

# POTENSI PENGEMBANGAN TOD PADA SIMPUL TRANSPORTASI MODA KERETA API

(Studi Kasus: Provinsi Jawa Barat, Indonesia)

*(TOD Development Potential on Railtransportation Node  
Case Study: West Java Province, Indonesia)*

Herawati Zetha Rahman<sup>1</sup>, Azaria Andreas<sup>1</sup>, Imam Hagni Puspito<sup>1</sup>, Perdana Miraj Sejatiguna<sup>1</sup>, Nina Kade Nirmala<sup>2</sup>

<sup>1</sup>Civil Engineering Department, Pancasila University

<sup>2</sup>Civil Engineering Department, University of Indonesia

E-mail: [azaria.andrea@univpancasila.ac.id](mailto:azaria.andrea@univpancasila.ac.id)

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## ABSTRAK

Kereta api adalah salah satu moda transportasi darat yang menjadi andalan masyarakat. Seiring dengan hal tersebut, maka stasiun kereta api sebagai pusat pergerakan khususnya di daerah perkotaan dapat dikembangkan menjadi pusat kegiatan perkotaan dengan memaksimalkan pemanfaatan ruang di stasiun dan pemanfaatan ruang di sekitarnya yang terintegrasi dengan pengembangan properti kepadatan tinggi dan fasilitas penunjang lainnya. Saat ini stasiun kereta api di Indonesia mayoritas hanya berfungsi sebagai naik turun penumpang tanpa adanya fungsi tambahan. Untuk itu perlu dilakukan suatu usaha untuk memaksimalkan potensi stasiun melalui pendekatan Transit Oriented Development (TOD). Pengembangan TOD di stasiun kereta api dapat mendekatkan jarak pengguna kereta api, menciptakan efisiensi biaya, waktu dan tenaga sehingga mampu meningkatkan kualitas hidup di perkotaan. Disamping itu melalui peningkatan fungsi stasiun menjadi TOD, maka diharapkan mampu mereduksi biaya pemeliharaan stasiun itu sendiri melalui penambahan fungsi yang dapat menghasilkan revenue. Dalam rangka mengoptimalkan fungsi stasiun kereta api khususnya di wilayah perkotaan, maka studi ini dilakukan untuk membuat konsepsi pengembangan kawasan dengan konsep TOD berbasis stasiun kereta api. Studi ini menggunakan pendekatan kualitatif dan kuantitatif dengan area studi berada di 5 provinsi di Pulau Jawa (di luar wilayah kerja BPTJ), dan pengumpulan data dilakukan dengan menggunakan metode purposive sampling. Hasilnya adalah stasiun yang berpotensi dikembangkan menjadi kawasan berbasis transit adalah Stasiun Bandung (Jawa Barat).

**Kata Kunci:** Investasi, Kereta Api, Stasiun, Transportasi, TOD

## ABSTRACT

*Railway is one of the land transportation modes that are widely used in many areas. Along with this, the train station as the central of movement especially in urban area can be developed as the central of urban activities by maximizing the use of space in the station and its surrounding area which is integrated with the development of properties high density and other public facilities. At present, the majority of train stations in Indonesia only serve as up and down of passengers without additional functions. For this reason, an effort is needed to maximize the potential of the station through the Transit Oriented Development (TOD) approach. The development of TOD at the train station can shorten the distance of train users, creating lower cost, time and energy efficiency so as to improve the quality of life in urban areas. Besides that, by increasing the station's function to TOD, it is expected to be able to reduce the maintenance costs of the station itself through the additional of functions that can generate revenue. In order to optimize the function of the train station, especially in urban areas, this study was carried out to make a conception of regional development with the TOD concept based on the train station. This study uses both qualitative and quantitative approach with the study area in 5 provinces in Java (outside the BPTJ work area), and data collection is done using the purposive sampling method. The result is, station that has the potential to be developed into a transit-based area, among others is Bandung Station (West Java).*

**Keywords:** Investment, Railway, Station, Transportation, TOD

## INTRODUCTION

Railway is a mass transportation that can load passengers or goods on a large scale, so that the Indonesian people use it as a means of transportation both within cities and between cities. Many developed and developing countries make trains the backbone of the land transportation system such as Japan, China, India, Singapore, the Netherlands, and others (Samuel, 2009). In addition to its speed, the train is able to accommodate a large number of passengers. The use of this mode of transportation is believed to be very instrumental in supporting the country's economic growth (The World Bank in Railway Reform: Toolkit for Improving Railway Sector Performance, 2011).

