CARRIYING CAPACITY OF ACCSESSIBILITY AND CONNECTIVITY IN THE TRANSIT ORIENTED DEVELOPMENT (TOD) AREA OF LRT CIKUNIR 2 STASION

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Keywords	ABSTRACT
TOD (Transit Oriented Development), Accessibility, Connectivity	This study is aimed at identifying the main problem in the TOD (Transit Oriented Development) area of Cikunir 2 LRT Station, namely, the lack of accessibility and adequate connectivity, especially for pedestrians and users of mass public transportation, due to the concept and infrastructure that is not optimal. The study was conducted for two months, from May to June 2023, using field observations and institutional interviews. The preliminary survey was conducted to obtain primary and secondary data, which were then processed using the analysis of the walkability, accessibility, and connectivity index. The results of this analysis are expected to provide insight into the development of access and connectivity in the area. The resulting recommendations include the provision of barrier-free pedestrian paths and separation from motor vehicles. The provision of safe crossing facilities, and increased safety through lighting and disturbance reporting instruments are also suggested. In addition, the arrangement of activity functions along the pedestrian path, improved cleanliness, air circulation, and visual attraction are suggested. Furthermore, studies on the behavioral dynamics between pedestrian and vehicle, the integration of smart technologies to enhance walkability and the environmental and health benefits of improved pedestrian infrastructure could provide valuable insights. Research on institutional integration and financial management for urban development projects would also help in optimizing the implementation of these improvements for safer and more accessible urban spaces.

INTRODUCTION

The development of transportation facilities and infrastructure currently needs to prioritize intermodal integration to make it easier for people to move and make people's travel more efficient. The integration of transportation services is one of the urgent steps to be implemented, but it needs to be balanced with accessibility and good connectivity with continuous conditions (Butler et al., 2020; Kuru & Khan, 2021; Pan et al., 2021; Shah et al., 2021; Thaller et al., 2021) or in this case, access to transportation mode nodes does not have obstacles.

The movement of people using means of transportation needs to be accommodated with well-planned systems and infrastructure through the development of a transportation mode node area that can be developed into an area with diverse/mixed functions. In this case in the form of an area with the concept of Transit Oriented Development (TOD) as per the Regulation of the Minister of ATR Number 16 of 2017 concerning Guidelines for the Development of Transit-Oriented Areas that Oriented

Development Transit or Transit Oriented Development, hereinafter abbreviated as TOD, is the concept of developing areas in and around transit nodes to add value which focuses on integration between mass public transportation networks, and between mass public transportation networks and non-motorized transportation mode networks, reducing the use of motorized vehicles accompanied by the development of mixed, dense areas, having medium to high intensity of space utilization.

The development of the transportation node area with the TOD concept is supported by the application of transportation aspects that can be of special concern because the development of the area is based on transportation in the form of mass public transportation. As the Regulation of the head of the Jabodetabek Transportation Management Agency (BPTJ) Number PR .377/AJ.208/BPTJ-2017 concerning Technical Guidelines for Transportation Aspects in the Implementation of Public Transportation-Oriented Areas in the Greater Jakarta Region, there are 5 aspects of transportation that are the principles in the implementation of TOD, namely: Public Transportation Aspects; Connectivity aspect; Aspects of Walking Facilities; Aspects of Bicycle Facilities; and Aspects of Mode Switching. The aspects in question are the main priority in the implementation of integration between transportation modes in the TOD area.

TOD (Transit Oriented Development) is a mixed-use land use that encourages people to live and do activities in areas that have public transportation facilities and reduce people's habits to drive private cars (Dayaratne & Wijesundara, 2014; Ibraeva et al., 2020; Khare et al., 2021; Noland et al., 2017; Thaller et al., 2021). TOD (Transit Oriented Development) first existed due to the large number of daily population movements or commuters who carry out activities in a city, especially those who live outside the city (Liu et al., 2022; Nasri & Zhang, 2014; Parker & Arrington, 2002; Pongprasert & Kubota, 2019; Susetyarto, 2020). In addition, there are also various transportation problems, so a solution is needed to meet the needs of the community to be comfortable in moving. The concept of TOD (Transit Oriented Development) was created to provide direction for an area to have a mixed community around the transit location (Cappellano & Spisto, 2014; Motieyan & Mesgari, 2017; Ndebele & Ogra, 2014; Sohoni et al., 2017; Sung & Oh, 2011).

Based on the Institute for Transportation & Development Policy (ITDP) regarding TOD (Transit Oriented Development) Standards, TOD (Transit Oriented Development) has principles and keys to its implementation in accordance with the TOD standard performance goals. The principles and keys to the implementation of TOD standard performance goals consist of walking, cycling, connecting, transit or public transportation, mix or blend, density or compacting, compact or close, and shift or switching (Putro & Wirasmoyo, 2020).

To deal with these problems, the government and related stakeholders must prepare facilities to support accessibility and continuous connectivity (seamless) for people who will go to the Cikunir 2 LRT station by paying attention to principles and standards related to TOD (Transit Oriented Development). Regulations related to TOD (Transit Oriented Development) standards that apply in Indonesia are Presidential Regulation No. 55 of 2018 concerning the Jabodetabek Transportation Master Plan, Presidential Regulation No. 60 of 2020 concerning the Jabodetabek Punjur Kawsan RTR, Regulation of the Minister of ATR Number 16 of 2017 concerning Guidelines for Transit-Oriented Areas, Regulation of the Head of the Jabodetabek Transportation Management Agency Number 377/A.208/BPTJ concerning Technical Guidelines for Transportation Aspects in the Region Oriented Mass Transportation that adopts TOD (Transit Oriented Development) standards from ITDP.

Based on the phenomenon from the description that has been described above, the researcher used the basic principles of TOD ITDP and will further study the Carrying Capacity of Accessibility and Connectivity in the TOD (Transit Oriented Development) Area of Cikunir 2 LRT Station. This study identifies the main problem in the TOD (Transit Oriented Development) area of Cikunir 2 LRT Station, namely the lack of accessibility and adequate connectivity, especially for pedestrians and users of mass public transportation, due to the concept and infrastructure that is not optimal. This study is focused on the performance of non-motorized transportation facilities within a radius of 400-800 meters from the Cikunir 2 LRT station, with the aim of analyzing and providing recommendations to improve accessibility and seamless connectivity in the area. The results of this study are expected to provide input for relevant stakeholders and enrich insights into the development of a more integrated and efficient TOD area.

