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Analysis of the Lebak Bulus MRT TOD Area, DKI Jakarta, based on Challenges and Expectations of Convenience Orientation

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ABSTRACT

Transit-oriented development (TOD) is often defined in terms of mixed development that is close to and/or oriented toward mass transit facilities. General characteristics of TOD include urban cohesiveness, pedestrian and bicycle friendly, public spaces near stations, and stations designed to be community centers. The Lebak Bulus area is strategic a`nd is quite popular as a terminal area that has the potential to support transportation between regions and between cities, as well as being a gathering point for community groups from various levels and backgrounds. In principle, the change in function of the terminal area to the TOD area is expected to have a positive impact on the behavior of public transportation users, although there are still some things that need to be improved. As a recommendation from this study, it is necessary to improve accessibility, such as by improving road and sidewalk conditions, as well as improving feeder transportation and parking services for private vehicle users. In addition, it is necessary to rearrange the environment around the station by optimizing the potential of buildings around the station, improving the quality of parks, pedestrians, and crossing areas, and considering the use of renewable energy. Increased security and safety (use of CCTV) also need attention. The implication of this research is that the TOD area must be built by taking into account the aspects of sustainability, the role of the community and stakeholders (government, developers, and the community) in the development of the TOD area is very important. By implementing the recommendations and implications of this research, it is hoped that the Lebak Bulus MRT TOD area of DKI Jakarta can develop optimally and provide maximum benefits for the community.

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1. INTRODUCTION

Transit-Oriented Development (TOD) is an approach to urban development centered on efficient public transport systems, with the aim of creating dense, sustainable, and people-oriented urban environments. This concept focuses on developing areas around public transportation stations, such as trains, buses, and trams, designed to reduce the use of private cars and encourage the use of more environmentally friendly public transportation(Cervero, 1998)(Cervero, 2013).

TOD is becoming more and more popular due to the increasing need for sustainable transportation solutions and a more humane environment(Cervero & Kockelman, 1997). This concept has been used in many major cities around the world, including in Asia, Europe, and North America, and has succeeded in creating a more environmentally friendly and sustainable environment(Dittmar & Ohland, 2004).

TOD is usually based on three main principles: accessibility, density, and diversity(Ewing & Cervero, 2010). Accessibility refers to easy and convenient access to public transportation stations(Permana & Wijaya, 2017). Density refers to dense urban development, with many facilities and services accessible by foot or bicycle(Gurran & Phibbs, 2017). Diversity refers to regional development that incorporates different types of facilities, such as residential, commercial, and institutional, thereby creating a balanced and diverse environment(Hall, 1998)(Handy, 2005)(Gurran & Phibbs, 2017).

TOD can provide a variety of benefits to society, including reduced travel time and transportation costs, increased accessibility and mobility, reduced pollution and greenhouse gas emissions, and improved health and quality of life(Jesson, Matheson & Lacey, 2011). In addition, TOD can also increase property values around public transportation stations, and improve the economy of the surrounding area(Hess & Moudon, 2010)(Jesson, Matheson & Lacey, 2011).

However, there are also several challenges that need to be overcome in implementing TOD, such as high development costs(Knaap & Hopkins, 2011), community resistance to change, and complex land development. Therefore, appropriate strategies and policies are needed to implement TOD effectively and efficiently(Newman & Kenworthy, 1999)(Talen, 1999)(Yang & Ferreira, 2019).

Several strategies that can be used to implement TOD include integrated urban development, improving public transportation, and developing supportive public policies. Integrated urban development involves holistic and integrated urban planning, taking into account aspects such as land use, infrastructure, and accessibility(Akbardin & Permana, 2020)(Milenia & Purwantiasning, 2021). Improving public transport involves developing more efficient transport systems, taking into account aspects such as travel time, safety, and convenience.

One of the ideas for developing TOD is to encourage people to change their mode of transportation which previously used private vehicles to change to public/public transportation modes, to reduce traffic density on available roads. Connectivity between modes of transport within walking distance conventionally determines the service area for public transport and the city's growth frontier for Transit-Oriented Development (TOD).

TOD is usually defined as a comfortable walking distance from a designated transit stop (Calthorpe, 1993). Transit professionals have established a heuristic of a 5 to 10-minute walk to a transit stop. This is usually a radius of 300–400 m (about a quarter mile) or 600–800 m (half a mile) around bus stops and train stations that are ideally connected to transit-enabled land areas (public spaces, commercial, office, and residential buildings).).

After it is set government policy through Governor Regulation no. 44 of 2017 concerning the development of the Transit Oriented Development area, on January 17, 2017, The Lebak Bulus terminal area of Lebak Bulus changed its function to become a TOD area which in turn the starting and ending station of the MRT train line, this is an important point where this area is a gathering point for people using various modes of transportation. Factors of comfort, security, and ease of access are priorities in attracting public interest.

