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The strategy to improve community interest toward Trans Metro Dewata public service transportation

Efendhi Prih Raharjo
Road Transport Management, Politeknik Transportasi Darat Bali, Indonesia

Aris Budi Sulistyo
Automotive Technology, Politeknik Transportasi Darat Bali, Indonesia

Rahmat Ahmad
Automotive Technology, Politeknik Transportasi Darat Bali, Indonesia

Ahmad Soimun
Logistic Management, Politeknik Transportasi Darat Bali, Indonesia

***Abstract*---**Traffic jam becomes a public problem to solve. The massive ownership of personal vehicles contributes to this traffic jam. This matter influences the environment negatively and increases the crowd volume. Generally, travelers prefer driving personal vehicles to use public transportations. This habit becomes a fundamental phenomenon. Currently, the presence of Trans Metro Dewata is expected to provide wise an efficient and friendly solution with a lower cost of energy per passenger and lower road space uses due to massive transportation. Unfortunately, this solution has not received significant attention from the community and road users due to privacy and security matters while driving. This research applied quantitative and descriptive qualitative methods. From the analysis, the researchers found some strategy categories to improve the public transportation use rates by the community. The strategies include identifying public transportation facilities, service quality, and performance of the public transportation, starting from the headway and load factor. The applied TOD system within the metropolitan area was useful to improve the rate of public transportation use. Thus, further policy implementation will be better and the community will choose public transportation. The other solution is to improve public transportation use via service, security, safety, comfortability, affordability, equality, and arrangement.

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***Corresponding author**: Raharjo, E. P.; Email: efendhisttd@gmail.com*
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Introduction

Transportations are important matters to realize excellent and advanced life of a nation. The transportations are also important to improve the national competitiveness with an integrated transportation system (Putra, 2016). A wise step of establishing and developing the transportation sector leads to improvement and supports for other sectors and national developments in urban and suburban areas. The transportation needs are observable from the high mobility of community and goods both domestically and internationally. This matter significantly influences local growth and development. Therefore, the functions of transportation must be prepared with integrated national transportation system mapping. Thus, transportation could provide equal, safe, secure, comfortable, affordable, and well-arranged needs.

High community mobility makes people think logically to have personal vehicles. The increased number of personal vehicles and the increased activity volumes on the road lead to the higher possibility of traffic jams. This situation can also worsen the Earth due to global warming and raised the risks of upper respiratory tract disease (Ayaragarnchanakul & Creutzig, 2022), (Nadrian et al., 2020). The offered solution by the government is to use public transport instead of personal vehicles. The consideration of this solution is based on the total consumed energy for every individual on a trip. The government recommends it because the total consumed energy and the spatial uses of the road are lower (Hassan, Zhu, Lee, Ahmad, & Sadiq, 2021). Public transportation becomes the preferred transportations by most people. They use the transportation by paying some amount of money. The public transportation launched by the government facilitates the mobility of the people by prioritizing smooth traffic. One of the public transportation requirements is to provide prime service for the people (Tumsekcali, Ayyildiz, & Taskin, 2022) securely, immediately, affordable, and efficiently.

The efforts to improve the economic areas also need a further plan with a reliable, secure, and comfortable transportation system (Agus Putrayasa & Sri Maharani, 2017). The advanced economic level of an area also improves the people and good mobilities. Thus, the transportation service needs to increase(Citra Wulandari & Sudiana M.si, I Ketut, 2018). In a metropolitan area, the excellent transportation infrastructure with excellent facilities and accessibilities include a bus station, bus stop, and traffic signs (Soimun, Etc. 2021). The interest of the Sarbagita community to use public transportation was still low. Many people used their vehicles to go anywhere(Hendrialdi, Etc. 2021). The effort to improve the community's interest to use public transportation needs the attention of the transportation system role and its supportive accessibility (Suthanaya, 2009).
The Ministry of the Transportation Republic of Indonesia provides solutions to support the people using public transportation with Buy the Service program, and the TEMAN BUS program.

