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## Potential development of transit areas that are in synergy with environment (case study: tanjung barat TOD, Jakarta)

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# Potential development of transit areas that are in synergy with environment (case study: tanjung barat TOD, Jakarta)

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**Abstract.** TOD is an urban development approach that integrates mixed spatial planning including housing, shops, markets, sports facilities, offices, open spaces and public facilities with mass transportation, such as buses, trains and equipped with pedestrian or bicycle lanes. The congestion problem that occurs in Jakarta can be reduced by TOD on the supporting area that has a significant impact on environmental pollution, high social costs, and energy waste. The problem arises because there is no balance between transportation needs and the provision of facilities and infrastructure, thus it ultimately impacts changes in land use. This research focuses on the area around the Tanjung Barat station, where apartments are being built with the TOD concept. The research method employed a qualitative descriptive approach. The data used were primary and secondary data. The results of research indicate that the construction of Tanjung Barat TOD is a dilemma for DKI Jakarta Government, because it has the potential to violate spatial rules. In addition, a congestion level that occurs can increase, although the government expects that with Tanjung Barat TOD, congestion levels can be reduced because passengers who live in TOD apartments switch to public transportation modes.

**Keywords:** Tanjung Barat TOD, spatial rules, transportation, congestion

## 1. Introduction

Congestion that occurs in big cities like in Jakarta has a significant impact on environmental pollution, high social costs and waste of energy; and this has become a reality in big cities. Various policies have been carried out by the local government, so that congestion problems can be reduced or addressed properly. In overcoming the congestion problem, many large cities in the world have applied concepts that combine transportation and land use. One of them is TOD (Transit Oriented Development), which prioritizes the principle of land use integration (urban planning system) with its transportation system. TOD is one of the approaches to urban development that integrates mixed spatial planning with mass transportation, such as busways, trains, LRT (Light Rail Transportation), MRT (Mass Rapid Transportation) and equipped with pedestrian or bicycle lanes.

Congestion cannot be separated from the pattern of people movements or activities outside their homes. In this case, the spatial region plays a role in creating travel [1–3]. As a result, movement behavior arises from the proposition that travel demand comes from the desire to participate in various activities or all human activities [4–6]. In addition, one of key elements in human life is how to use time in pursuing personal and social goals [7–9]. Studying patterns and time allocation decisions by



human groups in the household is a natural method for studying the time used for their movements [10–13].

Initially the TOD concept emerged as a reaction to the urban sprawl phenomenon in the United States, followed by a high population dependence on road use and private vehicles [14]. The concept of TOD is an elaboration of the Smart Growth City concept in the urban planning concept that emphasizes an integration principle of between land use/urban activity systems associated with its transport system. The TOD concept aims to create an environment that reduces dependence on private vehicles, and encourages the use of public transportation (buses, trains, public transportation, etc.) through the promotion of accessibility and good mobility to transit points. The Institute for Transportation and Development Policy [15] as one of the organizations handling a transportation sector explained that there are eight factors from the TOD principle, namely: walk, cycle, connect, transit, mix, density, compact, shift, meanwhile, typology TOD can be divided into two development models [16], namely:

- a) Neighborhood TOD, which is located on the feeder bus lane with a range of 10 minutes walking ( $\leq 3$  miles) from the transit point.
- b) Urban TOD, is TOD with city service scale located on the main city circulation paths, such as inter-city bus stops and train stations (both light rail and heavy rail).

## 2. Research Method

The research focused on areas in Tanjung Barat, Kebagusan and Lenteng Agung Subdistricts, which cover in Jagakarsa and Pasar Minggu Districts, and have a railroad transportation network, TransJakarta bus, and other public transportation modes. This area was chosen because in the Tanjung Barat station area, flats and apartments will be built with the TOD concept. The research method used was a qualitative descriptive approach and direct application to the site. The data used were primary data through direct observation on the site of TOD development plan at Tanjung Barat station, and secondary data through document review. The data analysis technique was qualitative descriptive analysis.