METHODS

This research is carried out through several stages, starting with the formulation of the problem and literature study, followed by research preparation which includes the identification of study sites, methods, and survey equipment. The preliminary survey was conducted to obtain primary and secondary data which were then processed using the analysis of the walkability, accessibility, and connectivity index. The results of this analysis are used to compile conclusions, recommendations, and policy implications related to the TOD area of Cikunir 2 LRT Station located on Jalan Batu Mulia, Jakasampurna, West Bekasi District, Bekasi City, West Java. The study was conducted for two months, from May to June 2023, using field observations and institutional interviews.

Primary data was collected through direct observation and interviews with public transportation users, while secondary data was obtained from government agencies, such as the Ministry of Transportation and the Ministry of ATR, as well as PT. KAI. The sampling technique uses accidental sampling with a target of 100 respondents. Data analysis was carried out with a mixed methods approach, combining quantitative and qualitative methods. The walkability index analysis assesses aspects of safety, comfort, and supporting policies, while the connectivity analysis identifies the connection between the assessment indicators and the perceived reality of the user. The results of this analysis are expected to provide insight into the development of accessibility and connectivity in the TOD area of Cikunir 2 LRT Station.

RESULTS
Accessibility and Connectivity Analysis
Walkability Analysis

The score in the walkability assessment is obtained through secondary and primary data, namely interview data of officials or authorized persons at institutions that have authority related to the object of this research which will then be combined with data obtained in the field.

Institutional Survey

The acquisition of data in this institutional survey is intended to obtain perspectives and additional information from institutions that have authority related to the object of this research, namely regarding transportation and especially transit oriented development (TOD) which will then be converted into a value by referring to the literature of The Global Walkability Index by Holly Virginia Krambeck. In its implementation, this survey is aimed at individuals who have authority regarding the formulation of policies at the institution in question.

Figure 1. E-Form for Institutional Survey

The data obtained as shown in Figure 1 comes from institutions that are authorized to arrange Greater Jakarta transportation and are related to TOD (Transit Oriented Development), namely the

Greater Jakarta Transportation Management Agency (BPTJ), Bekasi City Transportation Agency, Bekasi City Highway Service, Bekasi City Spatial Planning Office, Directorate General of Railways, PT. KAI. The data collection that also uses the E-Form is then converted into numbers as shown in Table 1 to 7 as follows:

Table 1. Institutional Survey Assessment Score (BPTJ)

Question	Points Assessment	Answer
1	Scale 1-5, in this case the number 1 is considered non-existent	3
2	One point for each answer on the checklist	3
3	The percentage result is divided by 10	1,5
4	"Yes" answer = 5 and "no" answer = 1	5
5	3 for the answer "Always"; 2 for the answer "Sometimes"; and 1 for the answer "rarely"; Then the result is divided by 2	6
	Total	18,5

Table 2. Institutional Survey Assessment Score (BEKASI CITY DISHUB)

Question	Points Assessment	Answer
1	Scale 1-5, in this case the number 1 is considered non-existent	2
2	One point for each answer on the checklist	2
3	The percentage result is divided by 10	2
4	"Yes" answer = 5 and "no" answer = 1	5
5	3 for the answer "Always"; 2 for the answer "Sometimes"; and 1 for the answer "rarely"; Then the result is divided by 2	4,5
	Total	15,5

Table 3. Institutional Survey Assessment Score (BEKASI CITY SPATIAL PLANNING OFFICE)

Question	Points Assessment	Answer
1	Scale 1-5, in this case the number 1 is considered non-existent	3
2	One point for each answer on the checklist	2
3	The percentage result is divided by 10	3
4	"Yes" answer = 5 and "no" answer = 1	5
5	3 for the answer "Always"; 2 for the answer "Sometimes"; and 1 for the answer "rarely"; Then the result is divided by 2	3,5
	Total	16,5

Table 4. Institutional Survey Assessment Score (DINAS BINA MARGA)

Question	Points Assessment	Answer
1	Scale 1-5, in this case the number 1 is considered non-existent	3
2	One point for each answer on the checklist	2
3	The percentage result is divided by 10	1,5
4	"Yes" answer = 5 and "no" answer = 1	5
5	3 for the answer "Always"; 2 for the answer "Sometimes"; and 1 for the answer "rarely"; Then the result is divided by 2	4,5
	Total	16

Table 5. Institutional Survey Assessment Score (DIRECTORATE GENERAL OF RAILWAYS)

Question	Points Assessment	Answer
1	Scale 1-5, in this case the number 1 is considered non-existent	2
2	One point for each answer on the checklist	3
3	The percentage result is divided by 10	2,5
4	"Yes" answer = 5 and "no" answer = 1	5
5	3 for the answer "Always"; 2 for the answer "Sometimes"; and 1 for the answer "rarely"; Then the result is divided by 2	4,5
	Total	17

Table 6. The Assessment Score of the Institutional Survey (PT. KAI - LRT DIVISION)

Question	Points Assessment	Answer
1	Scale 1-5, in this case the number 1 is considered non-existent	2
2	One point for each answer on the checklist	2
3	The percentage result is divided by 10	3
4	"Yes" answer = 5 and "no" answer = 1	5
5	3 for the answer "Always"; 2 for the answer "Sometimes"; and 1 for the answer "rarely"; Then the result is divided by 2	4,5
	Total	16,5

Table 7. Average Score of Institutional Survey Assessments

Number	Institusi	Score
1	JAKARTA TRANSPORTATION MANAGEMENT AGENCY	18,5
2	BEKASI CITY TRANSPORTATION DEPARTMENT	15,5
3	BEKASI CITY SPATIAL PLANNING OFFICE	16,5
4	DINAS BINA MARGA	16
5	DIRECTORATE GENERAL OF RAILWAYS	17
6	PT. KAI (LRT DIVISION)	16,5
	Average	**16,67**

Based on table 7, an average score of 16.67 was obtained, which will then be combined or summed up with the score on the results of the walkability indicator assessment.

