The Perception of Travel Behavior on Public Transport Mode Choice: A Case of Depok-Jakarta Route

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Abstract
Traffic congestion is a major unresolved problem and a joint task of the community and the government. A high level of mobility will be directly proportional to traffic congestion, and public transportation is an efficient solution for dealing with this problem. This research aims to determine the public's perception of choosing public transportation along the Depok-Jakarta route. The data collection method will be carried out by distributing questionnaires online through social media. Respondent data processing is presented using a spider chart in Microsoft Excel. The results indicate that most public transportation users are millennials and women. This generation prefers the Commuter Line (KRL) compared to other transportation. Schedule accuracy, level of comfort and security, disability friendliness, adequate facilities, infrastructure, and affordable costs are considerations in choosing public transportation. The KRL is highly interested in using it and has a positive service perception.

Keywords: Public Transportation, Perception, Behavior, Suburban Area

1. Introduction

Transportation is a problem and a measure of the success of the city. This is because it is used to determine the quality of social life. Public transportation is expected to be able to deal with several problems, such as traffic congestion and the environmental impact of the smoke produced by vehicles. City people's high mobility to school, work, and daily needs require a reasonably high travel time. Therefore, the percentage of traffic congestion will be more significant if people choose private vehicles over public transportation. Some research states that people can spend 45 minutes to an hour with a percentage weight of 40% to 60% traveling from home to their destination (Iclodean, Cordos, & Varga, 2020).

The Indonesian government continues to monitor congestion problems in cities with high mobility. Technology's rapid and continuous development can increase the quality of service and the determination to choose public transportation. In the Jabodetabek area, people can choose from several public transportation options, such as buses, TransJakarta, the Commuter Line, and Mass Rapid Transit (MRT) (Isradi et al., 2021). Communities can determine the mode of transportation to be used by considering the level of good service, the short travel time, and the economical prices. Technological developments make people aware of many companies offering various transportation services. Therefore, people do not only depend on the choice of transportation modes provided by the government. Competition between companies in offering services causes the best quality to be one of the factors forming community loyalty in determining the mode of transportation. A consideration of the quality of services or products in transportation modes is obtained by measuring user satisfaction. Service and user satisfaction will be the primary keys in service business

activities to improve the quality of public transportation in Indonesia (Sugiyarto, Dewi, & Junaedi, 2020).

Depok City is one of the closest cities to the Capital City. In 2021, the city of Depok had a population of 2.085.935 (The Central Bureau of Statistics for the City of Depok, 2022). The commuter line is the mode of transportation that Jabodetabek residents rely on. Commuter Line users from August 29 to September 2, 2022, with an average of 689,310 per day (PT KAI Commuter Jabodetabek, 2022) . The interest of users and fleets that are not directly proportional cause long queues at each station. Different interests combined with limited time can lead to high emotional possibilities and even physical fights between users to obtain a transportation fleet with a short waiting time.

The purpose of this research is to find out the perception of public interest in determining public transportation modes. Communities will evaluate comfort and safety, travel time, and economic costs before making the right choice of transportation mode. The community's choice is expected to be an evaluation so that public transportation can be more advanced with the best quality service. In addition, modes of transportation that offer the same level of service can increase public interest in using other modes of public transportation while decreasing the number of crowded lines for specific modes of transportation.

2. Literature Review

Settlements in suburban areas will continue to grow in developed countries. Commuters who live in this area will mostly choose private vehicles to travel to the city (Hansson, Pettersson, Svensson, & Wretstrand, 2019). This is because of the ability to have a private vehicle. This ability is quite essential for people who live in suburban areas. Vehicle ownership is one of the tools to support daily activities, for example, travel to work, shopping, recreation, and travel for other purposes.

Private vehicles have adverse effects such as using non-renewable fuels, pollution, noise, and traffic congestion. Various ways to reduce traffic congestion are significant, especially in big cities. This can be done by reducing the density of vehicles while traveling on the road (Nguyen, 2019). If people are aware that they can use public transportation, the density of vehicle use can be reduced. Therefore, it's essential for transportation service providers to improve service quality to attract people's interest in using public transportation.

Service factors that make users continue to use public transportation are the cleanliness and comfort of the fleet, good service from officers, and timeliness. Users who recommend it to others and overall service satisfaction are indicators of loyalty to a particular mode of transportation (Lierop & Badami, 2018). The interest of service users in public transportation is expected to be an effective solution to reduce traffic congestion on roads. Public transportation will be compared based on travel time, cost, and waiting time.