## 3. Result and Discussions

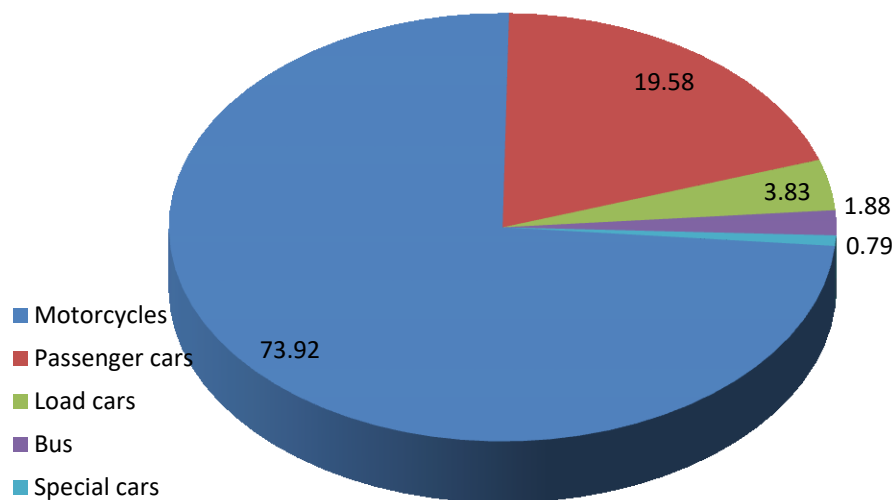
### 3.1. Population and Public Transportation

The Tanjung Barat Subdistrict is included in the Jagakarsa District with an area of 400 ha, with a population of 23,360 people (5,840 people/km<sup>2</sup>). The numbers of public transportation that pass through the Tanjung Barat Subdistrict are 10 modes of public transportation, including large, medium and city buses and also it has a train station. The Lenteng Agung Subdistrict is also included in the Jagakarsa District with an area of 227.74 ha and a population density of 51,778 people (22,736 people/km<sup>2</sup>). The numbers of public transportation that pass through the Lenteng Agung Subdistrict are 13 modes of public transportation and has a train station. Meanwhile the Kebagusan Subdistrict which is included in the Pasar Minggu District area has an area of 226 ha with a population of 38,006 people (16,817 people/km<sup>2</sup>). Kebagusan Subdistrict is passed by 13 modes of public transportation, and it is also crossed by the railway line (from various sources).

### 3.2. Travel Patterns of People in Jakarta

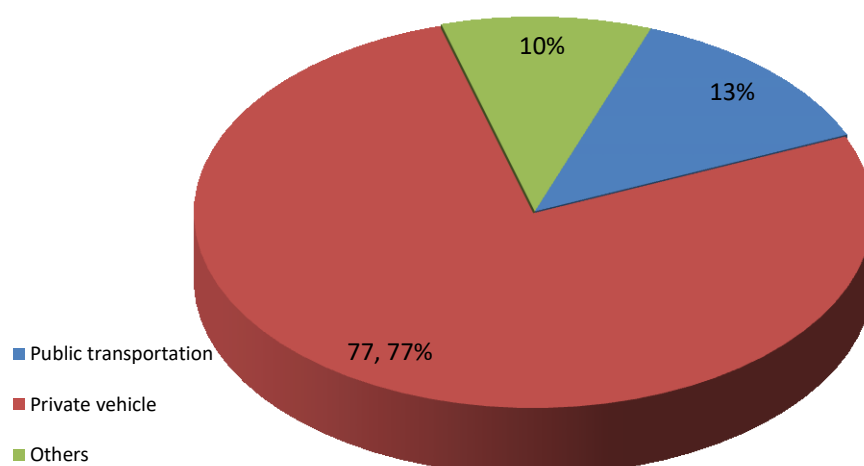
The growth in the number of vehicles (motorbikes and cars) in Jakarta increases 12 percent annually. According to the Executive Director of the Regional Development Study Association Syahrial Loetan [17], there are 18 million motorized vehicles on the streets of Jakarta. The composition of the vehicle is motorcycle 73.92 percent; passenger car 19.58 percent; car load 3.83 percent; 1.88 percent bus cars and 0.79 percent special vehicles (figure 1). Based on the number of motorized vehicles, public transportation is only 13 percent, and more than 77 percent are private vehicles, such as motorcycles

and cars (Figure 2). Thus, the DKI Jakarta Government needs to create a policy to move people's travel patterns to public transportation.