Train users in Indonesia also continue to increase. Compared to 2015, in 2016 there was an increase in train users by 10% in 2016, where in 2016 the number of train passenger transport trips reached 351 million, up from 321 million passengers in 2015 (Book of Infrastructure Statistics of the Ministry of Transportation, 2016 ). Railways in Indonesia are regulated in Law Number 23 of 2007 and Government Regulation Number 56 of 2009 concerning Railway Operations. According to its function, Indonesian railways consist of general railways and special railways. The operation of public railways includes urban railways and intercity railways that serve the public interest for both goods and passengers.

The development of railway infrastructure is inseparable from regional development, urban spatial planning and connectivity between transportation modes. Along with this, the train station as a center of movement, especially in urban areas, can be developed into a center for urban activities by maximizing the utilization of space at the station and the utilization of the surrounding space which is integrated with the development of high density properties and other supporting facilities. Currently, the majority of train stations in Indonesia only function as boarding and dropping passengers without any additional functions. For this reason, it is necessary to make an effort to maximize the potential of the station through the Transit Oriented Development (TOD) approach. The TOD area is an area defined in the Spatial Plan as a centralized area for inter and intermodal integration located within a radius of 400 m to 800 m from a mass public transport node that has a mixed, dense space utilization function with moderate to high intensity of space utilization ( ATR Regulation No. 16 of 2017).

The development of TOD at train stations can bring train users closer together, creating cost, time and energy efficiency so as to improve the quality of life in urban areas. In addition, by increasing the function of the station to TOD, it is expected to be able to reduce the cost of maintaining the station itself through the addition of functions that can generate revenue. In order to optimize the function of train stations, especially in urban areas, this study was conducted to create a

concept of regional development with the concept of TOD based on train stations.

The study location is in West Java Province. Study locations outside the Jabodetabek area that can be identified based on the BPTJ work area in accordance with Presidential Regulation 103 No 2015 concerning BPTJ Article 3 paragraph 2, such as,

1. The Province of the Special Capital Region of Jakarta;
2. West Java Province, namely Depok City, Bogor City, Bekasi City, Bogor Regency, and Bekasi Regency; and
3. Banten Province, namely Tangerang City, South Tangerang City, and Tangerang Regency.

West Java Province is located in the western part of Java Island. Its territory is bordered by the Java Sea in the north, Central Java in the east, the Indian Ocean in the south, and Banten and DKI Jakarta in the west.

Next, the author performs benchmarking in several countries. From the results of benchmarking, an organization can get an inside picture of the condition of the organization's performance so that it can adopt best practices to achieve the desired goals. The following are the results of benchmarking in Pasadena, United States, Singapore, and Malaysia.

### 1. Pasadena, The United States of America

A case study was conducted by the Creative Housing Association (CHA) of several TOD projects in the United States as an incentive to invest in the transit system. With the desire to change land use patterns, the TOD development pattern is studied as an alternative that prevents irregular urban growth with transit as the backbone of development. The TOD project in Pasadena called Mission Meridian Village was developed with several missions. Some of the advantages to be achieved are:

- a. For communities and individuals
- b. For city development
- c. Development type: 67 housing units 4,000 square feet ( $\pm$  370 meters<sup>2</sup>) retail 324 parking slots Total funding: USD. 26 Million (Rp. 352 Billion)

### 2. Singapura

Kwon (2015) observes the idea of applying the principle. According to Kean and Yingda, TOD has a very big role in the development of the Singapore state/city. The concept of implementing TOD in Singapore has been around since the 70s. This is based on conditions in Singapore which has a small area. To avoid urban sprawl and developments that take up large areas ineffectively, TOD development is used early on. Via the MRT transit system. The development of the TOD and MRT areas themselves influence each other. Regional development itself is often determined by the placement of MRT stations. On the other hand, there are cases such as the development of the ION orchard project which resulted in the adjustment of several station points in

the project area. With the TOD approach, Singapore's limited area can be developed effectively. With the transit system, areas in Singapore can also be connected, allowing for a more even but uninterrupted development pattern.