2.1 Rail Transport

Railway transportation in Indonesia, particularly in the capital city, has a long history and has evolved relatively rapidly as technology has advanced (Jumardi et al., 2020) . The railway is a unified system consisting of infrastructure, facilities, and human resources, as well as norms, criteria, requirements, and procedures for implementing railway transport (Government Regulations, 2021) . Resilience in rail transportation is the ability to provide adequate services under normal conditions and to be able to survive and recover quickly from unexpected disturbances (Bešinović, 2020).

The use of railroad transportation has quite a lot of user interest. The advantages of using this transportation are that it has a mass service range or large transport capacity, a faster travel time because it has a particular lane, more minimal pollution, cheaper travel costs, and good accessibility (Biomantara & Herdiansyah, 2019). In addition, the high level of safety provided by special lanes and officers available in each fleet is one factor assessing users' satisfaction with transportation service modes (Amalia, 2022).

PT KAI Commuter Jabodetabek is a limited liability company of PT Kereta Api Jabotabek's urban transportation division and the operator of railway facilities. The purpose of this company is to provide commuter rail transportation services using electric rail facilities that have operational areas in Jakarta, Bogor, Depok, Tangerang (Serpong), and Bekasi (Jabotabek). This company is in the non-passenger

transportation business (PT KAI Commuter Jabodetabek, 2022). As a company engaged in the field of services, service improvements made by PT KCI began to be felt to increase customer satisfaction. One of them is the addition of train cars, the addition of departure schedules, the availability of women-only cars, the transition from paper tickets to electronic tickets (e-tickets), and other service improvements (Pratiwi, 2018).

2.2 City Transport

City transportation is one of the traditional modes of transportation that still exists and has an interest in the community. People who do not have access to private vehicles can benefit from transportation. As a result, city transportation remains a relatively inexpensive mode of transportation with a reasonably broad range (Alexandri & Novel, 2019). In general, city transportation follows a route that includes the city's main thoroughfares, making it easier to find (Rifai & Arifin2020).

According to a study conducted in Makassar, people prefer online taxis over city transportation. Several factors influence mode selection, including cost, ease of obtaining modes, comfort, and certainty in obtaining the mode of transportation (Nuh, H, & Syarkawi, 2022). The interest of city transportation passengers who switch to online transportation causes the mode of city transportation to operate inefficiently. Such circumstances encourage competition among urban transportation drivers in the search for passengers (Pratama, 2020).

Several transportation issues frequently arise in Indonesia. These problems can be seen in the number of passengers exceeding the transport capacity, the long travel time, comfort, safety, timeliness of arrival, and the interminable waiting time. This mode of transportation, in general, still has limited facilities and infrastructure, such as fleet physical condition, fleet number, route number, and stop number (both stops and terminals). These concerns bind urban transportation users together (they have no other options). When given the option, users prefer to travel by private vehicle because it is more comfortable (Mutiawati, 2019).

2.3 Bus Rapid Transit

Bus Rapid Transit (BRT) is a mode of transportation that began as one of the government's investments in public infrastructure in developing countries with limited capital resources (Zolnik, Malik, & Irvin-Erickson, 2018). The BRT transportation system is primarily viewed as a mode of transportation that can promote development, emphasizing increasing car drivers' interest in transit and using public transportation (Linovski, Baker, & Manaugh, 2018). This is one of the goals that can help reduce traffic congestion and air pollution caused by using private vehicles. Having adequate facilities and infrastructure and providing quality services are significant supporting factors.

Through the Ministry of Transportation, the central government incorporates BRT into efforts to alleviate traffic congestion, particularly in major cities. This transportation concept is a mass transportation system linked to each corridor to meet the community's transportation needs in the city (Febriarini & Astuti, 2019). This transportation service has become one of the most critical sectors for local governments' economic development. Everyone is expected to use this mode of transportation because it is inexpensive and provides a reasonably high level of service (Kurniati, Astuti, Salim, & Ramadhan, 2018).

Depok city government cooperates with the Jabodetabek Transportation Management Agency (BPTJ) in operating the BRT and Jabodetabek Residence Connection (JRC) (Prihanto, 2021). BRT (Bus Rapid Transit) is one of the collecting transportation networks from the city center to settlements and destinations. This is because the city of Depok is a satellite city, considering that it has an area that is on the outskirts of the city and close to the strategic location of the commuter or commuter community work (Arthurius & Hari W, 2020).