Walkability Indicator Assessment

At this stage, the 9 indicators for the walkability assessment are calculated based on the location as the segments have been determined and then each is calculated also based on the method from the literature The Global Walkability Index by Holly Virginia Krambeck. As the literature indicates, the research was conducted using a likert scale of 1 to 5, namely: Number 1 = Very Bad; Number 2 = Bad; Number 3 = Enough; Number 4 = Good; Number 5 = Very Good. The results of the calculation in the analysis are as follows:

Table 8. Walkability indicator assessment

No.	Assessment Indicators	Surveyed Road Segment 1	Surveyed Road Segment 2	(Σ(x*road length*10*Number of pedestrians))/Number of Segments)))/10	Result
		1	*2*		
1	Conflicts on Pedestrian Paths	4	2	24	24.2
2	Safety When Crossing	2	2	12	24.2
3	Safety from Crime	3	3	18	36.3
4	Behavior of Motorists	2	2	12	24.2
5	Pedestrian Facilities	1	1	6	12.1
6	Infrastructure for the Disabled	1	1	6	12.1
7	Pedestrian Maintenance and Cleanliness	1	1	6	12.1
8	Existence of Barriers	1	1	6	12.1
9	Availability of Crossing Facilities	1	1	6	12.1
10	Number of Pedestrians	60	121		
11	Length of Road Section (km)	0.2	0.2		

Average	10,67	18,82

As stated in table 8, there are 2 segments that are the location or object of research, the segments in question are as follows:

1) Segment 1 : Access via Jalan Raya Kalimalang to Jalan Raya Puncak Cikunir Kampung Dua.
2) Segment 2 : Access via Jalan Batu Mulia.

Based on Table 4.8, it can be seen that segment 1 (access in and out of Cikunir 2 LRT Station from Jalan Raya Kalimalang to Jalan Raya Puncak Cikunir) and segment 2 (access in and out of Cikunir 2 LRT Station via Jalan Batu Mulia) have very low values, this also temporarily identifies that in this segment there are issues that need to be exploited to be improved and need to improve facilities, especially for non-motorized transportation. Overall, these values will then be summed up with scores on the institutional survey with the following results:

1) Segment 1
   a) Institutional survey value : 16,67
   b) Indicator value   : 10,67
   c) **Total value   : 27,34**
2) Segment 2
   a) Institutional survey value : 16,67
   b) Indicator value   : 18,82
   c) **Total value   : 35,49**

Based on the calculations in segments 1 to 2 related to institutional survey scores and indicators, various values are obtained and this needs to be aligned in the walkability score category referring to Redfin Company (https://www.walkscore.com/) as follows:

Table 9. Walkability Score

Walkability Score	Information
90 - 100	In carrying out activities do not require motorized vehicles
70 - 89	Most activities can be done on foot
50 - 69	Some facilities are within walking distance
25 - 49	Few facilities within walking distance
0 - 24	Almost all activities require motorized vehicles

Based on Table 9, it can be concluded that the values in segments 1 and 2 are in the range of values 25-49 which means that the segment needs to be the main concern and focus to be improved or improved, especially in segment 1 which has the lowest score, this is also reflected as shown in previous figures with inadequate and not optimal attention to pedestrian facilities.

Connectivity Carrying Capacity Analysis
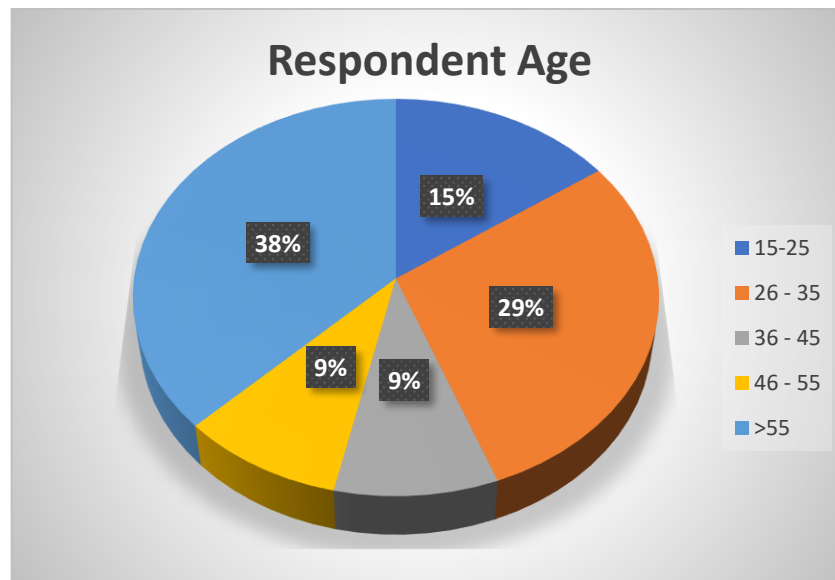*Respondents Characteristics*
1) Age