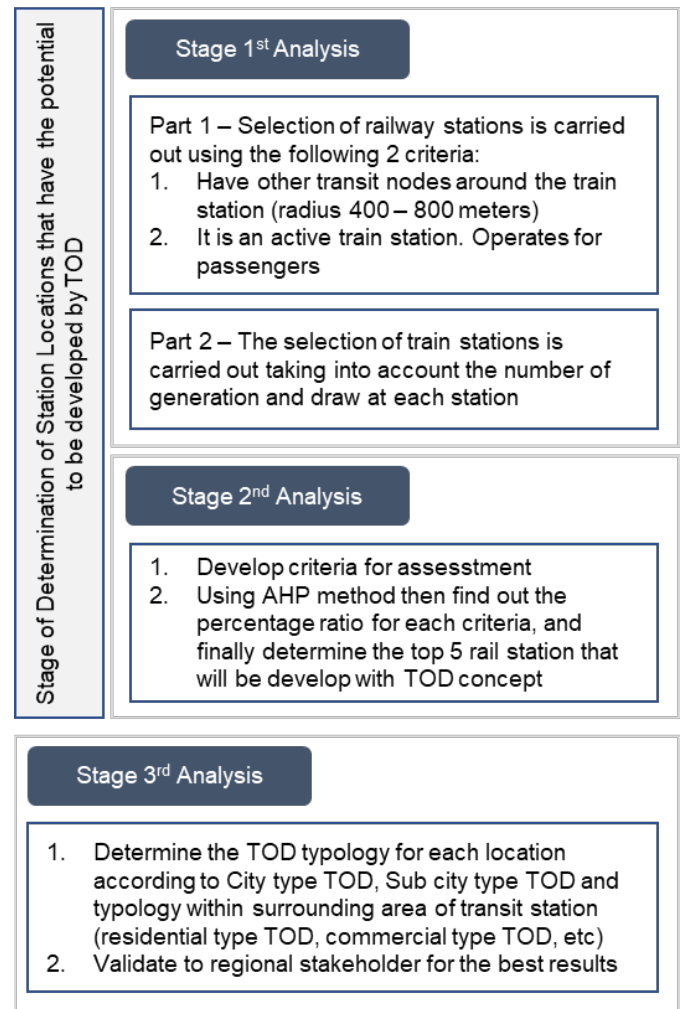
**3. Malaysia**

Latitud8 is the name of the TOD complex developed in Kuala Lumpur, Malaysia. Latitude is marketed as the first TOD building in Malaysia. Located in the downtown development area of Kuala Lumpur City Center (KLCC), Latitude is a Malaysian government-driven project and involves a private partner in developing and marketing this project. This project is built right above the transit point of the Dan Wangi LRT station so that there will be access to the building directly from the railway for pedestrians. Latitud8 itself consists of a podium and tower building that will be designated for shops, convention room facilities, offices, small office flexible office (SOFO), small office home office (SOHO), residential units, duplex, and rooftop lounge and bar. The project was initiated through a groundbreaking which took place in April 2016 and is expected to be completed by the end of 2019. The construction of this project is expected to be able to foster a new lifestyle in the middle of the Malaysian capital that is more productive and healthier. So far, Malaysia has relied on the use of private vehicles which resulted in overcrowding and congestion. The TOD Latitud8 project keeps pedestrians active in the transit network because everything is available within the TOD and transit lanes. This project is also expected to be a driving force for the development of the area and lifestyle around the development area to become a lively commercial community. Latitud8 is also the first TOD project with a public private partnership (PPP) scheme in Malaysia. It is hoped that the project with a cost of 1.1 million Ringgit is able to help in Kuala Lumpur's target to become the top 20 most liveable cities by 2020.

**METHOD**

This research begins by conducting an inventory of regulations and provisions related to the development of TOD at the railway transportation node. The regulation that underlies this research is the Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency of the Republic of Indonesia No. 16 of 2017 concerning Guidelines for the Development of Transit Oriented Areas. This Ministerial Regulation is intended as a reference for the Government, Provincial Government, and Regency/Municipal Government, in determining and stipulating TOD locations and developing TOD areas.

The following figure shows a flowchart of the implementation of the analysis in the study to get the most suitable TOD typology. In this study, the AHP (Analytical Hierarchical Process) method was used to determine which variables affect the TOD typology in an area first.



**Figure 1.** Implementation Flow of TOD Potential Evaluation Analysis at Stations

Source: Researcher Analysis, 2020

In selecting stations that have the potential to be developed for TOD, the approach is carried out through four stages which will be explained in Figure 2 as follows. In addition to the above stages, a Focus Group Discussion is also needed. FGDs can be used to dig deeper into the findings of a survey that cannot be explained statistically, as well as to gather certain opinions on the topics discussed. The results of the FGD are expected to produce a regulatory, institutional and funding framework for TOD development, including the potential for state revenue in the use of state-owned assets.

**RESULT AND DISCUSSION**

The results of the questionnaire processing aim to obtain a ranking of the components that make up Transit Oriented Development (TOD). The implementation of the preparation of the questionnaire and the method of analysis used the Analytical Hierarchical Process (AHP) approach. The purpose of this survey is to obtain a weighted value from each of the 3 Criteria and 12 Sub Criteria that have been determined previously. The criteria and their weights will then be used to analyze the list of stations resulting from the initial screening (short list) to get the score for each

station. Next will be selected 5 stations with the highest score in the province of West Java.

