Types of Financing from Land Value Capture in Transit Oriented Areas in Terminal Baranangsiang

Ario Bayu Hariyanto, Tedy Murtejo, Alimuddin Alimuddin

Civil Engineering Departement Ibn Khaldun University Bogor, INDONESIA
E-mail: ariobayu168@gmail.com

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ABSTRACT

Transportation infrastructure plays an important role in increasing access and accelerating economic growth. The TOD design concept presents an area arrangement that is multi-use in nature and is integrated with the public transport network. Thus, there is another potential that can be captured from the high accessibility in the area, namely the opportunity to increase land value. The increase in land value comes as a result of the benefits obtained directly by residents of the TOD area, including various choices of transportation modes and also savings in transportation costs (Smith and Gihring, 2013). The method for capturing the increase in land value so that it is diverted for the development of facilities and infrastructure around the terminal or station location is known as Land Value Capture (LVC). The concept of Land Value Capture has been widely applied in many developing countries in the world. Among the many mechanisms and tools used in Land Value Capture, Jillella and Newman (2016) explain that joint development is the most widely used mechanism, followed by Tax Increment Financing and Property Tax. Thusin brief, TOD planning aims to increase accessibility in the area, where that accessibility can be converted into other sources of financing for the TOD project itself or the development of public transport infrastructure, through increasing land value with the LVC mechanism.

Keywords: land value capture (LVC); financing scheme; TOD area; mechanism; increasing.

INTRODUCTION

In many big cities in the world, the need for a transportation system is very high along with the growth of the population in a large city, as well as an increase in traffic congestion which results in wasted time in people's activities and increases in air pollution. On the other hand, the International Transport Forum (2013) argues that governments in developing countries have difficulty funding transportation infrastructure projects because of the high costs of construction, maintenance and maintenance, while government capacity is very limited. Realizing regional development requires not only the readiness of the area design, but also in terms of financing. The amount of financing needed for the development of the TOD area, as well as in realizing a sustainable TOD, presents its own challenges in finding sources of financing. The concept of Land Value Capture has been widely applied in many developing countries in the world. Among the many mechanisms and tools used in Land Value Capture. In Indonesia, the concept of Land Value Capture to finance Transportation Infrastructure is still relatively new, while the need for Transportation Infrastructure is aware that it tends to increase. In the 2015-2019 Medium Term Development Plan (RPJMN), the National Planning and Development Agency (2018) states that the need for transportation infrastructure financing in Indonesia is IDR 1.283 trillion. With the limited economic capacity of the Government, Land Value Capture is one of the financing schemes that deserves to be explored. However, there are still very few studies on Land Value Capture in Indonesia. Therefore, this paper aims to identify critical success factors from studies of transportation infrastructure projects that have been running around the world that can be used as a good hope and can be adopted and adapted to the social, economic and legal conditions in Indonesia. The TOD design concept presents an area arrangement that is multi-use in nature and is integrated with the public transport network. Cervero (2006) states that the TOD concept places the function of residential land, workplaces and centers of other urban activities, having easy access to terminals or train stations. Thusin brief, TOD planning aims to increase accessibility in the area, where that accessibility can be converted into other sources of financing for the TOD project itself or the development of public transport infrastructure, through increasing land value with the LVC mechanism.

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Motorized vehicles passing through one area will affect the pattern of that area. Starting from an area that is comfortable and safe if motorized vehicles pass (Akbardin J et.al, 2020; Syaiful S, Yogi P, 2019). If there is a new activity center, the main mode used is motor vehicles. These motorized vehicles will connect one activity point to another activity point. It is this motorized vehicle activity that will be described as supporting conditions for the concept that are properly adjusted. The concept that will be upheld is the concept of equal distribution of motorized vehicles passing through designated areas (Syaiful S, 2017; Syaiful S, Agus F, 2020; Syaiful S et.al, 2022; Syaiful S et.al, 2021). This vehicle will affect the travel patterns that are created. The most important patterns of mutual support for integrated transportation activities are created (Syaiful S et.al, 2023).

Definition of Land Value Capture

LVC is an approach where the government creates an increase in the value of a land through various programs that increase the accessibility of a land or through regulation.