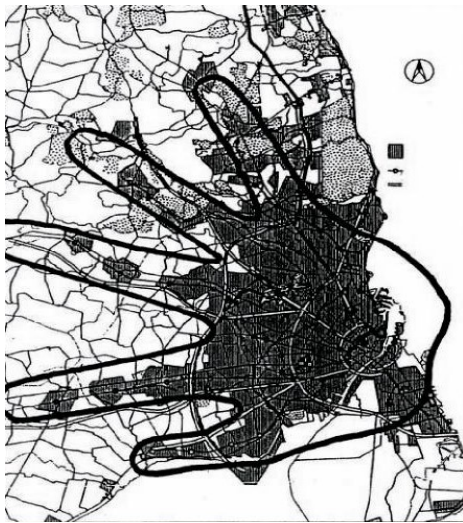


**Figure 1.** Composition of vehicles in Jakarta

Generally, people movements or trips that occur in Jakarta are to workplaces or schools. The urban people live in the Bogor-Depok-Tangerang-Bekasi areas and work in Jakarta. The DKI Jakarta Central Bureau of Statistics in 2015 noted that there were around 1.4 million people traveling to Jakarta from its buffer zones (Bodetabek) every working day [18,19]. Most people who work in Jakarta live on the outskirts of Jakarta. This phenomenon arises because the prices of houses and land are relatively cheaper on the outskirts of Jakarta, such as Bogor, Depok, Tangerang and Bekasi. Thus, new settlements are growing rapidly in those regions, which triggered the movement of people from the region (commute) was quite large.



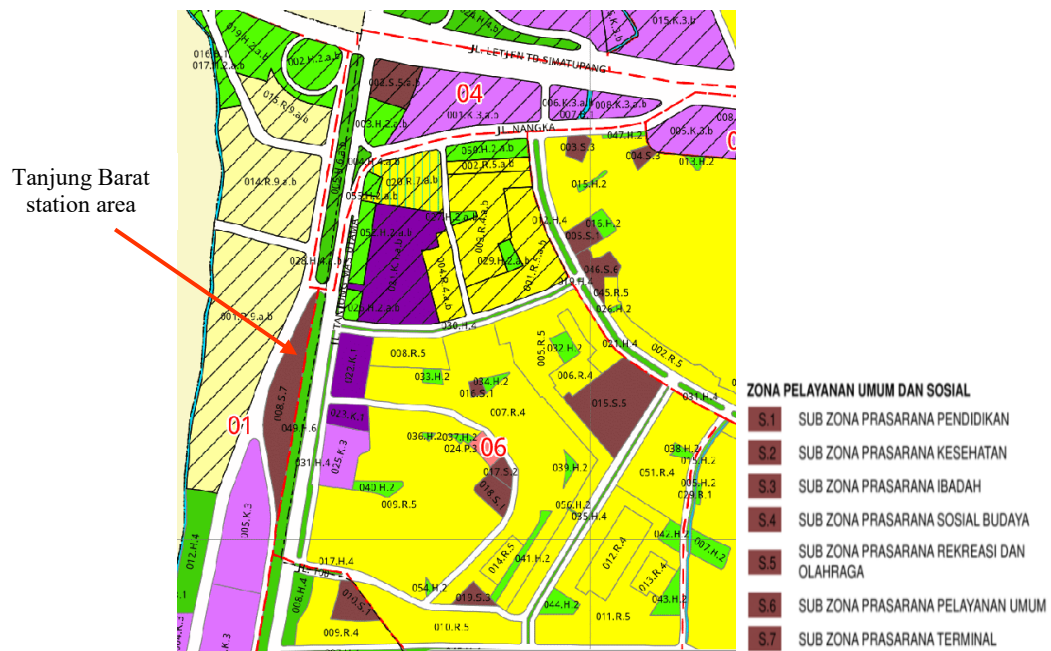
**Figure 2.** Comparison of public transportation and private vehicles



**Figure 3.** Analogy of the palm as a pattern of people movement.

### 3.3. Land Allocation Compliance

Tanjung Barat Station is included in the area of Tanjung Barat Subdistrict, Pasar Minggu District. The station has an area of 15,525 m<sup>2</sup>. The large area of land is indeed possible for other activities beside as a station, like a parking lot for train users. Land in the Tanjung Barat station area is included in the S zone or public and social service zone. The station area is included in the S7 sub zone (terminal infrastructure zone), which means it is included in the terminal infrastructure sub zone [20]. The zoning map of the Tanjung Barat area indicated by an arrow can be seen in Figure 4.



