transjakarta has operated 13 busway corridors and several lanes are available outside the corridor with a fleet of 1,591 buses. These 13 corridors are examined in this study. Based on data from the Transjakarta Public Service Agency, in 2004 Transjakarta was able to carry 14.9 million users, in 2005 as 20.8 million users, in 2006 as 38.8 million users, in 2007 as many as 61.4 million users, and in 2008 it rose again to 74.6 million users. In 2011, there were 114.7 million users and in 2017 the number of users increased to 144.9 million.

Total Transjakarta passengers in 2019 increased 40 percent compared to the previous year. In 2019 Transjakarta will transport as many as 264,6 million users.

The data shows that the public's need for public transportation that can support their daily needs is very large. The number of users has increased every year. In the midst of the current pandemic, public transportation still has an important role in the resilience of a city facing a pandemic of disease outbreaks.

The important role in question is the ability to provide public transportation services that can be used by the community, by paying attention to important parts relating to the safety and health of users and officers so that people who use Transjakarta can safe from transmitting the virus.

According to Jabodetabek Transportation Management Agency data, the number of Transjakarta users only reached 84,000 people per day on 1-15 April 2020. In fact, during the previous conditions, as in January 2020, the number of Transjakarta users could reach 840,000 people per day. In fact, a
decrease in the number of users has occurred since March, which only reached 550,000 people per day or down about 34.52% of the number of users in January 2020. During the COVID-19 pandemic, there was a significant decrease in the number of Transjakarta users. So the need for guarantees such as supporting facilities that are full of health standards COVID-19. Providing good service can have a positive influence on the level of customer satisfaction associated with the services provided, so that by increasing the level of service quality provided by transportation service providers has a positive impact on increasing consumer satisfaction [6]. For this reason, the aims and objectives of this study are to analyze the impact of the COVID-19 pandemic on the mobility of Transjakarta passengers, and as a solution to provide supporting facilities by the needs of passengers in carrying out activities during this pandemic.

2. Method
This research uses descriptive statistics. In this study data analysis was performed using the Importance Performance Analysis model.

2.1 Data collection
In this study using primary data obtained from the distribution of online questionnaires. Secondary data were obtained from literature studies that include research on public transportation, public service facilities, assessment of service quality (public perceptions & expectations), and institutional data sourced from the DKI Jakarta government website (media COVID-19 Center) and PT. Transjakarta.

2.2 Questionnaire
In this study, the questionnaire was distributed online by using Google Form, the number of respondents obtained was 455 people, and the number of respondents who matched the data required for the study was 400 respondents. The questionnaire in this study is divided into 2 main parts, namely questions regarding the level of satisfaction with the quality of the Transjakarta facilities available during the COVID-19 pandemic, and the level of need for facilities during the COVID-19 pandemic. The questionnaire contains 40 questions and uses a 1-4 Likert scale to mark each answer's value. Value 1 for the answer is very inappropriate / very unneeded, value 2 for the answer is not suitable / not needed, value 3 for the answer is appropriate / needed, and value 4 for the answer is very suitable / very needed.

The suitability level results from a comparison of perception scores (reality) with a score of expectations. The satisfaction level of Transjakarta users can be seen based on the level of suitability of the answers given in the questionnaire [7].

Customer's assessment regarding products/services is the right of the customer to provide an evaluation based on the level of expectation of the product/service before use and the level of customer satisfaction with the product/service after use [8]. Factors that determine the level of service quality, by comparing consumer ratings of satisfaction related to services provided and the level of consumer expectations for these services [9]. The research calculation was then entered on the basis of the mean value interpretation referring to the score interpretation [10].

| Score | Indicators | Interpretation of Service Satisfaction |
|-------|------------|---------------------------------------|
| 1     | 1 - 1.75   | Very dissatisfied                     |
| 2     | >1.75 - 2.5| Not Satisfied                         |
| 3     | >2.5 - 3.25| Satisfied                             |
| 4     | >3.25 - 4.0| Very Satisfied                        |

Table 1. Interpretation of the assessment of service satisfaction indicators.
3. Results and discussion

3.1 Conditions for spreading the COVID-19 Virus

Transjakarta officially operates to serve consumers from February 1, 2004, to the present. Transjakarta is one of the innovations carried out by the Provincial Government of DKI Jakarta to answer the public's need for public transportation that is safe, comfortable, prioritizes safety, and is affordable for the community. Until the end of 2017, Transjakarta has operated 13 busway corridors and several lanes outside the corridor available with a fleet of 1591 buses.