3. Methodology

Research is an organized investigation or a regular, critical investigation to find facts to determine a goal. One of the research goals is to ask questions and then find answers to those questions (Nurlan, 2019). Quantitative research is defined as research that draws conclusions based on statistical hypothesis testing

and empirical data gathered through measurement (Aksara, 2021). Data is one of the main strengths in compiling scientific research and modeling (Rifai, Hadiwardoyo, Correia, Pereira, & Cortez, 2015). A systematic scientific research process must begin with identifying the right problem (Rifai, Hadiwardoyo, Correia, & Pereira, 2016).

The stated preference technique becomes one of the data collection methods by providing questions related to perception, attitude, motivation, assessment, and satisfaction with the conscious choice (Ben-Akiva, McFadden, & Train, 2019). This technique serves as an approach by conveying the choice (option) in the form of a hypothesis that respondents can assess in different situations (Nadi, 2018). A hypothesis is developed based on experiments that serve as guides in developing it. This can make it easier for researchers to determine the overall factors in the situation described in the hypothesis (Putra, Rifai, Isradi, & Mufhidin, 2021).

The research method to be used is descriptive analysis. This method is used in researching the ideas outlined by describing, discussing, and criticizing the primary idea to conduct a study in the form of comparison, relationship, and model development (Nurwicaksono & Amelia, 2018). Data collection used in this study was conducted by distributing online questionnaires via Google Forms. Questionnaires that have been designed on Google Forms will be distributed through online media platforms such as WhatsApp and Instagram. Online platforms are an effective way to reach respondents of all ages and backgrounds.

The population of respondents needed to support this study amounted to 100 people. This number was obtained from calculating the sample size needed by comparing the number of residents in Depok City in 2021. Respondents will be declared valid if they have traveled from Depok to Jakarta using public transportation. The sample from this study was taken in November 2022. The research location used is Depok, West Java, with an area of 200.29 Km^2 (Depok City Government, 2022).
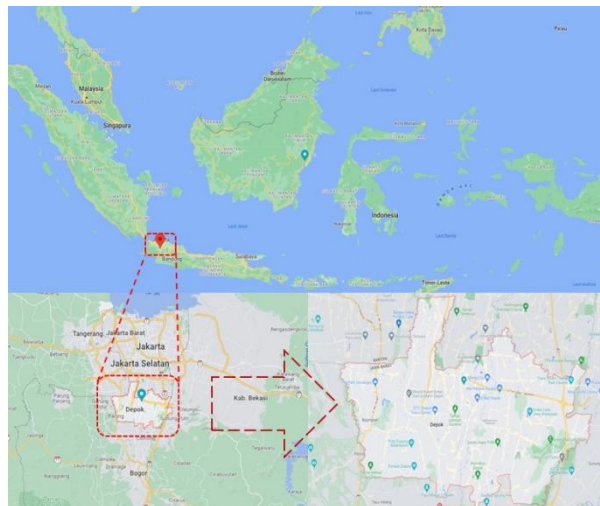
Figure 1. Location of research

The data obtained from respondents through the Google Forms questionnaire is processed into a detailed and thorough description. The results obtained will be presented as a spider chart using Microsoft Excel. A spider chart is a graphical method for illustrating data in two dimensions and using axes at the same starting point (Nalmpantis, Roukouni, Genitsaris, Stamelou, & Naniopoulos, 2019).

4. Result and Discussion

4.1 Characteristics of Respondents

This research received 154 responses from the distribution of questionnaires through digital social media platforms. As a result, 152 respondents have used public transportation with this travel route, for a percentage of 98.70%. However, there are still two people, with a percentage of 1.30%, who have never

used public transportation. The percentage figure shows that public transportation already has many fans, so the level of service satisfaction will be one of the most critical factors in whether those fans continue to use it.

The questionnaire used as the object of this study will be selected randomly, and only 100 respondents are required if they have used public transportation to travel the Depok–Jakarta route. Based on gender, public transportation users are dominated by females, with a percentage of 64%. For male users who include the criteria as a respondent, the percentage is 36%. Based on age, public transportation users are dominated by people aged 21–30 years, who get a percentage of up to 73%. Then in the following position, public transportation along this route is in demand by the public at the age of 31–40. This is evidenced by the percentage obtained of 13%. Finally, private-sector employees, with a percentage of 51%, are the most frequent users of public transportation, followed by students, with 26%.