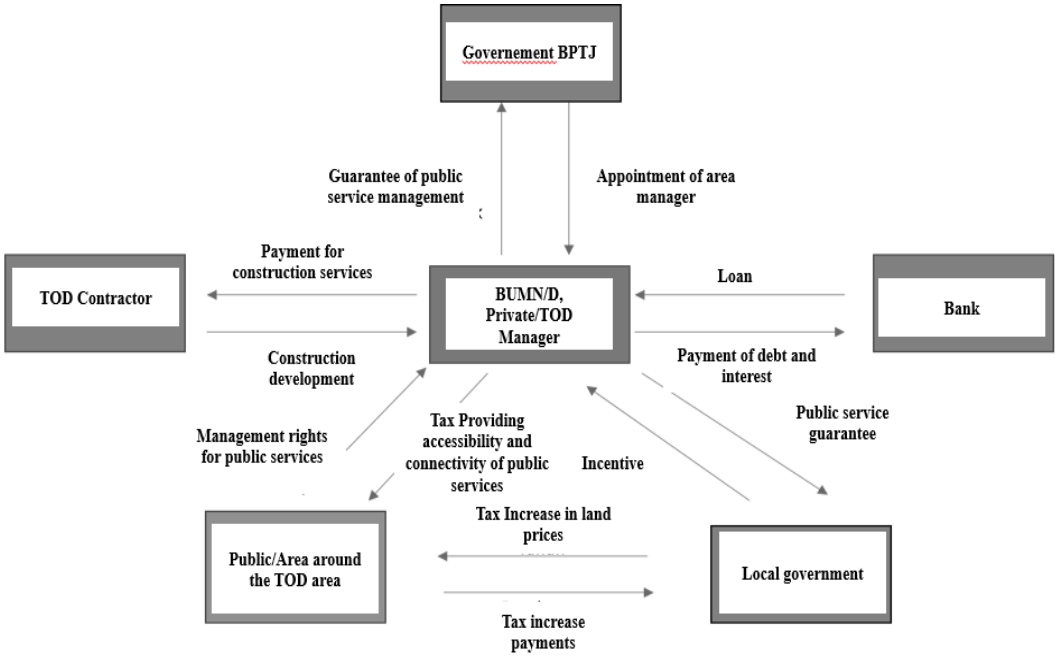

Figure 1. Land Value Capture Model

In the Land Value Capture scheme, the Government or BPTJ appoints the manager of the TOD area to BUMN/D, or the private sector as the manager of the TOD. BUMN / D or private companies must guarantee the management of public services. TOD managers can make loans to the bank as payment for construction services to the TOD contractor. It is hoped that the TOD will provide accessibility and connectivity to the area around the TOD area which causes land prices to rise. Local governments can provide incentives to TOD managers from paying increases in tax prices from areas around the TOD area. In practice, land valuation includes a range of mechanisms and policies, which are implemented by different jurisdictions and practices differently.

Definition of TOD

The TOD concept is defined as a development pattern that maximizes the benefits of the public transport system. The TOD describes a high-quality planning and design process of spatial and territorial patterns to support, facilitate and prioritize not only public transport users, but also the most basic modes of transportation namely walking and cycling.

TOD has the following objectives:

1. Increase the use of mass transportation services organized by the city government.

2. Reducing the use of private vehicles in the TOD area.

3. Replace urban mobility with sustainable transportation such as walking, cycling and public transportation.

4. Optimizing the function of urban spatial cultivation to support the increasing growth of urban life.

RESEARCH METHODS

The method used in this research is survey and observation methods. The data collected in the form of primary data and secondary data. The primary data is in the form of land use, generation and attraction data, traffic counting, road geomatics, and share modes. Meanwhile, secondary data is in the form of RTRW for Bogor City, Legal and Regulatory Basis, Location Map, Land Characteristics, and Public Transportation Characteristics. The next stage is analysis of environmental impact grouping. The research flow diagram is presented in Figure 2 below.