![Transjakarta Network Map](source: PT. Transjakarta, 2020)

![Trend of Addition to Positive Cases of COVID-19 in Research Areas](source: PT. Transjakarta, 2020)

Since the first positive case of COVID-19 was found in DKI Jakarta on March 2, 2020, which is 2 cases, there has been a significant increase in cases until mid-April 2020. The large-scale Social Restrictions Policy came into force in DKI Jakarta from 10 April 2020. In the first two weeks when Large-Scale Social Restrictions were imposed, the addition of positive cases rose by 1439 cases within 15 days (April 9 - April 25, 2020). However, in the following weeks, there was a decrease in the number of additional cases. That means the This policy also controls the COVID-19 virus’s spread. However, on the other hand, this policy has decreased the community's mobility, so that Transjakarta users are also reduced.
Figure 4. Distribution of positive cases map.
Source: DKI Jakarta’s COVID-19 Media Center, 2020

Based on the data, dark red areas are regions with a positive number of 121-196 cases, to soft red with several 1-20 cases. If the Transjakarta network map is integrated with the map of the distribution of positive cases of COVID-19, then we can see which areas are included in the red zone, so that the provision of facilities for Transjakarta users can be by the needs of each region.

3.2 The Impact of the Large-Scale Social Limitation Policy on the Transjakarta users mobility

Figure 5. Total Transjakarta users per day.
Source: Author’s Processed Results

Based on the data, there was a significant decrease in the number of Transjakarta users, reaching 90%. In January 2020, the number of Transjakarta users reached 840,000 per day, then decreased to 550,000 per day in March 2020, and decreased to 84,000 per day in the period from 1-15 April 2020. The mobility of the community using Transjakarta can increase, it is necessary to provide supporting facilities that are by COVID-19 health protocol standards.

3.3 Provision of Transjakarta users mobility support facilities

The results of this study indicate that the respondents are dominated by women, with a vulnerable age of 17-30 years. Most of the respondents used Transjakarta at the time before COVID-19 was around 3-6 times a week, then changed to 1-3 times a week after the COVID-19 and Large-Scale Social...
Restriction policies. In addition, those who normally use Transjakarta for two-way mobility, now only use Transjakarta for one destination only. Their origin and destination locations are in different administrative cities. Apart from using Transjakarta, in the end, they also switched to using online transportation for those who did not have private vehicles and using private vehicles for those who did.

Table 2. Calculation of Expectation Value, Perception Value, Gap Value, and Service Satisfaction Value

| No | Variables | Perception Level | Expectancy Level | Gap | Satisfaction Level |
|----|-----------|------------------|------------------|-----|--------------------|
| 1  | Easy access to Transjakarta bus stops | 3,3 | 3,6 | -0,3 | Very satisfied |
| 2  | Availability of Transjakarta bus stops in various places | 3,2 | 3,7 | -0,5 | Satisfied |
| 3  | Integration with other transportation modes | 3,3 | 3,6 | -0,3 | Very satisfied |
| 4  | Providing special routes for medical personnel | 3,3 | 3,6 | -0,3 | Very satisfied |
| 5  | The readiness of officers as a guide for the queue to enter the bus stop | 3,1 | 3,7 | -0,6 | Satisfied |
| 6  | The initial marker enters the queue line, as well as a barrier when the queue is full | 3,0 | 3,6 | -0,6 | Satisfied |
| 7  | Measurement of body temperature at the beginning of the queue enters the bus stop | 3,0 | 3,7 | -0,7 | Satisfied |
| 8  | Measurement of body temperature at the beginning of the queue enters the bus stop | 3,2 | 3,6 | -0,4 | Very satisfied |
| 9  | Markers on the floor to keep the distance min. 1 meter during the queue | 3,0 | 3,6 | -0,6 | Satisfied |
| 10 | Rope for separating the incoming and outgoing queues | 3,0 | 3,6 | -0,6 | Satisfied |
| 11 | The queue line signs into the bus stop | 3,1 | 3,4 | -0,3 | Very satisfied |
| 12 | The place for washing hands & hand washing soap and tissue/hand dryer | 3,2 | 3,6 | -0,4 | Very satisfied |
| 13 | Provision of disinfectant spray booths for passengers before entering the bus stop | 2,8 | 3,4 | -0,6 | Satisfied |
| 14 | Matches the position of the currently available card tap | 3,1 | 3,4 | -0,3 | Very satisfied |
| 15 | Officers readiness to set the path for tap cards | 3,1 | 3,5 | -0,4 | Very satisfied |
| 16 | The card tap line direction to enter | 3,0 | 3,4 | -0,4 | Very satisfied |
| 17 | Adding card tap places to | 2,9 | 3,6 | -0,7 | Satisfied |
|   | Description                                                                                                               | Rating 1 | Rating 2 | Rating 3 | Satisfaction          |
|---|--------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-----------------------|
|18 | Separation of card tap places for incoming and outgoing passengers                                                       | 3.1     | 3.5     | -0.4    | Very satisfied        |
|19 | The directional queue line enters the bus                                                                               | 3.0     | 3.6     | -0.6    | Satisfied             |
|20 | Splitting rope for queuing into the bus (if more than 1 line)                                                            | 2.9     | 3.5     | -0.6    | Satisfied             |
|21 | Seating in the waiting room The stop uses markers on the seats to maintain distance                                      | 3.3     | 3.6     | -0.3    | Very satisfied        |
|22 | Adequate distance between the bus stop door and the entrance to the bus                                                   | 3.2     | 3.6     | -0.4    | Very satisfied        |
|23 | Provision of health workers for first aid if there are passengers who are indicated by the transmission of the virus     | 3.0     | 3.6     | -0.6    | Satisfied             |
|24 | Provision of temporary space for first aid for passengers who have indicated the transmission of the virus               | 2.9     | 3.6     | -0.7    | Satisfied             |
|25 | Provision of toilets for passengers equipped with hygiene facilities                                                    | 2.5     | 3.6     | -1.1    | Less satisfied        |
|26 | Provision of Hand sanitizers on the bus                                                                                  | 3.2     | 3.6     | -0.4    | Very satisfied        |
|27 | Marking (X) on the seat so that passengers do not use the seat marked (X)                                                | 3.3     | 3.7     | -0.4    | Very satisfied        |
|28 | Officers on the bus to supervise the passengers to comply with the rules                                                | 3.0     | 3.7     | -0.7    | Satisfied             |
|29 | Avoid using handgrip by limiting passengers standing on the bus                                                         | 2.9     | 3.5     | -0.6    | Satisfied             |
|30 | Markers on the floor to keep the distance min. 1 meter to exit the Bus                                                   | 3.0     | 3.5     | -0.5    | Satisfied             |
|31 | Use of PVC Curtain (room dividing plastic curtain)                                                                       | 2.8     | 3.4     | -0.6    | Satisfied             |
|32 | Provide special lanes for transit passengers so they don't have to join queues of other passengers                       | 3.0     | 3.6     | -0.6    | Satisfied             |
|33 | The queue direction line enters the special bus for transit passengers                                                  | 2.9     | 3.6     | -0.7    | Satisfied             |
|34 | Provide a special lane for passengers who will leave the stop (not at the same time as                                  | 2.9     | 3.5     | -0.6    | Satisfied             |
To be able to use Transjakarta again, passengers expect facilities that can support them in using Transjakarta without having to be afraid of contracting the virus. Some of the available facilities need to be repaired and equipped by health protocols, while several other facilities are not yet available, so it needs provision from the Transjakarta management.