Based on the characteristics of the last level of education, users who have completed their education at the S1 level are more dominant public transportation enthusiasts. This is evidenced by the 60% percentage obtained. Considerations in the choice of mode of transport can be influenced based on the amount of income, the frequency of use, and the purpose of the trip. From the results of the respondents' data, it can be concluded that 48% of users with an income of Rp3.000.000–Rp5.999.999 predominantly use public transportation. The purpose of the trip undertaken by the respondents was to work, garnering a considerable percentage of 49%. The use of public transportation modes repeatedly now reaches 43 percent, with the frequency of use of modes reaching as much as 3–5 times a week. Frequent repeated trips indicates that public transportation has a good level of service for enthusiasts.

Table 1. Respondent Characteristics

No.	Parameter	Category	Frequency	Value (%)
1.	Gender	Man	64	64
		Woman	36	36
2.	Age	< 20 years old	6	6
		21 - 30 years old	73	73
		31 - 40 years old	13	13
		41 - 50 years old	3	3
		51 - 60 years old	4	4
		>60 years old	1	1
3.	Occupation	Government Employees	15	15
		Private-sector employees	51	51
		BUMN Employee	2	2
		Entrepreneur	5	5
		Student	26	26
		Others	1	4
4.	Education	SMA	24	24
		D3	14	14
		S1	60	60
		S2	2	2
5.	Purpose	Shopping	1	1
		Go to school	18	18
		Recreation	16	16
		Working	49	49
		Others	16	16

No.	Parameter	Category	Frequency	Value (%)
6.	Income Amount	< Rp1.000.000,-	19	19
		Rp1.000.000 – Rp2.999.999,-	12	12
		Rp3.000.000 – Rp5.999.999,-	48	48
		Rp6.000.000 – Rp 7.999.999,-	10	10
		> Rp8.000.000,-	11	11
7.	Frequency of user	≤ 2	26	26
		3 – 5	43	43
		> 5	31	31

4.2 Perception of Public Transport Selection

People's desire to use a product is heavily influenced by their perception of it (Yodha, Abidin, & Adi, 2019) . Perception can be defined as an individual's assessment of past events. Public transportation planning aims to increase convenience and comfort for all users. The advancement and development of technology affect both users' and policymakers' perceptions. As a result, equating perceptions may encourage more commuters to use public transportation (Chowdhury, Hadas, Gonzalez, & Schot, 2018).

Some assessment indicators can cause each person to have a different perception, particularly when deciding. The outcomes of the indicator evaluation are closely related to the users' interests, goals, and economic conditions. The causes of perception differences in public transportation can be seen in the cost of travel, travel time, waiting time, comfort, ease of access, security, and friendliness of operational facilities and infrastructure to persons with disabilities. User perception differences can lead to other perceptions that must be used in evaluating service providers to improve the quality of operational services.

Table 2. Distribution Behavior on Public Transportation

Rating Parameters	KRL (%)	City Transpt. (%)	Bus (%)	BRT (%)
Travel Expense	74	18	3	4
Traveling Time	87	7	2	4
Waiting Time	78	12	5	5
Convenience	77	6	5	12
Ease of Access	65	25	4	6
Safety	78	5	7	10
Disability Friendly	81	5	5	9

Transportation is the lifeblood of life, as is the population's economic, social, political, and social mobility in following developments in various fields. The provision of fleets, facilities, and infrastructure helps the service provider determine the cost to the user. Service providers consider this cost determination to support operational activities. Based on the results of data processing for travel expenses, it is mentioned that 74% of respondents prefer Commuter Line (KRL) compared to other modes of transportation. This is because the fee charged for this mode of transportation is between Rp3.000 and Rp5.000 (PT KAI Commuter Jabodetabek, 2022) . In other modes of transportation, users need to spend an estimated Rp3.500–Rp5.000 for BRT (Bus Rapid Transit), Rp5.000–Rp6.000 for city buses, and Rp5.000–Rp10.000 with City Transportation.

Travel time and waiting time are now two parameters used to assess user perception. This is because there will be an estimated length of travel from the initial place to the destination. Therefore, travel time can be defined as the length of the journey that needs to be taken by the user to the destination, while waiting time can be interpreted as the length of time the user waits between transportation fleets. Most respondents currently prefer the Commuter Line (KRL). This is evidenced by the large percentage of

respondents choosing KRL transportation when traveling, namely 87% for travel time and 78% for waiting time. The travel time required by Commuter Line (KRL) in traveling is estimated at 30-45 minutes, and the arrival between fleets requires a waiting time of 5 minutes (PT KAI Commuter Jabodetabek, 2022).