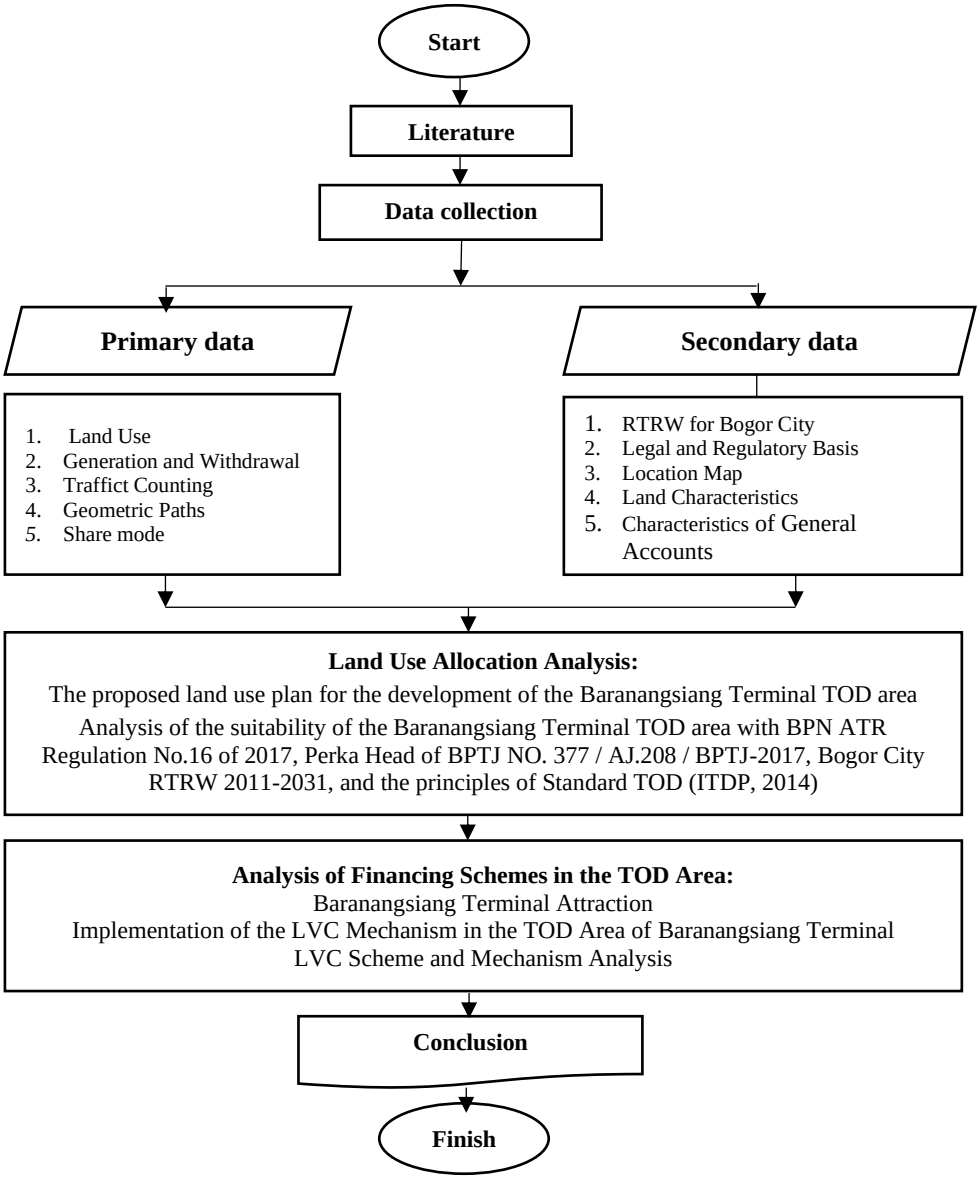

Figure 2. Research flow diagram

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When this research began in November 2020 and finished in March 2021. The research site is located at Jl. Manggis VI, Baranangsiang, Kec. East Bogor, Bogor City, West Java Province, Indonesia. The research location is shown in Figure 3