The table above shows that the value of the gap between the highest level of perception and expectation is number 25. The highest scoring criterion is calculated from a value of 0.8 and higher than that. To determine the priority level of the items in the respondent's answer, and analyze using Importance Performance Analysis (IPA). By using this analysis model can produce recommendations for priority facilities variables to be provided based on the results of the assessment of customer satisfaction and expectations.

**Source:** Author’s Processed Results
Based on the cartesian diagram above shows that which is included in quadrant I (Top Priority) totaling 11 variables, quadrant II (Maintain Achievement) totaling 13 variables, quadrant III (Low Priority) totaling 11 variables, and quadrant IV (Exaggerated) totaling 5 variables. Some of the top priority variables are splitting rope for queues outside the stop (if more than 1 line), the initial marker enters, the queue line as well as a barrier when the queue is full, additional categories of facilities provided at the time of the COVID-19 pandemic such as provision of temporary space for first aid for passengers who have indicated the transmission of the virus. Some of them are still not available, like adding card tap places to reduce queuing piles, and provision of health workers for first aid if there are passengers who are indicated by the transmission of the virus.

Some variables are the best service quadrant felt by users, are providing special routes for medical personnel, the readiness of officers as a guide for the queue to enter the bus stop, measurement of body temperature at the beginning of the queue enters the bus stop, markers on the floor to keep the distance min. 1 meter during the queue, the place for washing hands & hand washing soap and tissue/hand dryer, provision of Hand sanitizers on the bus, marking (X) on the seat so that passengers do not use the seat, and increasing the frequency of washing buses using disinfectants.

Some of the variables included in the low priority quadrant are Rope for separating the incoming and outgoing queues, provision of disinfectant spray booths for passengers before entering the bus stop, avoid using handgrip by limiting passengers standing on the bus, use of PVC Curtain (room dividing plastic curtain), and provision of a place for washing hands & hand washing soap and tissue/hand dryer at the door to the outside of the bus stop.

Then, some of the variables included in the excessive quadrant are The queue line signs into the bus stop, matches the position of the currently available card tap, officers readiness to set the path for tap cards, and separation of card tap places for incoming and outgoing passengers.

4. Conclusion
Based on the results obtained, the conclusions of this study are:
1. The priority level lies in the provision of facilities related to health protocols are a priority in the Transjakarta service. Especially in keeping physical distancing. In addition, utility facilities like toilets are needed by passengers, place for washing hands & hand washing soap and tissue/hand dryer, and provision of Hand sanitizers on the bus.
2. Transjakarta passengers are satisfied with the Transjakarta service. Most of the Transjakarta passengers use Transjakarta even in the COVID-19 pandemic. For that reason, passengers expect the provision of additional facilities to support and complement passengers' needs when using Transjakarta, so that the level of Transjakarta passenger’s mobility can be increased because they are already satisfied and safe to use Transjakarta even during the pandemic.

The study suggests regarding the results of this study, it is necessary to provide supporting facilities in accordance with standard health protocols, based on the needs of each bus stop and Transjakarta corridor. With this facility, it can have an impact on the sense of security for the community to continue using Transjakarta during the COVID-19 pandemic, and thus the number of Transjakarta passengers can increase again.

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