From each agency/ institution/ association that became respondents in filling out the AHP questionnaire that had been prepared, on average there were 2 respondents. These respondents are people who are familiar with TOD issues, and some have been directly involved in TOD-related work. For respondents from the Ministry, apart from the Ministry of Spatial Planning, from other Ministries, respondents were taken from the Directorate related to transportation, railways, or spatial planning issues.

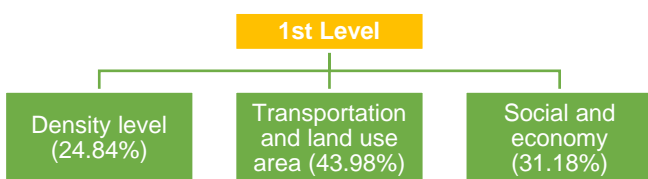
**Table 1.** Research Respondents

No	Agency/ Institution/ Association
1	Ministry
2	National Agency
3	Infrastructure and Transport Association
4	Academician/ Expert

Source: Researcher Analysis (2020)

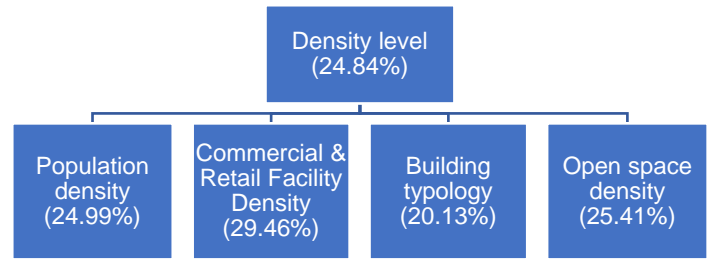
Furthermore, the demographic position of these respondents can be seen in the following analysis. Part A consists of 4 questions regarding the general data of respondents. This question is intended to find out the background of respondents who fill out the questionnaire. Therefore, in this section the questions that will be asked are in the form of place of work, last education, position in the institution and experience in the company/institution.

For the evaluation of the criteria with 3 main components (level 1), the results of the questionnaire show that the transportation and regional criteria are the largest contributors (43.98%) followed by social and economic criteria (31.18%) and the density level criteria (24.84%).



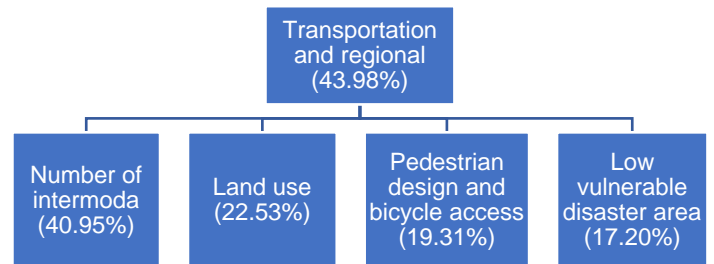
**Figure 2.** Respondents' Perceptions of TOD Forming Components at Station  
Source: Researcher Analysis (2020)

Meanwhile, for the density level, the highest sub-component is the density of commercial and retail facilities, followed by the density of open space, then the population density and finally the building typology.



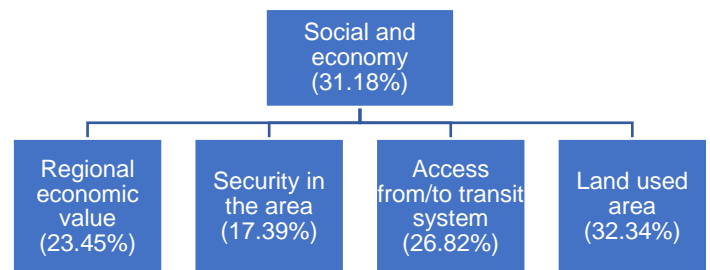
**Figure 3.** Respondents' Perception of Density Level Sub-components  
Source: Researcher Analysis (2020)

Meanwhile, for a sustainable environment, the highest sub-component is the number of intermoda, followed by the proportion of land use, pedestrian design and bicycle access and finally the area is in low disaster.



**Figure 4.** Respondents' Perceptions of Transportation and Territorial Sub-Components  
Source: Researcher Analysis (2020)

Finally, for social and economic aspects, the highest sub-component is land use in the area, next is access from/to the transit system, then the economic value of the area and finally the level of vulnerability of the area.