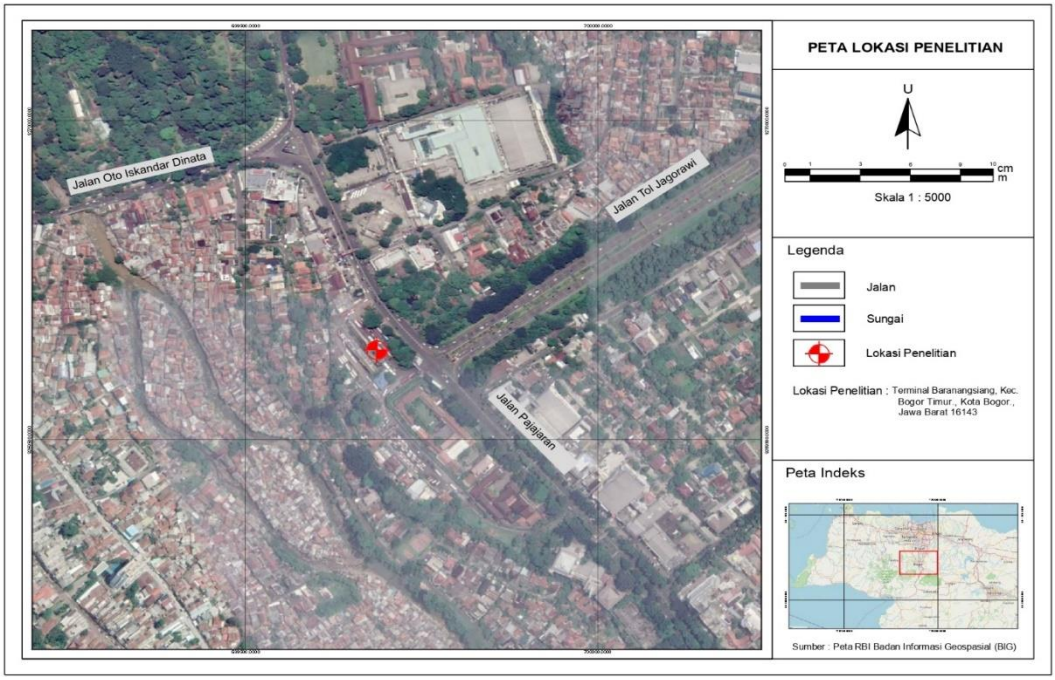

Figure 3. Research location

RESULTS AND DISCUSSION

Survey Results

Generation and Attraction of the TOD Area

Table 1. Land Allocation

No	Block	Land allotment		Floor area (m^2)	Number of floors	Total number of floors (m^2)	KLB	Total KLB	Nett Saleable Area	Unit Room
		Code	Type							
1	A	Residensial A	Apartement	520	15	7800	0,6	0,84	5850	244
		Komersial A	Supermarket Lt.1		2	1040	0,08		624	31
			Shopping Center Lt. 2 & 3		4	2080	0,16		1248	2
2	C	Perkantoran	Office	309	10	3090	0,24	0,24	1854	3
3	B	Residensial B	Apartement	921	20	18420	1,42	1,7	13815	526
			Park and Ride		4	3684	0,28		2763	3
4	D	Port And Terminal	Terminal		1					71
5	E		LRT Stasiun	1800	2	3600	0,28	0,28	2700	1
		Sub Total				**39714**	**3,05**	**3,05**		

Source: analysis results

The calculation of the generation and attraction of the TOD area uses the Manual Trip Generation ITE Generation 10th and MKJI 1997. By multiplying the units of the generation and pull coefficients against the land use in the TOD area. From the results of this calculation, the amount of generation (out) and pull (in) of the TOD area will be obtained.

Table 2. Generation and attraction of TOD (ITE) areas

No	Block	Land allotment			Units Sqm	KSF²	Coeffisien ITE	ITE Generation (Trip/hour)
		Code	Type					
1	A	Residential A	Apartement	Dwelling Units	244	244	0,62	151
		Commercial A	Supermarket Lt.1	KSF²	520	6	9,48	53
			Shopping Center Lt. 2 & 3	KSF²	520	6	3,71	21
2	C	Office	Office	KSF²	309	3	1,49	5
3	B	Residential B	Apartement	Dwelling Units	526	526	0,62	326
		Port And Terminal	Park and Ride	Paring Spaces	921	1194	0,62	740
4	D		Terminal	Paring Spaces	3010	137	0,62	85
Total								**1381**

Source: analysis results

The total number of generation in the TOD area is 1381 Tirp / hour. This result is the unit trip while the desired result is the passenger car unit, therefore the generation result is multiplied by the passenger car equivalent for each type of mode on the road around the TOD area. Other types of heavy vehicle modes are not included in the calculation to avoid bias when calculating vehicle occupancy.

Generation and pull of peak hours in the TOD area

Table 3. The generation and pull of peak hours in the TOD area

No	Land allotment	Total generation (smp/hour)	Peak hour of adjacent street rate				Peak hour of adjacent street rate (Trip/hour)			
			AM (7 - 9)		PM (4 - 6)		AM (7 - 9)		PM (4 - 6)	
			in	out	in	out	in	out	in	out
1	Apartement	117	20%	80%	65%	35%	23	94	76	41
2	Supermarket Lt.1	37	62%	38%	51%	49%	23	14	19	18
3	Shopping Center Lt. 2 & 3	14	62%	38%	48%	52%	9	5	7	8
4	Office	3	88%	12%	17%	83%	3	0	1	3
5	Apartement	227	20%	80%	65%	35%	45	182	148	79
	Park and Ride	515	79%	21%	25%	75%	407	108	129	386
6	Terminal	59	79%	21%	25%	75%	47	12	15	44
	Sub Total	**973**					**557**	**416**	**394**	**580**

Source: analysis results

Financial Feasibility Calculation Assumptions

In preparing financial projections or analysis, it is necessary to have assumptions on which to base calculations. The following are assumptions used to analyze Land Value Capture financing in the Baranangsiang Terminal Area.