In designing Transit Oriented Development (TOD), there are several parameters that must be considered so that the concept can be implemented effectively. The following are some important parameters in designing TOD:

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1. Availability of public transportation: Availability of public transportation is an important factor in designing TOD. The availability and accessibility of good public transportation can increase the use of public transportation as the main option and reduce the use of private cars. This can help reduce traffic congestion and the resulting carbon dioxide emissions.
2. Population density: Population density is also an important parameter in designing TOD. The denser the population around the transit station, the more effectively the TOD concept can be implemented. This is because the more people who live or work around a transit station, the more opportunities they have to use public transport.
3. Linkages between modes of transportation: Linkages between modes of transportation also need to be considered in designing TOD. The TOD concept must pay attention to the interrelationships between modes of transportation, such as bicycle lanes, sidewalks, and links between other modes of public transportation. This can increase the accessibility and convenience of using public transportation for the community.
4. Land use: Land use is also an important parameter in designing TOD. The TOD concept must be able to optimize land use around transit stations in order to increase the potential use of public transportation and reduce the use of private cars. This can include residential developments, business districts and other public facilities.
5. Social and cultural factors: Social and cultural factors also need to be considered in designing the TOD. The TOD concept must be able to adapt to the habits and needs of the local community, and to maintain the sustainability of local culture. This can help strengthen regional identity and encourage community participation in the implementation of the TOD concept.

1.1. Background

The Lebak Bulus area of DKI Jakarta is strategic in terms of its geographical location, which is located in the Cipete area of the Lebak Bulus sub-district, South Jakarta, bordering one corner of the South Tangerang city area. Before the establishment of the MRT station (2013-present) as one of the modern transportation infrastructure facilities in the city, it was formerly known as the Terminal area which was dominated by Inter-City Inter-Provincial (AKAP) buses with the name Lebak Bulus Terminal, apart from being an intercity bus terminal city, this terminal also serves transportation modes within the city (city transportation, mini metro, and buses in the city.

This area has abundant access to the DKI Jakarta buffer city area, which includes direct access via the provincial road to the city of Bogor in the West Java Province region, via the TOL road to the city of Serang in the Banten Province province which is also in the opposite direction heading to the Bekasi city area, Cikampek area of West Java province which leads to the eastern region of the island of Java. This potential can be utilized by both regional functions, both as a function of the AKAP bus terminal area and as a function of the TOD (Transit Oriented Development) area.

Even though the two modes of transportation provide different transportation service functions, the expected goals, in this case, have similarities, namely for passenger satisfaction or users of transportation services. This article was developed through field observation data collection techniques and documentation accompanied by a literature review based on SWOT analysis, to compare the success rate of regions in facilitating public transportation in general, along with the benefits of the two functions of the area, especially for the affected community and environment.

Transit-Oriented Development (TOD) is an urban design concept that promotes the development of settlements and business centers around public transit stations, such as trains, buses, or metro. The TOD design concept aims to create a more sustainable, efficient, and pedestrian-oriented environment, thereby reducing dependence on private vehicles(Hermawan et al., 2021)(Anissa et al., 2020).

In designing TOD, there are several principles that must be obeyed. First, the location of a public transit station must be considered as the main activity center in the city, so the surrounding environment must be designed in such a way that it can accommodate various activities, such as residential, business, and public facilities(Rizqi & Ashadi, 2020)(Permana et al., 2020).

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Second, environmental planning must allow easy and convenient access to public transit stations, for both pedestrians and cyclists. This can be achieved by providing safe walking and bicycle paths linked to transit routes, as well as providing bicycle parking facilities near stations.

Third, land use around public transit stations must be optimized in order to accommodate the maximum number of activities and encourage social and economic diversity. This can be achieved by using flexible and responsive urban design techniques, such as providing flexible and easily adaptable buildings and encouraging the development of small and medium-sized businesses.

Fourth, environmental design must be sustainable and environmentally friendly. This can be achieved by providing sustainable transportation facilities, such as bicycle lanes, electric vehicles, or shared vehicles, as well as adopting green technologies and sustainable construction practices.

Overall, the design of TOD aims to create a more sustainable, efficient and pedestrian-oriented environment, thereby improving the quality of life for urban residents and reducing the negative impacts of excessive transportation.

2. RESEARCH METHOD

This paper was built using a literature review method approach. Jesson et.al. (2011) categorize literature review as a method that can stand alone. The literature review is a library-based or desk-top method involving secondary analysis of explicitly present knowledge. This study examines the level of comfort, and other aspects arising from the object of study Transit Oriented Development (TOD) in the Lebak Bulus terminal case in DKI Jakarta.