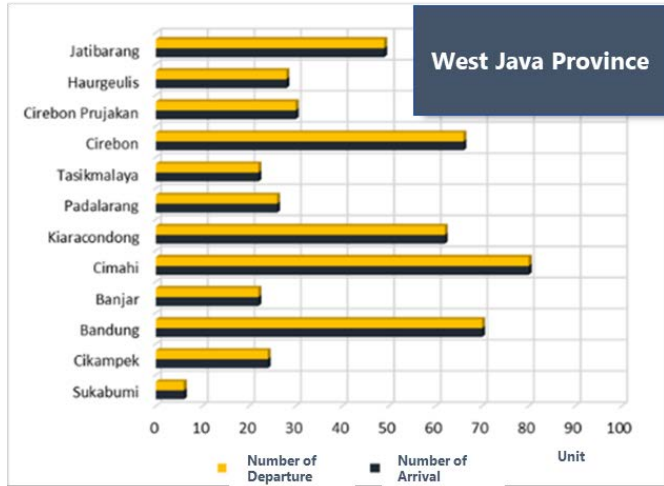
**Figure 5.** Respondents' Perceptions of Social and Economic Sub-components  
Source: Researcher Analysis (2020)

**Stage 1<sup>st</sup> Analysis**

In this phase 1 analysis, the result is a list of stations as a result of the initial screening for the following areas: West Java, from a total of 113 existing stations, only 12 stations will be evaluated using the TOD development criteria. In accordance with the analysis method described in the previous section. The results of the selected stations from the initial screening will then be continued in Phase 2 Analysis to see whether the stations can be recommended to be developed into transit-based areas or not.

**Origin and Destination Analysis at the Station Results of Phase 1 Analysis**

Generations and tows at each station are obtained using the approach to the number of arriving trains (attraction/destination) and the number of departing trains (generation/origin). The results can be seen in the following image:



**Figure 6.** Origin – Destination (O/D) at Station Analysis Result Phase 1  
Source: Processed from GAPEKA (2017)

From the figure, it can be seen that stations located in the provincial capital have a tendency for higher OD values than stations located in locations that are not the provincial capital.

**Stage 2<sup>nd</sup> Analysis**

From the results of stage 1 analysis on all evaluated stations, then proceed with Stage 2 Analysis which will use 3 Criteria and 12 Sub Criteria assessments. At each station, data is filled in according to the sub-criteria. The data filling is done by looking at the existing conditions at the station and in the surrounding area. The existing condition data that has been inputted is then translated according to the Assessment Indicator column (scores 1, 2, and 3). So that each station will be filled with a score of 1, 2, or 3 according to the value on the Assessment Indicator.

**Table 2.** Station Evaluation

Criteria Evaluation	Score		Cikampek	Bandung	Padalarang	Cirebon	Cirebon Pujakan
	Score	Sub-Score					
Density level	24.84%		0.50	0.35	0.48	0.43	0.48
Population density		24.99%	0.50	0.25	0.25	0.50	0.50

Criteria Evaluation	Score		Cikampek	Bandung	Padalarang	Cirebon	Cirebon Pujakan
	Score	Sub-Score					
Commercial & Retail Facility Density		29.46%	0.59	0.29	0.59	0.59	0.59
Building typology		20.13%	0.40	0.60	0.60	0.40	0.60
Open space density		25.41%	0.51	0.25	0.51	0.25	0.25
<b>Transportation and regional</b>	<b>43.98%</b>						
Number of intermoda		40.95%	1.23	1.23	1.23	1.23	0.82
Land use		22.53%	0.45	0.23	0.45	0.23	0.23
Pedestrian design and bicycle access		19.31%	0.39	0.58	0.19	0.39	0.19
Low vulnerable disaster area		17.20%	0.52	0.34	0.34	0.52	0.52
<b>Social and economy</b>	<b>31.18%</b>						
Regional economic value		23.45%	0.47	0.23	0.47	0.23	0.23
Security in the area		17.39%	0.17	0.52	0.17	0.17	0.17
Access from/to transit system		26.82%	0.27	0.80	0.54	0.80	0.54
Land used area		32.34%	0.97	0.65	0.97	0.97	0.65
<b>Total Score</b>			<b>2.22</b>	<b>2.08</b>	<b>2.03</b>	<b>2.15</b>	<b>1.75</b>

Source: Researcher Analysis (2020)

The value in the Sub-Criteria obtained on the assessment indicator is then multiplied by the Sub-Score Weight value to get the Sub-Criteria Weight value. Then from the four Sub Criteria in each Criterion, they are added up, then the result of the sum is and multiplied by the Score Weight to get the Criterion Weight value. The last part, add up the three Score Weight values to get the Total Score value.

Then at the end of stage 2 analysis, 5 stations were selected with a total score of stage 3 analysis which



resulted in the type of TOD typology which will be explained in the following section.

**Stage 3<sup>rd</sup> Analysis**

Areas that have the potential to be developed using the Transit Oriented concept must be areas dominated by existing land uses in the form of residential areas. If it is adjusted to regional conditions on the island of Java, it is not possible to build TOD with a uniform development direction. This is because, all of these stations do not stand in locations that have the same characteristics. As an illustration, stations located in metropolitan/megapolitan urban centers will have different environmental conditions around stations from those in district city centers.