TEMAN BUS aims to promote mass urban-based public transportation development to improve the security, safety, and comfortability of the people, and to use cashless technology. TEMAN BUS aims to provide an economic, comfortable, and reliable transportation experience. The applied minimum standard by the government for TEMAN BUS includes 20 medium-sized buses with 40 seats and 30 large-sized buses with 30 seats. Each bus type is designed with two seat rows. The minimum service standard is declared by the Director-General of Land Transportation Number. SK.687/AJ.206/DRJD/2002 about the Technical Manual of Public Transportation for Permanent and Scheduled routes in urban areas. This regulation explains that the load factor and headway determination becomes the comparison between the available capacity among the trips stated by percentages. Generally, public opinion is useful to consider and evaluate public service performance (Qi, Costin, & Jia, 2020). The problem appears among the people that use public transportation. They prioritize prime service rather than the public transportation costs or tariffs. This problem leads to the lower intention of the suburban people, Sarbagita. Thus, it is important to analyze the efforts to attract the people's intention to use Trans Metro Dewata public transportation. Therefore, the consideration to operate the transportation must be in excellent condition for all aspects. This research aims to provide options to attract people's intention to use public transportation. Thus, public transportation can lower the traffic jams Sarbagita area.

Method

This case study research used the quantitative method and descriptive qualitative method as the guideline to answer problems. The quantitative method was useful to determine the number of public transport passengers. The applied qualitative descriptive method was to determine the answers to the indications, facts, problems, and new insight after analyzing the data. The obtained data included both secondary and primary data. The secondary data were literature studies about Trans Metro Dewata passengers, including the capacity and route. The researchers did both dynamic and static surveys from December 21 until December 22, 2021, from 08.30 Middle Indonesian Time until 16.00 Middle Indonesian Time.

The primary data was the direct observation data from the fields to get the passenger numbers, load factors, headways, and the public facilities of Trans Metro Dewata. The researchers obtained the headway values of a bus on a certain route by measuring the distances between the arrival times for each bus. The occupation factor of the buses was based on the ratio of the passengers and the occupied vehicles. The researchers observed the indicators of public transportation indicators toward the applied criteria by the government to determine the functionality of the transportation. The applied criteria in Indonesia were based on the Minimum Service Standard issued by The Director-General of Land Transportation Number. SK.687/AJ.206/DRJD/2002 shown in Table 1.

Table 1
The Performance Standard of Public Transportation

Number	Parameter	Standards
1	Headway	5-10 minutes

	H ideal	2-5 minutes
	H max	
2	Waiting time	
	Average	5-10 minutes
	Maximum	10-20 minutes
3	Load factor	70%
4	Average Trip Time	
		1-1.5 hours
	Maximum	2-3 hours
5	Numbers of Units	-
6	Routes	-

Source: The Decree of the Director-General of Land Transportation

Results and Discussion

The public transportation Trans Metro Dewata

The available services of Trans Metro Dewata are important to win the people's interest as the users of the service. The bus, Trans Metro dewata, has special facilities for people with disability. However, the bus stop was not excellently maintained. The provided facilities are comfortable seats, AC, running text, CCTV, GPS tracker, non-cash payment scanner, seatbelt, and holder (see Figure 1).

Figure 1. The Public Transportation Trans Metro Dewata Facilities
Source: Personal Documentation

The safety and comfortability managements

The application system of TEMAN BUS provides information about unexpected matters, such as stealing, leaving belongings, etc. This feature is reachable via *Contact Us* and is connected with the WhatsApp Center, numbered 0821 82000 300. The passengers can also send *DM* via TEMAN BUS' social media. Some left belongings were announced via social media of TEMAN BUS.
The missing reports of the passengers' belongings were findable in the Call Center, direct message, social media, and SMS sent to the management and the operator for further checking process.