Figure 2. Percentage of respondents by age

The largest age range that participated in filling out the questionnaire based on Figure 2 was in the age range of 26 to 35 years with a percentage of 29%, this indicates relatively that in the area there are many pedestrians who travel in a fairly young age range.
2) Gender: The acquisition of data in the form of gender is also an effort to identify respondents who participate in filling out questionnaires based on gender, both male and female.
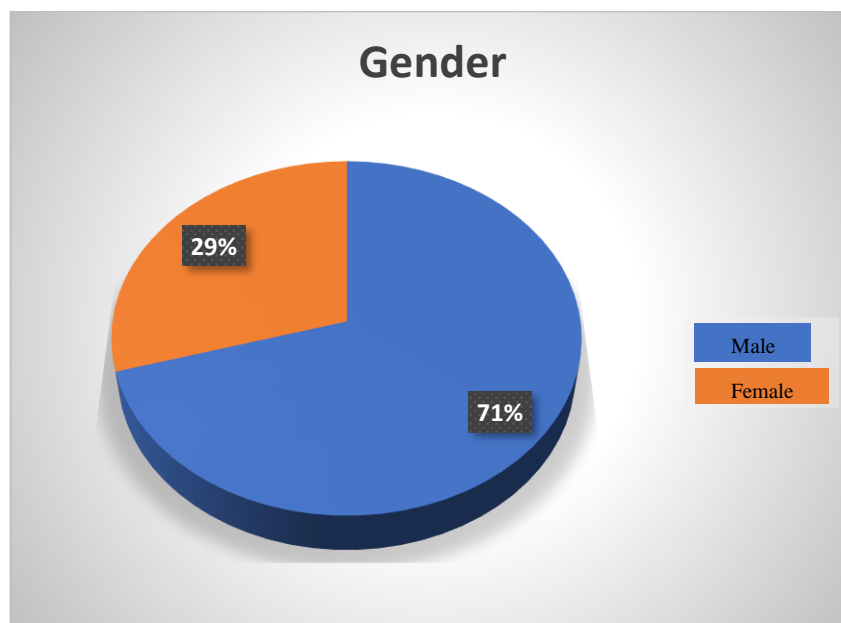

Figure 3. Percentage of respondents by gender

As shown in Figure 3, it can be identified that more males participated in filling out the questionnaire with a percentage of 71%. It also indicates relatively that many male pedestrians pass through the area.
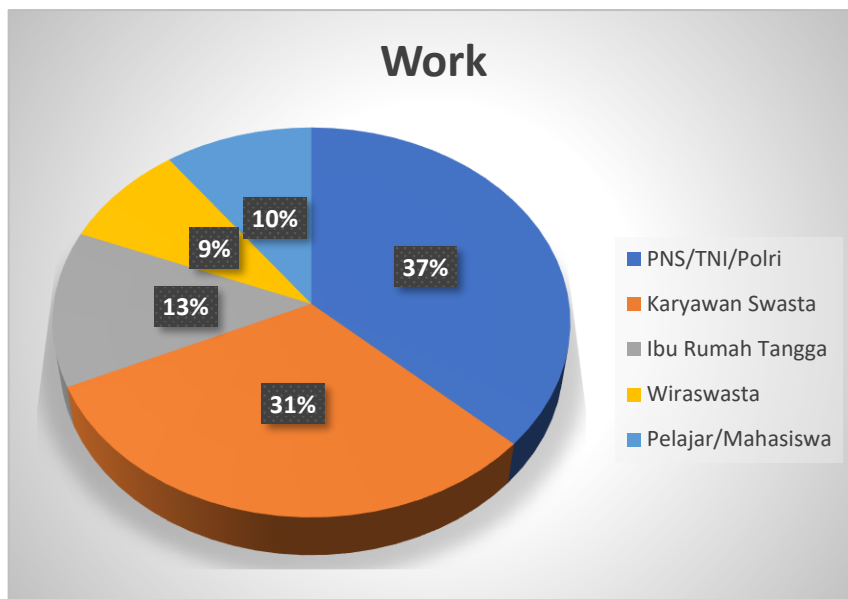
3) Work

Figure 4. Percentage of respondents by occupation chart

The largest percentage in the job category based on Figure 4 is 37% with employment as civil servants/TNI/Polri followed by Private Employees. This also indicates relatively that many pedestrians who work as civil servants/TNI/Polri both who work in the area and in other places then use public transportation in the area. In this case, in the TOD area of Cikunir 2 LRT Station there is an area with quite diverse functions both from residential zones, services and trade, public services, to government.
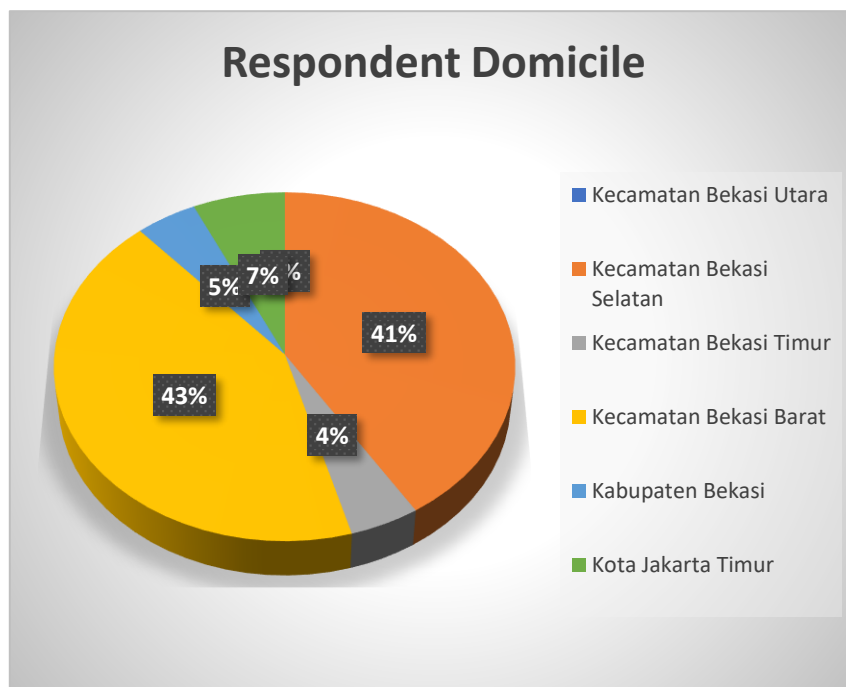
4) Domicile

Figure 5. Percentage of respondents based on domicile

The observation results obtained the largest percentage in this domination category is West Bekasi District with an acquisition of 43% and followed by South Bekasi District 41% as shown in Figure 5 above. This can also indicate relatively that the most respondents came from the area around the location of the Cikunir 2 LRT Station which is located in the administrative

area of Jakasampurna Village, precisely between the West Bekasi and South Bekasi Administrative Regions.