**Figure 4.** Zoning map for the Tanjung Barat station  
(source: <http://www.sindikat.co.id/zonasi/search>)

Based on the zoning map, it can be seen that the Tanjung Barat station area is located in Tanjung Barat Subdistrict, Jagakarsa District. Allotment of the area is not permitted for residential or residential buildings. Activities allowed in the area are for terminals or stations, or other activities that are still related to station activities, as explained before.

### *3.4. Development of the Tanjung Barat TOD and its Problems*

In general, the price of a property increases around 15 to 20 percent every year. The reduced land will force people or developers to build more housings from the city center. Therefore, housing that is near or easily accessible to the city center will be in high demand over time. Meanwhile the legal basis for TOD has been made through Regional Regulation No. 1 of 2014 concerning Spatial Detail Plans and Zoning Regulations, stating that the TOD areas are Gambir, Harmoni, Senen District, Grogol District, Setia Budi District, Tebet Subdistrict and Jatinegara District. In addition, the DKI Pergub No. 140 of 2017 concerning the Assignment of Management of the Corridor (North-South) TOD Area of Jakarta Mass Rapid Transit Phase I, submitting the TOD area points are HI Round, Dukuh Atas, Setiabudi, Bendungan Hilir, Istora Senayan (underground), Blok M and Lebak Bulus (elevated) [13]. Meanwhile the Tanjung Barat TOD project is a TOD developed by BUMN-Indonesian State Owned Enterprises (Perumnas and KAI), which has become a central government program. The whole business entity of Indonesian State Owned Enterprises and also a large portion of their capital are owned by the state that has gone through a statement directly derived from separated state assets (Based on the Law of the Republic of Indonesia No.19 of 2003)

The Tanjung Barat TOD project consists of one flat (Rusunami tower) of 23 floors and two apartments (Anami towers) of 29 floors each (Figure 4). Thus there are three vertical house towers with a total of 1,232 units, of which 298 units are in Rusunami and 938 units are in Anami. Rusunami is a subsidized flat for MBR (Masyarakat Berpendapatan Rendah or Low-Income Communities), with a maximum monthly income of IDR 7 million. Meanwhile, Anami that is a commercial flat is intended for middle class consumers whose income is above IDR 7 million per month. The price offered by PT Brantas Abipraya is IDR 9.2 million per m<sup>2</sup> for subsidized flats (Rusunami) and IDR 19 million per m<sup>2</sup> for commercial apartments (Anami). The response of consumers to the Tanjung Barat TOD project is indeed very enthusiastic, where 1,270 subscribers of the Tanjung Barat TOD unit, especially Rusunami, are intended for MBR consumers. The construction of TOD in the station area is expected to bring the house closer to the railroad transportation mode, which is integrated with other modes of transportation. In addition, the TOD construction aims to improve a costs efficiency, time and energy for its residents, reduce vehicle pollution and improve a life quality for general public in Jakarta.

From the zoning map (Figure 4), it can be seen that a construction of Tanjung Barat TOD is a dilemma for DKI Jakarta Provincial Government, because it has a potential to violate spatial rules. The HPL (Hak Pengelolaan Lahan or Land Management Right) of Tanjung Barat Station is owned by the Ministry of Transportation. The meaning of HPL (Hak Pengelolaan Lahan) is the controlling right of the State whose partial implementation authority is delegated to the holder. PT Brantas Abipraya as developer/contactor can still build a flat at the location of the Tanjung Barat TOD with a HGB (Hak Guna Bangunan or Building Use Right) status of at least 25 years above the Land Management Right (HPL). HGB (Hak Guna Bangunan) is the right to establish and own buildings on land that is not their own, with a maximum period of 30 years. In addition, until the beginning of July 2018, the developer has not submitted a construction design, so the IMB (Izin Mendirikan Bangunan or Building Permit) cannot be issued. IMB (Izin Mendirikan Bangunan) is licensing granted by the Regional Head to building owners to build new, change, expand, reduce, and/or maintain buildings in accordance with the administrative requirements and applicable technical requirements. However, the development permit has been obtained by the developer since the beginning of June 2018, so that the construction of Tanjung Barat TOD flat has been started since June 2018. The construction of Tanjung Barat TOD is estimated to take 2.5 - 3 years, so that the target completion year is 2021.