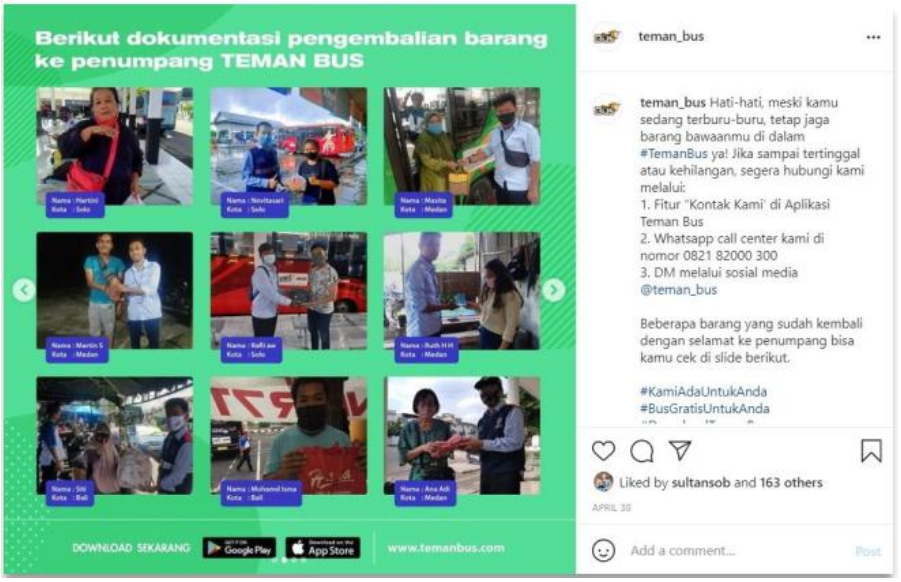

Figure 2. Returning the left belongings
Source: TEMAN BUS Report, 2021

The service quality of Trans Metro Dewata

From the survey, the public transportation, Trans Metro Dewata, had seats for 24 people. In a day, this public transportation had less than 29 units that were operating on each corridor. Each unit could do three-round trips in a day. Thus, based on the calculation, many people used this transportation. In corridor 3, the researchers observed many people used this transportation because Trans Metro Dewata passed the route via some schools and shopping centers. The bus provided the maximum and qualified service for the passengers, both the prioritized and non-prioritized passengers. Besides that, the appearance of the officers became a supportive factor of excellent service. The officer's presence also indicated the readiness to provide the services to the community. Some shelters had also implemented special accesses for people with disabilities. However, the researchers found some bus stops or shelters that did not implement special access facilities. The reliability of the officers to service was by providing accurate information. This service developed the customer trust and responsibility to provide the required information to the passengers.

The performance analysis of Trans Metro Dewata
The numbers of the passengers

From the dashboard of TEMAN BUS (2021), the researchers found the numbers of passengers started from January until June 2021 (see Figure 3).

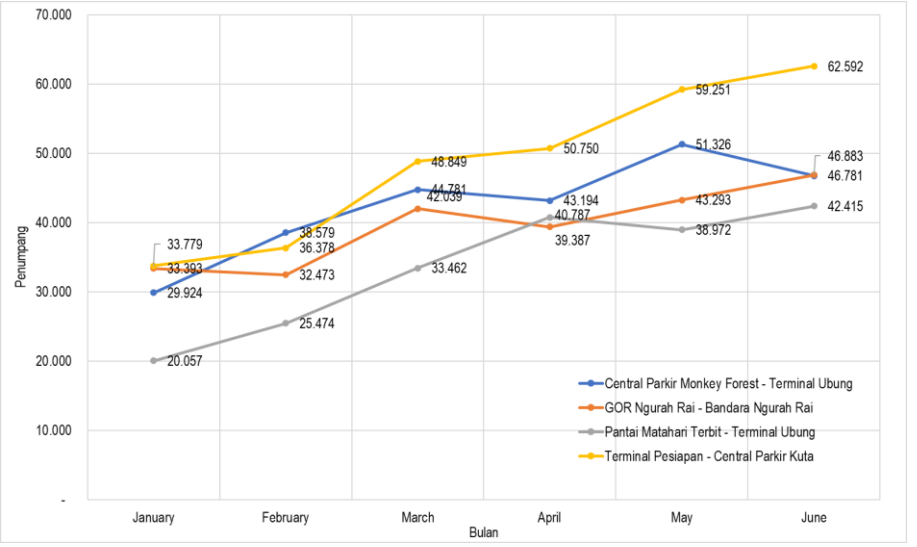

Figure 3. The Numbers of TEMAN BUS' Passengers from January - June 2021 in Denpasar
Source: the processed dashboard information of Teman Bus, 2021.

Graphic 3 shows the significantly increased numbers of the passengers from January - to June 2021 in Denpasar, 200% increased numbers. The routes of departing station- Central Parking Kuta (orange) had the highest numbers of passengers. Then, the route of *Matahari Terbit* beach - Ubug station (gray line) had the lowest number of passengers.

Headway

The obtained data from the Land Transportation Directorate, the General Directorate of Land Transportation, showed the following results of Trans Metro Dewata headways, Bali.