5) Destination Location

Figure 6. Percentage of Respondents Based on Destination Location

The observation results obtained the largest percentage in the category of respondents' destination locations were DKI Jakarta Province with an acquisition of 61% and followed by the Cikunir 2 LRT TOD Area and West Bekasi District at 19% as shown in Figure 6 above. This can indicate relatively that the majority of respondents traveled to DKI Jakarta Province.
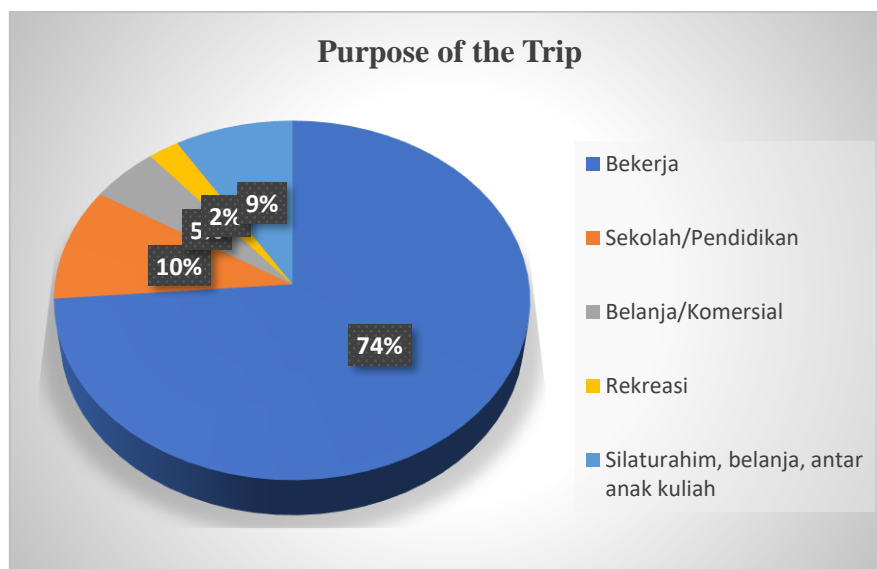
6) Purpose of the trip

Figure 7. Percentage of respondents by occupation chart.

The largest percentage in the Intention to Travel category based on Figure 7 is 74% with the intention of traveling to work followed by school/education. This also indicates relatively that the majority of respondents do activities for work and school/education.

Mode Usage Preferences
Public Transportation

Figure 8. Diagram of the percentage of respondents who use public transportation

The respondents who participated in filling out the questionnaire based on Figure 8 were public transportation users with a percentage of 71%, this indicates relatively that in the area many people travel using public transportation in carrying out daily activities.
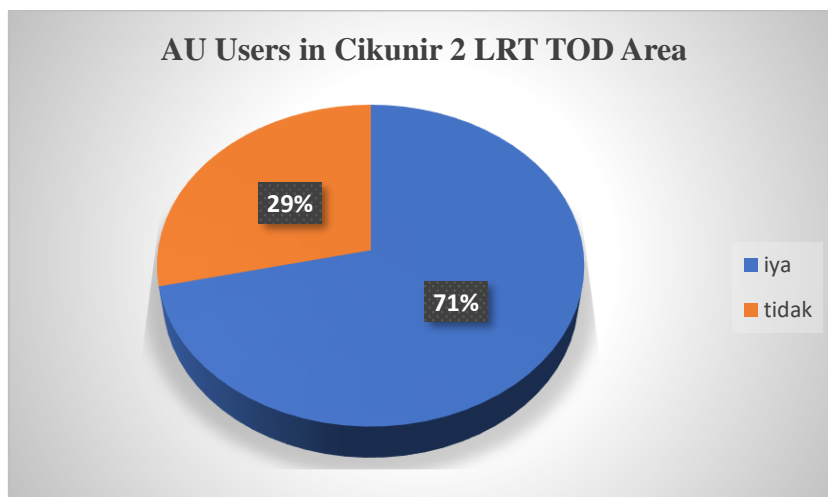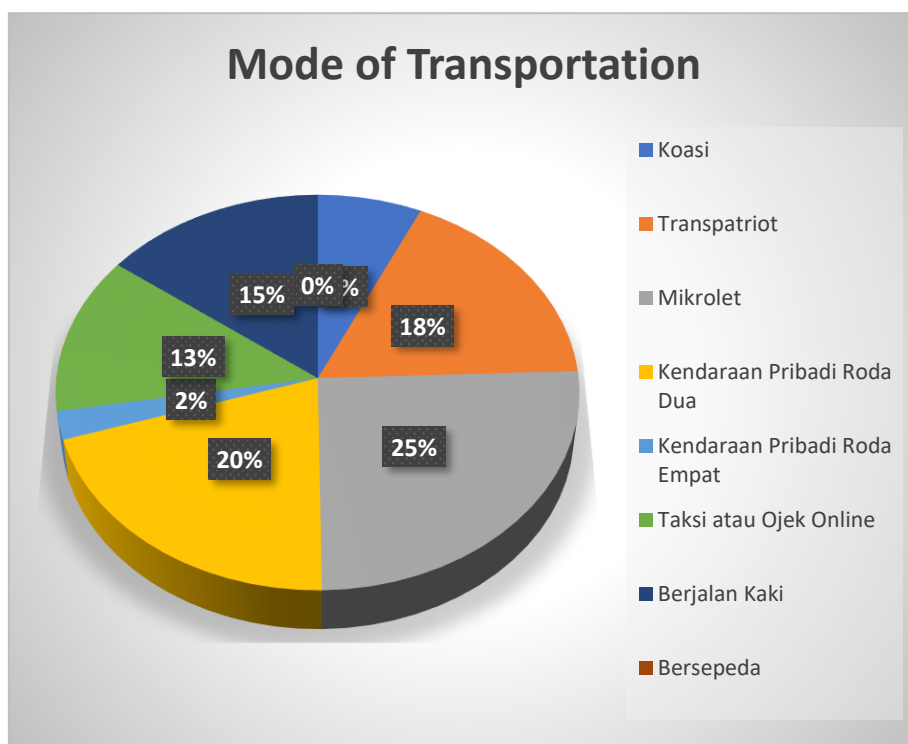
Mode of Transportation