Figure 2. Spider Chart

Convenient transportation will continue to be an essential determinant of assessment variables influencing community satisfaction (Zhan, 2018). The level of comfort can be assessed based on several determining factors, such as the availability of supporting facilities, the accuracy of the departure schedule, the accuracy of travel time, and the services provided by the service provider. According to data analysis, 77% of respondents chose the Commuter Line (KRL) as a more convenient transportation option than other public transportation options. This is demonstrated by the availability of prayer rooms, toilets, waiting for seats on each station platform, women-only carriages, officers who can be found at each station, and so on. One of the contributing factors to increasing comfort is the accuracy of the fleet schedule. Schedule delays are uncommon during Commuter Line (KRL) operations because they already have a particular line so that traffic jams do not occur.

The proper focus goal in determining and planning public transportation is the ease of access or accessibility (Handy, 2020). Accessibility is the ease with which a location can be reached or traversed by other modes of public transportation. The accessibility factor is determined by the short distance to the destination and the low cost (Pranitasari, Prawira, & Prawira, 2020). Based on ease of access, 65% of respondents chose the Commuter Line (KRL), while 25% chose city transportation. Because the Commuter Line (KRL) is in the city center, it is easily accessible by other modes of transportation. This is demonstrated by the presence of the Depok Baru station, which is located near the Margonda Depok terminal. City transportation is second in ease of access because it operates on the city's main streets.
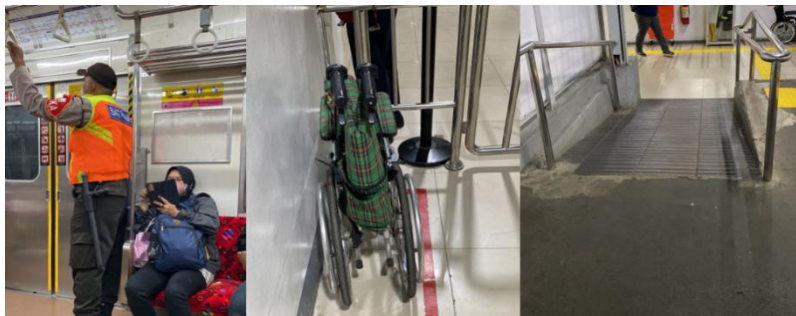
Figure 3. Disability *Commuter Line* (KRL) Facilities

Safety is a top priority in public transportation services, so the necessary facilities and infrastructure that support each trip of the transportation fleet are in place (Lestari & Aldino, 2020). From the online questionnaire obtained, 78% of respondents chose Commuter Line (KRL) as a safe mode of transportation. For security, other transportation such as BRT (Bus Rapid Transit) has a percentage of 10%, 7% of respondents choose city buses, and 5% of respondents prefer city transportation. Furthermore, because

traffic accidents are uncommon, the Commuter Line (KRL) is a relatively safe mode of transportation. This is because KRL has already designed and calculated the strength of a particular steel line. In addition, PT KAI Commuter Jabodetabek provides the availability of women's carriages and officers in each fleet to ensure the safety of users.

People with disabilities have limitations in performing daily activities due to physical or non-physical deficiencies. This limitation is due to an event, disaster, or accident in his limbs and the nature of his birth. There are now a variety of public transportation options available, but not all are accessible to people with disabilities. According to data analysis, the Commuter Line (KRL) is a disability-friendly mode of public transportation. This is evidenced by the percentage obtained at 81% and the existence of several supporting facilities and infrastructure. Facilities are available for people with disabilities, such as the availability of wheelchairs, disability unique lines, officers who are ready to help people with disabilities on the train fleet, etc.

5. Conclusion

The study concludes that public transportation is prevalent in all segments of society. Most users are women; the purpose of the trip is for work, and the age range is 21–30 years. In using public transportation, the millennial generation tends to choose to use the KRL. The high percentage of several assessment parameters demonstrates this. Even though the cost comparison is not far away and tends to be the same as other modes of transportation, the millennial generation still chooses and uses the KRL when traveling. Queues at stations frequently form, especially on weekdays, Monday through Friday. The community chose the KRL over other modes of transportation because of the predictability of travel schedules and the facilities and infrastructure that support them while remaining affordable. These elements help KRL provide a high-quality service that attracts new customers.

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