In addition, there are also stations that are close to the tourism area, so that the direction of the development of the TOD area will be different from stations that are close to the office area or residential area. The suitability of this area then becomes the separator between one type of station that will be developed into a TOD area with other stations. Which is adapted to the environmental conditions around the existing station and future development plans.

On the other hand, apart from having to look at the suitability of the area from the point of view of land use and travel characteristics of rail users, one must also consider the transportation function which is the main point of developing the TOD area. Integration between modes, especially from trains (stations) to bus stops or public transportation, must also pay attention to the provision of infrastructure. The convenience of users of train public transportation to move when leaving the train to other transportation must be taken into account. Supporting infrastructure for transportation users can be in the form of providing comfortable pedestrian path facilities, protected from scorching heat, rain, excessive wind, safe from violence and crime. The existing condition of the area for development for both City TOD and Sub-City TOD at priority stations if further analyzed is not uniform, but can be divided into 3 types of service functions based on the travel characteristics of rail transport users who use the station, namely,

1. Residential type TOD

This type of TOD is most suitable to be developed for stations whose surrounding area is a residential area with the characteristics of rail mass transit users whose daily activities are workers. This type of TOD is suitable to be developed by adding commercial areas around the TOD area, either in the form of shopping centers, or restaurant and cafe areas. This TOD area will be crowded in the morning and evening. Suitable locations for this type of TOD are stations located in suburban areas.

2. Commercial type TOD

This type of TOD is most suitable to be developed for stations whose surrounding area is a commercial area in the form of an office area or government area. So that the area around the train station is more engaged in trading and service

activities. Users of mass rail transportation are workers who come either as permanent workers in companies or civil servants, or for business purposes. This type of TOD is suitable to be developed by adding other commercial areas around the TOD area, either in the form of hotels, restaurants, and cafes which can also be used for meetings or meetings that are generally held by companies or government offices. The TOD area is usually crowded during the day at lunch and in the evening. Suitable locations for this type of TOD are stations located in business areas within the city.

3. TOD types City Tourism

This type of TOD is most suitable to be developed for stations that are not far from tourism areas. Users of mass rail transportation are usually dominated by tourists who come to tourist areas or those who will travel by airplane (airport) or ship (port). TOD can be developed into a transit area by rail users who will change modes of transportation. Therefore, this type of TOD is suitable to be developed by adding commercial areas around the TOD area, either in the form of shopping centers, hotels, or restaurant and cafe areas. The TOD area is usually crowded at certain times which reaches its peak during weekends, or long holidays, for example.

If you look at the TOD typology listed in the ATR Ministerial Regulation No. 16 of 2017, then for the Residential TOD service function, it is most appropriate to the Sub-City and Environmental TOD. Meanwhile, the Commercial TOD service function is most in line with the City TOD. As for the function of the Tourism TOD service, it is most suitable for the City, Sub-City, and Environmental TOD.

**Table 3.** TOD Typology and Its Relevance to Service Functions

TOD typologi according to Permen ATR No. 16/ 2017	TOD Service Function		
	Residential type TOD	Commercial type TOD	TOD types City Tourism
City type TOD		√	√
Sub city type TOD	√		√
Rural type TOD	√		√

Source: Researcher Analysis (2020)

As previously explained, both stations that will be developed into City and Sub-City TODs (according to the TOD typology based on the ATR Ministerial Regulation No. 16 of 2017) must still pay attention to the smoothness of rail transport users to change modes using public transportation or other mass transportation to get to its destination, whether to residence, office, shopping center, and also tourist destinations.

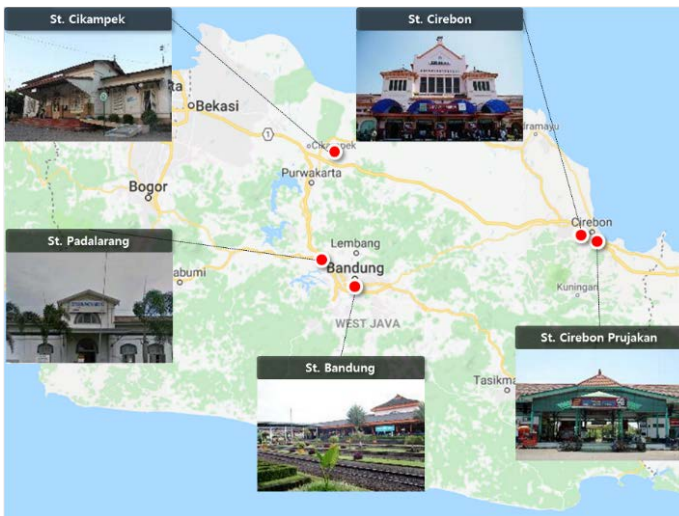
In West Java province, 5 stations have the potential to be developed as transit points for TOD. Furthermore, by using the characteristics of the type of typology listed in Permen ATR No. 16 of 2017, then if it is adjusted to the

existing conditions of the area around the station, the results are as follows.