Figure 9. Diagram of the percentage of respondents who use public transportation

The respondents who participated in filling out the questionnaire based on Figure 4.17 were users of the microlet mode of transportation with a percentage of 25%, followed by users of the Two-Wheeled Private Vehicle mode of transportation as much as 20% and Transpatriot as much as 18%, this indicates relatively that in the area many people travel using public transportation in carrying out daily activities.
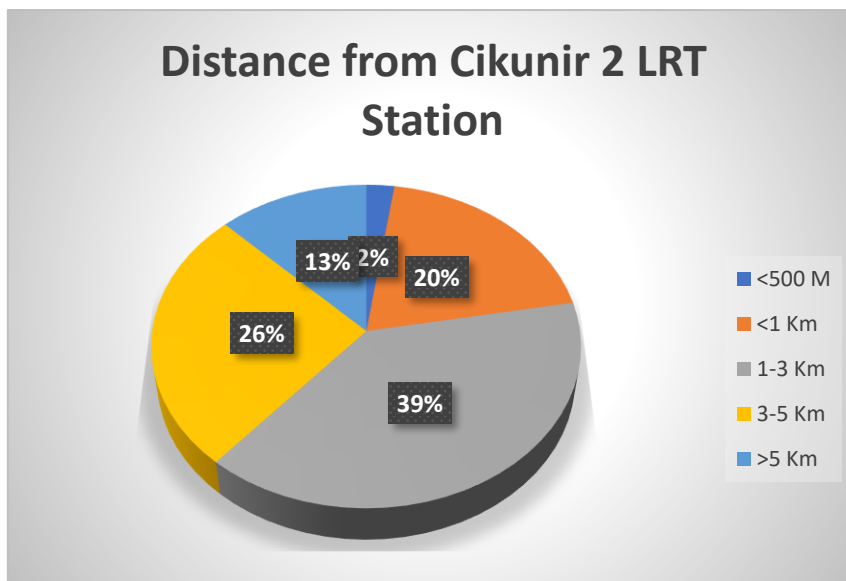
Distance from Cikunir 2 LRT Station

Figure 10. Percentage of respondents based on Distance traveled

The respondents who participated in filling out the questionnaire based on Figure 10 were the majority with a distance of 1-3 Km as much as 39%, followed by a distance of 3-5 Km as much as 20% and a distance of < 1 Km as much as 20%, this indicates relatively that the location where the respondents live is in the TOD (Transit Oriented Development) area of Cikunir 2 LRT Station.

Travel time to Cikunir 2 LRT Station
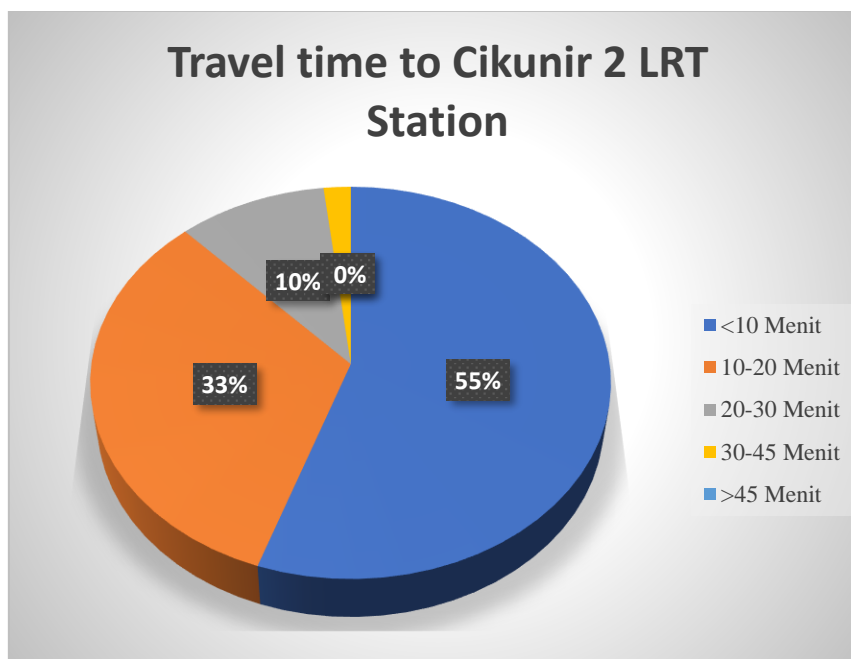
Figure 11. Percentage of respondents by travel time

The respondents who participated in filling out the questionnaire based on Figure 11 were the majority with a travel time of <10 minutes as much as 55%, followed by a travel time of 10-20 minutes as much as 33% and a travel time of 20-30 minutes as much as 10%, this shows relatively that the travel time needed by respondents from their residence to the TOD (Transit Oriented Development area) Cikunir 2 LRT Station is relatively reachable in a short time.

Activity start time

Figure 12. Percentage of respondents based on Time of starting the journey to the place of activity