Table 1
Headway Bus Trans Metro Dewata

Corridor	Weekend		Weekdays-Peak Hours		Weekdays-Off-Peak Hours	
	Irrelevant with the Minimum Service Standard	Relevant to the Minimum Service Standard	Irrelevant with the Minimum Service Standard	Relevant to the Minimum Service Standard	Irrelevant with the Minimum Service Standard	Relevant to the Minimum Service Standard
The route of Departing Station - Central	24.4	75.6	60.34	39.66	10.98	89.02

Parking, Kuta						
The Route of Ngurah Rai Sports Center - Ngurah Rai Airport	17.71	82.29	52	48	5	95
The Route of *Matahari Terbit* Beach - Ubung station	17.85	82.15	50	50	6	94
The Route of Central Parking, Monkey Forest Ubud - Ubung station	23.44	76.56	54.75	45.25	10.5	89.5
Total	20.85	79.15	54.27	45.73	8.12	91.88

Source: the processed dashboard information of Teman Bus, 2021.

Based on the minimum service standard declared by the Director-General of Land Transportation Number, SK.687/AJ.206/DRJD/2002 the maximum headway is 7 minutes during peak hours and 15 minutes during off-peak hours. From the diagram, the average headway is 7 minutes and 21 seconds. Based on the applied regulation, the headway of Trans Metro Dewata buses still met the minimum service standard.

Dynamic survey of load factor

The researchers surveyed on December 21, 2021, at 08.30 mornings on the numbered-3 corridor (see Table 2).

Table 2
The dynamic survey of the numbered-3 corridor

Number	Segment		Onboard passengers	Off-board passengers	The Numbers of the Passengers	Capacity	Load Factor
1	The Urban Station of Denpasar, Ubung	In front of Aksara	9	0	9	20	45%
2	In front of Aksara	Puri Jero Kuta	1	0	10	20	50%
3	Puri Jero Kuta	The Gajah Mada Heritage Site	1	0	11	20	55%
4	The Gajah Mada Heritage Site	In front of Udayanaa Hospital	0	3	8	20	40%
5	In front of Udayanaa Hospital	The Eastern corner of Sudirman	0	2	6	20	30%

Number	Segment		Onboard passengers	Off-board passengers	The Numbers of the Passengers	Capacity	Load Factor
6	The Eastern corner of Sudirman	In front of Indonesia Bank, Renon	0	1	5	20	25%
7	In front of Indonesia Bank, Renon	In front of the License Bureau office	3	0	8	20	40%
8	In front of the Licence Bureau office	Next to Renon Plaza	0	0	8	20	40%
9	Next to Renon Plaza	In front of Public Primary School 2, Sanur	0	0	8	20	40%
10	In front of Public Primary School 2, Sanur	In front of KF, Sanur	1	0	9	20	45%
11	In front of KF, Sanur	*Matahari Terbit*	2	0	11	20	55%
12	*Matahari Terbit*	Hangtuah	3	2	12	20	60%
13	Hangtuah	Parking area	2	1	13	20	65%
14	Parking area	Bajra Sandi, Renon	0	0	13	20	65%
15	Bajra Sandi, Renon	In front of Educational Institution Bali Province	1	0	14	20	70%
16	In front of Educational Institution Bali Province	In front of *Matahari* Mall	0	1	13	20	65%
17	In front of *Matahari* Mall	Across from Ramayana Mall	3	0	16	20	80%
18	Across from	Pura Jala	0	5	11	20	55%

Number	Segment		Onboard passengers	Off-board passengers	The Numbers of the Passengers	Capacity	Load Factor
	Ramayana Mall	Lambih Diponegoro					
19	Pura Jala Lambih Diponegoro	Hasanudin	2	0	13	20	65%
20	Hasanudin	In front of Cineplex	1	0	14	20	70%
21	In front of Cineplex	Puri Kawan Jero Kuta	0	0	14	20	70%
22	Puri Kawan Jero Kuta	In front of Toyota, Cokroaminoto	0	0	14	20	70%
23	In front of Toyota, Cokroaminoto	In front of the Aston Hotel	2	0	16	20	80%
24	In front of the Aston Hotel	In front of Mitra 10	3	2	17	20	85%
25	In front of Mitra 10	In front of Tiara Gatsu, the Southern side	0	2	15	20	75%
26	In front of Tiara Gatsu, the Southern side	The Joint Monitoring Post, Dialung	3	1	17	20	85%
27	The Joint Monitoring Post, Dialung	In front of Tiara Gatsu, the Southern side	0	0	17	20	85%
28	In front of Tiara Gatsu, the Southern side	In front of Fulquran Mosque	1	0	18	20	90%
29	In front of Fulquran Mosque	In front of the Aston Hotel	0	0	18	20	90%
30	In front of the Aston Hotel	The Urban Station of Denpasar,	0	0	18	20	90%