**Figure 5.** TOD Tanjung Barat plan (source: TOD Tanjung Barat Marketing Office)

The availability of parking lots, clean water and sewage disposal can also be a problem for the existence of Tanjung Barat TOD. This must be planned as well as possible, because at the time before the construction of Tanjung Barat TOD, this area had prepared lava parking for commuters who left/arrived at Tanjung Barat station. The issue of flat ownership must also be considered by State-Owned Enterprises (Perumnas and KAI), because the status is only Building Use Rights. According to information received from Perumnas, the flat has Building Use Rights over Land Management Rights with a lease hold scheme of up to 50 years that can be extended. It might be better if the flat is rented out according to its designation, namely housing for low-income people and anami for middle-class people, considering that the status cannot be changed into Ownership Rights.

Another problem that can arise with Tanjung Barat TOD is congestion. At present, where the TOD has not yet been built, congestion is often experienced by commuters in the region. Congestion occurs in the morning (at 6:30 a.m. - 08:30 a.m. Western Indonesian Time) when commuters begin to move and afternoon to night (16:00 - 19:30 Western Indonesian Time) when they return from their respective activities. This needs to be taken into account, considering that with the Tanjung Barat TOD, a congestion level that occurs can only increase. Nevertheless, the government expects that with a Tanjung Barat TOD, congestion level in Jakarta can decrease, because commuters who live in TOD flats switch to the public transport mode in order to save time and costs from home to the station.

The most densely populated areas of TOD are located within a radius of 400-800 m around the central transit stop, because this is considered to be the right scale for pedestrians. Another key feature of transit-oriented development that distinguishes it from "transit-transit development" is the reduction in the number of parking for private vehicles. On the other hand, the world of transportation must also begin to realize the importance of putting standards and consistently maintaining the quality application so that people are willing to switch modes from private vehicles to public transportation. The continued decline in public transport users who have gradually shifted to private vehicles so far should be used as an alarm for the importance of improvements in terms of public transportation services

### 3.5. *The potential of Tanjung Barat TOD as city revitalization*

Rejuvenation of urban areas is the built-up areas realignment of urban areas that experience degradation in environmental quality, degradation of area functions, and/or parts adjustment of urban areas to plan for urban development. In the future, the Tanjung Barat TOD can support the urban renewal concept as a solution to overcome the limited urban land for housing problem. Similarly, it can replace part or all of the old elements with new elements with the aim of increasing the vitality and quality of the TOD environment/region. This is in accordance with the Minister of Public Works Regulation Number 18 year 2010 where the area revitalization is expected to solve urban problems, including increasing the urban areas vitality, reducing slum areas, increasing network services for facilities and infrastructure, and increasing the value of regional locations. In addition, it can also support the survival of its citizens and support social, cultural and economic productivity while maintaining the physical environment quality.

## 4. Conclusions

Generally, people's movements or trips that occur in Jakarta are to workplaces or schools. The urban people live in the Bogor-Depok-Tangerang-Bekasi areas and work in Jakarta. DKI Jakarta Central Bureau Statistics (BPS) in 2015 noted that around 1.4 million people travelled to Jakarta from its buffer zones (Bodetabek) every working day. This triggered quite large movements of people from the areas (daily commute). Changes in travel patterns, travel volume and choice of travel modes are a function of the pattern of land use sharing in urban contexts. The TOD concept is the concept of developing a transit area that is in synergy with the environment by maximizing pedestrians and reducing vehicles.

Land in the Tanjung Barat station area is included in the S zone or public and social service zone. The station area is included in the S7 sub zone, which means it is included in the terminal infrastructure sub zone. The construction of Tanjung Barat TOD is a dilemma for DKI Jakarta Provincial Government, because it has the potential to violate spatial rules. However, a flat project at the location of Tanjung Barat TOD can be carried out with a minimum Building Rights (HGB) status of 25 years. The construction of Tanjung Barat TOD flat is estimated to take 2.5 - 3 years, so that the target completion year is 2021.

The problem that can arise with the Tanjung Barat TOD is congestion, and this needs to be considered by the government. However, the government expects that with the Tanjung Barat TOD a congestion level in Jakarta can decline, because commuters who live in the TOD flat switch to the public transport mode in order to save time and costs from their house to the station.

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