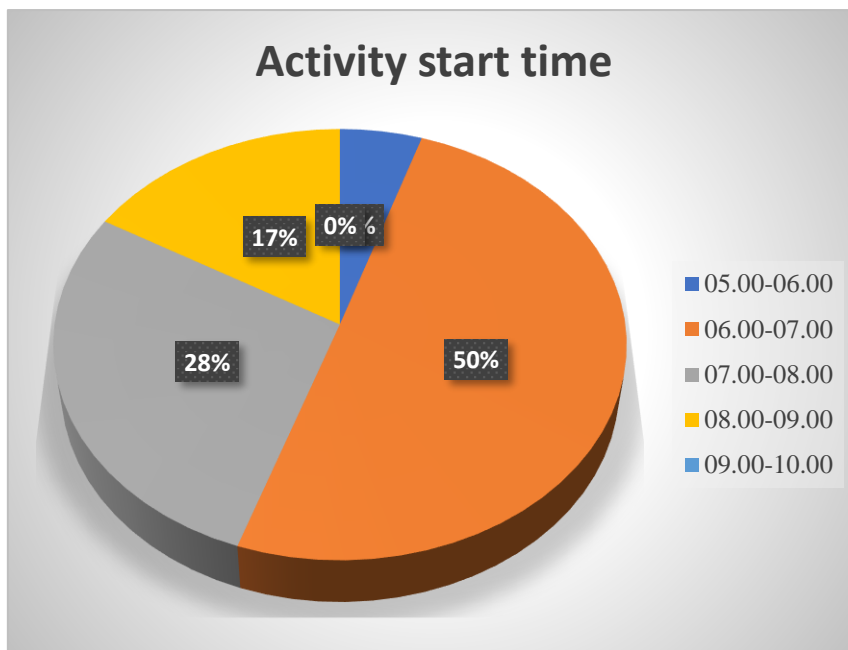The choice of time to start activities for respondents who participated in filling out the questionnaire based on Figure 12 the majority started activities at 06.00-07.00 as much as 50%, followed by 07.00-08.00 as much as 28% and 08.00-09.00 as much as 17%, this shows relatively that respondents carry out activities in the morning and at almost the same time from 06.00-09.00, things that need to be considered are the availability of pedestrian paths and switching modes of transportation from and to TOD (Transit Oriented Development) Cikunir 2 LRT Station.

Anatomy of Cikunir 2 LRT Station Connectivity
Condition of Infrastructure or Facilities for Pedestrians/Cyclists in the TOD (Transit Oriented Development) area of LRT Cikunir 2.

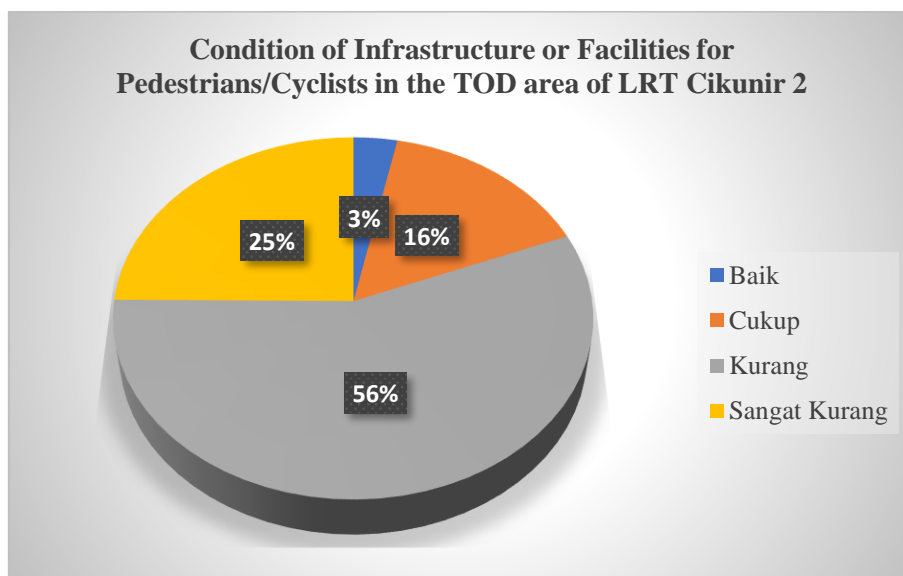**Figure 13.** Diagram of the percentage of respondents to the Condition of Infrastructure or Facilities for Pedestrians

The respondents' responses to the Condition of Infrastructure or Facilities for Pedestrians in the TOD (Transit Oriented Development) area of Cikunir 2 LRT Station based on Figure 13 as many as 56% thought it was not enough, then as many as 25% thought it was very lacking and 16% thought it was

enough. This indicates relatively that in the area the condition of Infrastructure or Facilities for Pedestrians is considered inadequate for pedestrians to carry out daily activities.

Traffic Conditions in the TOD (Transit Oriented Development) area of LRT Cikunir 2 during peak hours (Morning and Evening)
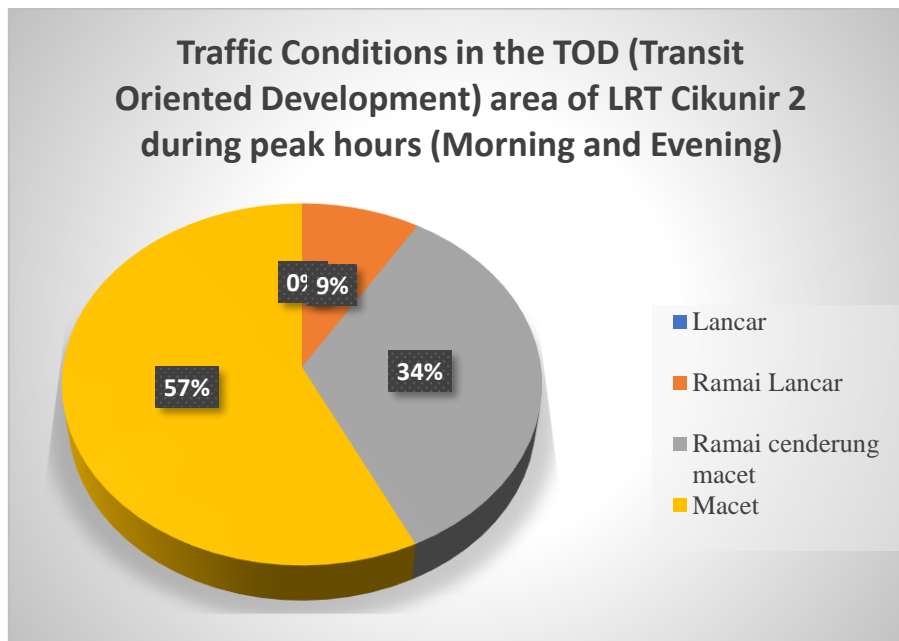

Figure 14. Diagram of the percentage of respondents to Traffic Conditions in the Cikunir 2 LRT TOD area during peak hours (Morning and Evening)

The respondents' responses to traffic conditions in the TOD (Transit Oriented Development) area of Cikunir 2 LRT Station based on Figure 14 as many as 57% thought it was jammed, then as many as 34% thought it was crowded and 9% thought it was crowded smoothly. This requires handling so that the traffic conditions in the area can be better and the travel time to the TOD (Transit Oriented Development) Area of the Cikunir 2 LRT becomes shorter.