3. RESULTS AND DISCUSSION

Geographical conditions as in the illustration above, are power attractiveness for people who use public transportation, with different destinations the area still displays vitality as a hub area (Node) for access to and from various regions. Evidenced by the dense traffic lanes around the triangular-shaped area, bordered by the TB Simatupang road (complemented by the toll roads), Jalan Ir. H. Juanda, and Jl. RE Martadinata. On the outside and inside of the Lebak Bulus triangle, are residential areas, shops, and mixed- use buildings.

Figure 1. Map of the study area.

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Regional potential, among others, can be described as follows:

table1. Regional Potential

PARAMETER	Lebak Bulus Terminal	MRT	Year 2021	
	Grades 1-9	Grades 1-9	Lebak Bulus Terminal	MRT
Accessibility	9	8		
Comfort	6	9		
Security	5	9		
Service Function	6	9		
Total passengers	200-600	19,696	115,000	7,100,000
ticket price	75,000 - 450,000	4,000 - 14,000	.....	.....

The selected study is a SWOT-based analysis (Strengths, Weaknesses, Opportunities, Threats), applicable to both regional functions based on the data obtained as follows:

3.1 Strengths

It can be said that the two regional models have different forms of service for bus terminals serving passengers to and from outside the city, while the MRT as a function of the TOD area, serves passengers to and from within the city of Jakarta. The vitality of the AKAP bus terminal service is enjoyed by the lower middle class and some of the upper middle class, from mostly unskilled to unskilled workers, who work in the Jakarta area and live (during the terminal's validity period) around the Lebak Bulus area.

While the MRT provides a significant increase in service starting from the start of the passengers stepping on the facilities in the MRT area (start), to their destination (end).

3.2 Weaknesses

During the validity period of the Lebak Bulus terminal, the terminal environment was not well organized, and the integration of various modes of transportation reduced the level of comfort not only for prospective passengers but also for road users around the Lebak Bulus triangle. congestion.

Figure 2. Lebak Bulus Terminal

Figure 3. Advanced Mode of Transport

The MRT has succeeded in correcting this problem by providing better comfort and ease of access for users of transportation services to and from the city. However, the presence of the MRT has an impact on other modes of transportation where the area environment that has been arranged is disrupted due to the unavailability of places for other modes of transportation which in this case support certain groups to continue their journey to the destination.

3.3 Opportunities

The nature of the terminal which is dominated by AKAP buses allows the mixing of various classes of society, from the lower class to the upper middle class. The Lebak Bulus terminal area provides an opportunity for people to interact with each other, from various groups, and regional ethnic groups to enable lower classes to earn income by selling, Mix used Building (mall) is present in the area (Point Square)

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providing opportunities for passengers to shop before leaving for the destination city.

Figures 4. MRT Station Entrance

In contrast to the MRT, the presence of Market Place which is integrated into the main station building displays a modern impression that is attractive to visitors, and offers facilities for persons with disabilities, besides that it is attractive for transportation users to switch from private vehicles to use public transportation.

3.4 Threats

Improving the quality of the environment with the presence of the MRT in the Lebak Bulus area has pushed the area towards privatization by certain groups. This was made possible because the area's status and sales value increased in the eyes of investors, which led to an increase in the area becoming an upper-middle-class area. Which led to the exclusion of low-income groups, away from the buffer zones, to form marginal groups.

Figure 4. Advanced Mode of Transport

The potential for congestion due to public transportation as an advanced mode of transportation does not have adequate facilities.

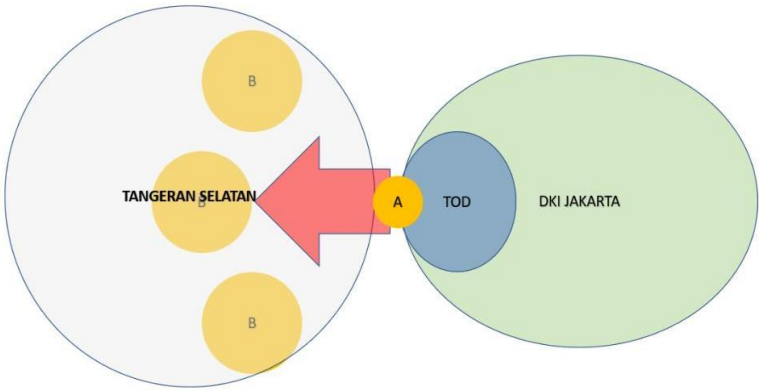

Figure 5. Community Distribution Map

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4 CONCLUSION

The infrastructure of the city in this case transportation is the main determinant of the development of an urban area, where the development of road infrastructure with adequate transportation support will facilitate movement from one point to the next, which means this affects the economic movement of people in affected areas. In the case of the Lebak Bulus area, the presence of the MRT has changed people's behavior to become more orderly, but this increase temporarily only applies to certain groups. The available infrastructure is comfortable and meets the requirements of the universal concept, security is guaranteed thanks to the presence of CCTV that monitors 24-hour full monitoring of movements in the MRT area.

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