**Table 4.** Typology of TOD Train Stations in West Java Province

No	Station	Location	Recommendation of Typology
1	Cikampek	Cikampek City	Sub city type TOD
2	Bandung	Bandung City	City type TOD
3	Padalarang	West bandung district	Sub city type TOD
4	Cirebon	Cirebon city	City type TOD
5	Cirebon Prujakan	Cirebon city	City type TOD

Source: Researcher Analysis, 2020



**Figure 7.** Location of 5 Stations in West Java Province  
Source: Researcher Analysis (2020)

The 5 stations were then further identified in areas up to 800 meters radius from the station location. Here are the data obtained:

1. Cikampek station

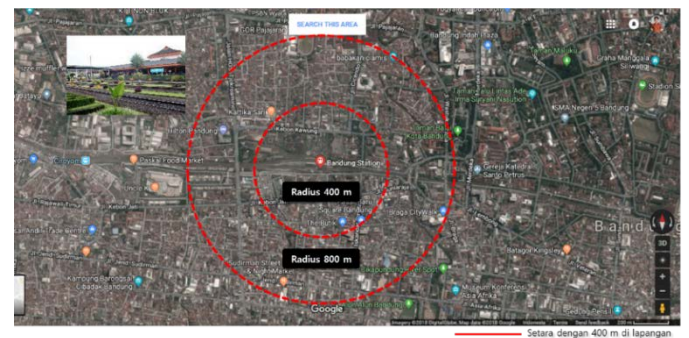
Cikampek Station is located in a location with a moderate population density. Meanwhile, the built-up area around the station is quite high, dominated by residential areas. The location of the station is in a residential and commercial area with access to public transportation and a bus stop which is not far from the station.



**Figure 8.** Area Around Cikampek Station Location  
Source: Researcher Analysis (2020)

2. Bandung station

Bandung Station is located in a location with a high population density. Meanwhile, the built-up area around the station is quite high, dominated by residential and commercial areas. The location of the station is in a residential and commercial area with access to public transportation and a bus stop which is not far from the station. Around the location there are also many hotels and shopping centers that are tourist destinations for tourists to the city of Bandung. However, the location of the Bandung station is included in the area of the Aviation Operational Area, so that the floor height for the development of the area has certain limitations.



**Figure 9.** Areas Around Bandung Station Location  
Source: Researcher Analysis (2020)

3. Padalarang station

Padalarang Station is located in a location with a low population density. Meanwhile, the built-up area around the station is still low, dominated by residential areas. The location of the station is in a residential and commercial area with access to public transportation and a bus stop which is not far from the station. The station location area is a new development area for residential locations in the city of Padalarang.



**Figure 10.** Area Around Padalarang Station Location  
Source: Researcher Analysis (2020)

4. Cirebon station

Cirebon Station is located in a location with a moderate population density. Meanwhile, the built-up area around the station is still low, dominated by residential areas. The location of the station is in a residential and commercial area with access to public transportation and a bus stop which is not far



from the station. Around the station location there are shopping areas and hotels.



**Figure 11.** Area Around Cirebon Station Location  
Source: Researcher Analysis (2020)

5. Cirebon Prujakan station  
Cirebon Prujakan Station is located in a location with a moderate population density. Meanwhile, the built-up area around the station is still low, dominated by residential areas. The location of the station is in a residential and commercial area with access to public transportation and a bus stop which is not far from the station. Around the station location there are shopping areas and hotels. The location of Cirebon Prujakan station is not so far from Cirebon station which is in the north.



**Figure 12.** Areas Around Cirebon Prujakan Station Location  
Source: Researcher Analysis (2020)

Screening the aspirations of regional stakeholders (especially the Provincial Transportation Service, City Transportation Office, City Bappeda, Provincial Bappeda, including other City Government agencies, and Railway Operators in Java) related to the results of the analysis that has been carried out through surveys both in-depth interviews and Focus Group Discussion (FGD). The potential for TOD development is carried out with the aim of getting input and aspirations of stakeholders in the region.

In addition, in this data collection survey, it is also possible for local stakeholders to propose station locations that are not included in the list of analysis results, in accordance with the policy directions of the relevant local government. The survey respondents were the Bandung City Transportation Service, West

Java Provincial Transportation Service, Bandung City Bappeda, and West Java Provincial Bappeda. The priority for developing station areas in West Java is Bandung Station and then Cikampek Station. Bandung station is prioritized because it will be traversed by 5 modes of transportation and a more strategic location, while Cikampek station has the potential to become a TOD due to the potential for further development.