Number	Segment	Onboard passengers	Off-board passengers	The Numbers of the Passengers	Capacity	Load Factor
Average	Ubung	1.27	0.67	12.53	20	63%

The source of analysis

Table 2, the dynamic survey result, shows the average of numbered-3 corridor passengers on the buses is 13 people with a load factor of about 63%. Then, the dynamic survey at 14.00 shows the average of the passengers in the corridor is 3. This rate indicates the load factor percentage, 15%.

The Static load factor survey at Ubung station

From the dashboard of TEMAN BUS (2021), the researchers found the numbers of passengers started from January until June 2021 (see Figure 4).

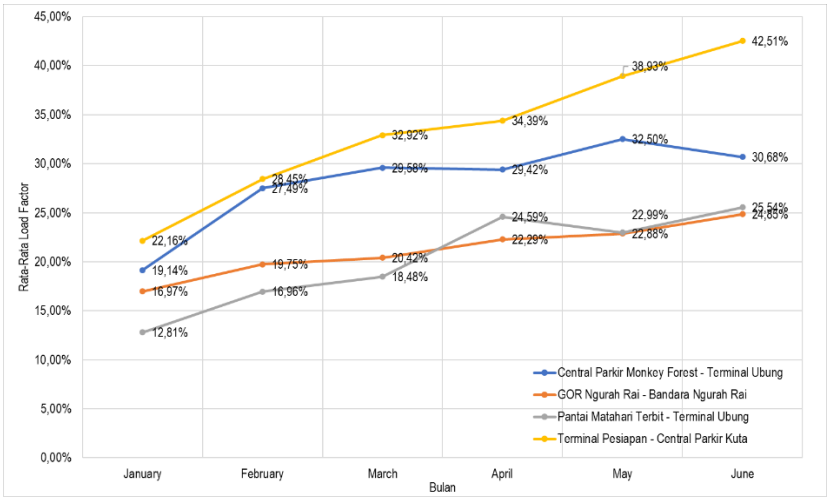

Figure 4. The Static Load Factor Survey from January - June 2021 in Denpasar
Source: the processed dashboard information of Teman Bus, 2021

The researchers used total bus passenger capacity to calculate the load factor. The patterns of the load factor show the linear increased passenger numbers boarded on the buses. The load factors from January until June 2021 gained the fluctuated increase numbers. The highest load factor: The Departing Station - Central Parking, Kuta (42.51%). The lowest load factor: The Route of Ngurah Rai Sports Center - Ngurah Rai Airport (24.85%) In June, the corridor of the Parking site of Monkey Forest - Ubung station declined by a percentage of 1.82%. The static survey of Ubung station, from 08.30 until 15.30 on December 21, 2021, found 76 buses of the numbered-3 corridor passed the station.

Table 3
The statistic survey of Ubung station with numbered-3 corridor

The volumes of passing buses	The average of the passengers	The highest volume of the passengers	The lowest volume of the passengers	Average load factor	The highest load factor	The lowest load factor
76	2.0	7	0	10%	35%	0%

Source: The analysis

From the primary data collection, the researchers found the onboard passengers were two people with the highest number of passengers being 7 people and the lowest number of passengers being 0. The average load factor was 10% with the highest load factor, 35%; and the lowest load factor, 0%. The static survey of Ubung station, from 08.30 until 15.30 on December 22, 2021, found 69 buses of the numbered-3 corridor passed the station. From the primary data collection, the researchers found the onboard passengers were four people with the highest number of passengers being 12 people and the lowest number of passengers being 0. The average load factor was 31% with the highest load factor, 35%; and the lowest load factor, 0%.

From the two-day data of the static and dynamic surveys, the average load factor of the dynamic survey reached the peak states in the morning and the midday, with a percentage of 21%. The average load factor of a static survey at Ubung station was 16%. Thus, the total load factor is 18%. From the data, the load factor value was still far from the expected condition by the Minimum Service Standard of the Director-General of Land Transportation. SK.687/AJ.206/DRJD/2002 about the Technical Manual Promotion of Urban Public Transportation with Permanent and Pre-arranged routes that demands the minimum load factor value is 70%. Thus, the load factor of Trans Metro Dewata in this survey had not met the standard. Generally, the operational performance of all routes in Denpasar for these recent six months had not been stable. The evidence was the fluctuation of various service provisions. However, the performance of the passengers increased. This increase led to lower passenger costs for each kilometer. The speed of the trip was an average of 15 km/hour with the lowest speed, 18.4 km/hour for all routes both weekdays and weekends. This finding indicated excellent trip performance.