Characteristics of Public Transportation in the Region

Table 10. Public Transportation Inventory

Route Number	Route	Operating Hours	Headway	Transfer Point Facilities
M.19	Stop Point: PGC – Cawang UKI – Lampu Merah Cawang – Cawang Sutoyo – The Hive – Yodya Tower – Simpang Kalimalang DI Panjaitan – Pasar Ciplak – Jalan Cipinang Indah – Mall Cipinang Indah – Jalan Inspeksi Saluran kalimalang – Universitas Borobudur – Jalan Raya Kalimalang – Jalan H Dahlan – Jalan Raden Inten – Jalan Kelapa Kuning – Pondok Kelapa Raya Kalimalang – Pasar Sumber Artha – Perempatan Caman – Jalan Patriot Raya – Pasar Kranji – Kolong Flyover Kranji	05.00 a.m. to 21.00 p.m.	every 15 minutes	none
M.26	Stop Point: Terminal Kampung Melayu – Jalan Pedati Raya – Jalan Haji Taslim – Bidara Cina – Halte GOR	05.00 a.m. to 21.00 p.m.	every 15 minutes	none

	Otista – Jalan Cawang Baru – DI Panjaitan – Simpang Kalimalang DI Panjaitan – Pasar Ciplak – Jalan Cipinang Indah – Jalan Inspeksi Saluran Kalimalang – Universitas Borobudur – Pangkalan Jati – Jalan Raya Kalimalang – Jalan H Dahlan – Jalan Raden Inten – Jalan Patriot Raya – Jalan Raya Kalimalang – Jalan Setra Niaga Kalimalang		
K.05	Stop Point: Terminal Bekasi – Ruko Grand Center – Jalan Cut Mutia -Unisma – Jalan Kayuringin – Jalan Burangrang Raya -Jalan Taman Galaxy – Jalan Nakula Raya	05.00 a.m. to 21.00 p.m.	every 15 minutes	none
K.05A	Stop Point: Ruko Grand Center – Jalan Cut Mutia – Ruko Sentra Niaga – Jalan Jendral Sudirman - Jalan Raya Patriot – Jalan Boulevard Raya	05.00 a.m. to 21.00 p.m.	every 15 minutes	none

Results of Regional Connectivity Observation

The connectivity of the TOD (Transit Oriented Development) area of Cikunir 2 LRT Station is identified through the following images and tables.

Figure 15. Layout of the TOD Area of Cikunir 2 LRT Station

Table 11. Anatomy of Connectivity in the TOD (Transit Oriented Development) Area of Cikunir 2 LRT Station

Road Access	Public Transportation Services	Available Pedestrian Facilities	Substance Issues
Jalan Puncak Cikunir Road width 5-6 meters	Not available	Not available	a. The main access to the station is only through Jalan Raya Puncak Cikunir and Jalan Batu Mulia; b. Jalan Raya Puncak Cikunir and Jalan Batu Mulia are local roads so that the increase in the volume of traffic to the station will cause social problems; c. The access road is impassable by the Transpatriot / Koasi / Mikrolet Bus;

d. There is no public transportation service to the station;
e. Inadequate infrastructure for pedestrians, cyclists and public transport users.

Not available

Jalan Batu Mulia Perum Masnaga Width 5-6 meters	Not available	

Social Impact of the Accessibility of the TOD Area of Cikunir 2 LRT Station

High mobility in the TOD area of Cikunir 2 LRT Station has consequences in the form of demand for people's accessibility. The need for accessibility of people/passengers will have a great impact on the provision of transportation facilities and infrastructure in quantity and quality which has an impact on the social order of the surrounding community. Transportation-based travel is still the mainstay of most people so that the provision of pedestrian facilities, special lanes for intermodal transfer access in the TOD area has a strategic role for the smooth movement of this movement.

The accessibility that is designed needs to include the diversity of society, the existence of physical and mental limitations in a social model. In this case, the importance of providing access and convenience for people with disabilities and people with other special needs such as the elderly, pregnant women, and people with children to be able to enjoy public transportation services, this can be a driver for the community to use public transportation is the provision of safe, comfortable, and seamless and inclusive facilities so that they can be accessed by all parties. The following is a matrix of potential social impacts on accessibility in the TOD area:

Table 12. Matrix of potential social impacts on accessibility in TOD areas

Accessibility Components	Potential Social Impact
Distance	By providing good accessibility, it has a positive impact, especially for the community around the Cikunir 2 LRT TOD Area, namely the relatively affordable distance will affect the desire of the community to use the public transportation mode at the Cikunir 2 LRT Station. Search Internet Reference: Close proximity to transportation services (Society's assumption of distance)
Time	The benefits that can be felt by the community around the TOD area of Cikunir 2 LRT Station are faster travel times by using LRT compared to using private vehicles.
Cost	The use of mass public transportation is expected to have a positive impact on the transportation costs incurred by the community in carrying out daily activities.

CONCLUSION

The study found that non-motorized transportation facilities in the TOD area of Cikunir 2 LRT Station, specifically in two access segments, show high conflicts between pedestrians and vehicles. The study highlights the urgent need for improved facilities, such as pedestrian paths, crossing facilities, and security instruments. The walkability analysis shows low scores in both segments, with segment 1 being the lowest. Recommendations include barrier-free pedestrian paths, safe crossing facilities, increased safety through lighting and disturbance reporting instruments, improved cleanliness, air circulation, and visual attraction. Accessibility and connectivity must also consider facilities for people with disabilities, involving them in development. Strategies for implementing accessibility improvement should include institutional integration, integrated financial management, risk mitigation, and effective operational management. Future research could explore the impact of infrastructure improvements on pedestrian safety and mobility in TOD areas, focus on inclusive urban design for people with disabilities, and study behavioral dynamics between pedestrians and vehicles. Additionally, research on institutional integration and financial management for urban development projects could optimize the implementation of these improvements for safer and more accessible urban spaces.

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