Furthermore, regional stakeholders proposed the Gedebage station to be used as a TOD transit point due to its location which will become the point of the fast train mode. However, because the evaluation of station points is more inclined to the existing stations, the proposal cannot be considered and becomes input for DJKA in the future in further planning.

Bandung Station is planned to be a City type TOD station and a Commercial service function. The existing condition of the area around the station is good, especially when viewed in terms of economic development. On the other hand, this station has a fairly large build and pull, it is estimated that there are more than 30 trains departing and arriving from and at this station. On the other hand, this station is close to shopping malls, hotels and trade areas. Therefore, supported by a large number of rail users, the management of the station can be left to the Business Entity, so it is recommended to use a PPP management scheme.

**CONCLUSION**

Conclusions that can be drawn from this research include the following:

1. Identification of the criteria for TOD development is carried out by benchmarking against the applicable laws and regulations (Permen ATR No. 16 of 2017), which states that the main criteria for developing TOD in an area are located at transportation nodes that connect several types of transportation modes of transportation. In this study, the transportation node in question is an active railway station.
2. The identification of the evaluation criteria for TOD development is carried out by benchmarking some literature from abroad which produces 3 main criteria, namely 1) Transportation and Territorial, 2) Density, and 3) Social & Economics. And 12 Sub Criteria.
3. Recommendations for the development of a TOD typology based on a train station in Java can be done as follows: 1) a TOD typology with a residential service function, 2) a TOD typology with a commercial service function, and 3) a TOD typology with a tourism service function. The development of this typology enriches the TOD typology in the Ministerial Regulation of ATR No. 16 of 2017.
4. The priority for developing the TOD area in West Java Province is Bandung Station.



## REFERENCES

- Berawi, M. A., Zagloel, T. Y., Berawi, A. R., & Abdurachman, Y.** (2015). Moh Ali berawi \_feseability analysis. *International Journal of Technology*, 3, 388-399.
- Davis, K.** (2017). An empirical investigation into different *stakeholder* groups perception of project success. *International Journal of Project Management*, 35, 604-617.
- Ewing, R., Tian, G., Lyons, T., & Terzano, K.** (2016). Trip and parking generation at transit-oriented developments: Five US case studies. *Landscape and Urban Planning*(160), 69-78.
- Glasson, J., & Marshall, T.** (2017). *Regional Planning*. Oxfordshire: Routledge.
- Guthrie, A., & Fan, Y.** (2016). Developer's perspective on Transit-oriented development. *Transport Policy*, 51, 103-114.
- Kim, T.-H., Lee, H. W., & Hong, S.-W.** (2016). Value Engineering for Roadway Expansion Project ove Deep Thick Soft Soild. *Journal of Engineering And Management*, 142(2).
- Knowles, R. D.** (2012). Transit Oriented Development in Copenhagen, Denmark- from the Finger Plan to Ørestad. *Journal of Transport Geography*, 22, 252-261.
- Kwon, Y.** (2015). Sejong Si (City)- are TOD and TND models effective in planning Korea's new capital? *Cities*, 242-257.
- Mu, R., & de Jong, M.** (2012). Establishing the condition for effective transit-oriented development in China: the case of Dalian. *Journal of Transport Geography*, 24, 234-249.
- Nasri, A., & Zhang, L.** (2014). The analysis of transit-oriented development (TOD) in Washington, D.C. and Baltimore metropolitan areas. *Transport Policy*(32), 172-179.
- Papa, E., & Bertolini, L.** (2015). Accessibility and Transit-Orientdted Development in European Metropolis Areas. *Journal of Transport Geography*, 47, 70-83.
- Ratner, K. A., & Goetz, A. R.** (2013). The reshaping of land use and urban form in Denver through transit-oriented development. *Cities*(30), 31-46.
- Susantono, B., & Berawi, M. A.** (2012, Agustus). Infrastruktur Transportasi berbasis Kerjasama Pemerintah Swasta Di Indonesia. *Jurnal Transportasi*, 12(2), 93-102.
- Wey, W.-M., Zheng, H., & Chang, Y.-J.** (2016). Alternative Transit-Oriented Development Evaluation in Sustainable Build Environment Planning. *Habitat International*, 55, 109-123.
- Yang, J., Chen, J., Le, X., & Zhang, Q.** (2016). Density-oriented versus development-oriented transit investment: Decoding metro station location selection in Shenzhen. *Transport Policy*, 51, 93-102.
- Zhang, M., & Xu, T.** (2017). Uncovering the Potential for Value Capture from Rail Transit Services. *Journal of Urban Planning Development*, 3(143).