The access of public transportation Trans Metro Dewata

The influential variable of the accessibility level was the available networking system in the region. With the increased networking system, the provided access gets easier and vice versa. The transportation lines became the influential factors in providing public service and were important to creating smooth flows for the community activities. The accessibility of the urban transportation system, SARBAGITA, is expected to attract the community's interest to use public transportation. The Trans Metro Dewata buses are managed with a fleet management system. This system allows the Managerial Party to manage the data via a dashboard. The data consisted of various data and output that had to be realized by the Managerial parties. The data dealt with total data needs that presented the combined information about the vehicle entity, human resource

entity, and passenger entity. From the three data sources, the results were the data trips and the operational unit data. The applied fleet management system of Trans Metro Dewata is already connected with Teman Bus application and downloadable by the passenger candidates. The other important data included the fleet operational data. These data were connected to the unique identity of a unit, stop and go time at the bus stop, and headway data. The passenger data consisted of the location and time to board the bus and get off of the bus. Thus, the managerial party could notice each passenger's kilometer trip. The dashboard became the instrument for the management to monitor and evaluate the program implementation, Teman Bus, especially dealing with the operational performance.

The applied TOD system

The development of the city made the multimode transportation facilities and the transit areas inseparable. The inter-mode facility refers to an area consisting of a transportation mode to be used optimally by the community. The surrounding areas of the transit station are potential for further development. This matter deals with the ease of access to the transportation facility in the Transit-Oriented Development area. The transit-oriented development refers to the urban plan integrated with the transportation system to create an efficient city. The development of this concept aims to provide problem solutions and alternatives for metropolitan development with a development-oriented model. The transit-oriented development concept integrated the regional transit networks and completed it with environmental development strategy around the transit areas. Successful implementation of the TOD concept made many people enjoy the facilities and infrastructures, especially the integrated public transportation with their settlements and daily activities. The concept of transit-oriented development encouraged people to focus on their daily activities around bus stops or transit corridors. Here is an example of TOD site implementation in an urban area (see figure 5).

Figure 5. The TOD implementation concept in urban areas
Source: insanpelajar.com

The urban plan and stakeholders in urban sites must adopt the TOD principle. However, the implementation of the concept in urban areas needs two main considerations. They are: considering the support of a high capacity transportation system with an adequate route, area scope, and relatively short distance. These matters are important to develop the surrounding environment around the transportation areas. From the results and discussion, it is important to create a friendly, comfortable, and affordable environment for non-motorized transportation and extended transportation modes.

Conclusion

From the discussion and analysis, the facilities of Trans Metro Dewata are categorized as excellent. The management and the given comfortability became the focused aspects of the unit operator, the application Teman Bus, to provide comfortability and information ease of access. The quality of the given service was excellent, proven by the readiness of the drivers to provide services and information. The number of passengers in 2021 increased significantly. The results of the dynamic and static survey showed that the average load factor was 18%, acceptable based on the applied Minimum Service Standard by the Director-General of Land Transportation Number. SK.687/ AJ/DRJD/2002 about the Technical Manual Promotion of Urban Public Transportation with Permanent and Pre-arranged routes that demands the minimum load factor value is 70%.

The field survey showed the headway of Trans Metro Dewata was 7 minutes. Based on the minimum service standard declared by the Director-General of Land Transportation Number, SK.687/AJ.206/DRJD/2002 the maximum headway is 7 minutes during peak hours and 15 minutes during off-peak hours. The accessibility of Trans Metro Dewata applied fleet management system,Teman Bus. This access is visible for users to see the bus positions. From the survey and literature studies, the numbers of passengers, facilities, accessibilities, and performance of Trans Metro Dewata were excellent so they could improve the numbers of passengers. Further socialization is important done by the authorized stakeholder for the people so that they will be interested to use public transportation as a reliable mode. The other strategy is - to implement Transit Oriented Development, TOD, to attract the people intention around the transportation areas.

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