Table 4. Table of Capex Financial and Economic Calculation

No	Type	Land area (m2)	Building Floor	Total area	Units	Cost (Rp)
1	AKAP and AKDP Parking Areas	11710	1	11710	370	29,275,000,000
2	Public Transport Parking Areas (Angkot)	1500	1	1500	200	3,750,000,000

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3	The Trans Jabodetabek/APTB urban transport bus parking area	8710	1	8710	276	21,775,000,000
4	JAC Multimodal Transport Parking Area (Soetta Airport)	1500	1	1500	50	3,750,000,000
5	Terminal private car park	1000	1	1000	100	2,000,000,000
6	Terminal Motorcycle Parking	1000	1	1000	500	2,000,000,000
7	Hotel Fave Floors 1-8	4500	1	4500	199	13,500,000,000
8	Hotel Parking Floor B1-1	500	2	1000	180	2,500,000,000
9	Baranangsiang Park and Ride Terminal	1000	1	1000	200	1,500,000,000
10	Main road	1555.3	1	1555.3		1,555,300,000
11	Circulation	3500	2	7000		10,500,000,000
12	Vegetation	9580	4	38320		250,000,000
	Amount	**27975**		**38918873.5**		92,355,300,000

No	Type	Land area (m2)	Building Floor	Total area	Units	Cost (Rp)
1	Apartement	890	15	13350	244	20.025.000.000
2	1st Floor Supermarket	890	2	1780	31	4.450.000.000
3	Shopping Center Lt. 2 & 3	890	4	3560	2	3.560.000.000
4	Office	613	10	6130	3	6.130.000.000
5	Apartement	1383	20	27660	526	82.980.000.000
6	Park and Ride	1383	4	5532	3	16.596.000.000
7	Terminal	3010	1	3010	71	7.525.000.000
8	LRT Station	1800	2	3600	1	10.800.000.000
9	Green Area	754	1	754	0	2.262.000.000
10	Road	4550	1	4550	0	2.275.000.000
	Amount	**13000**		**69926**		156.603.000.000

Source: analysis results

No	Block	Land allotment		Parcel Area				Units		Cost (Rp)
		Code	Type	(Sqm)	Parcel Area (m^2)	Number of Floors	Total Floor Area (m^2)	Nett Salea ble Area	Room	
1	A	Residential A	Apartement	890	520	15	7800	5850	244	0
		Commercial A	Supermarket Lt.1			2	1040	624	31	0
			Shopping Center Lt. 2 & 3			4	2080	1248	2	0
2	C	Office	Office	613	309	10	3090	1854	3	12.260.000.000
3	B	Residensial B	Apartement	1383	921	20	18420	13815	526	0

			Park and Ride			4	3684	2763	3	0
4	D	Port And Terminal	Terminal	3010		1			71	60.200.000.000
5	E		LRT Station	1800	1800	2	3600	2700	1	36.000.000.000
		Sub Total		**7696**			**39714**			**108.460.000.000**
		Green area		754	5,80%					15.080.000.000
		Road		4550	35,00 %					91.000.000.000
		Sub Total Non Saleable Area		**5304**	**40,80 %**		**Sub Total Cost**			**106.080.000.000**
							Grand Total Cost			**214.540.000.000**
		Grand Total		**13000**	**100%**					

Source: analysis results

Tabel 5. Tabel WACC Terminal Financial and Economic Calculation

Debt	70,00%	
Equity	30,00%	
Risk-free rate ("Rf")	7,20%	
Equity Market Risk Premium ("EMRP")	8,90%	
Beta (ß)	1,05	
Loan Provisions	1,00%	
Cost of Equity	17,55%	
Loan interest	12,00%	Per/year
Tax	25%	
Cost of Debt (after tax)	9,00%	
Weighted Average Cost of Capital (WACC)	11,56%	
Discount Factor	11,56%	

Source: analysis results

Weighted average cost of capital (WACC) is a calculation of the cost of capital based on the portion of debt (debt) and equity (equity) of the company. This method is generally used to test the feasibility of investing in companies based on a varied capital structure, usually involving debt and equity. In companies that only use equity funding, the cost of capital is equivalent to the cost of equity.

Tabel 6. Table Financial Calculation Baranangsiangn Terminal

Calculation in million rupiah												
Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
CAPEX												
Terminal	103.005											
angkot	34.921											
Apartment	7.070	65.863										
utility	4.537	4.537										
Design	14.953	7.040										
Increasing the Accessibility of Transportation Services		12.688										
Improvement of Transportation Services		1.886										
OC	29.907	14.080										
IDC	14.953	7.040										
Capex tax	26.168	12.320										
TOTAL CAPEX	235.514	125.454										
OPEX												
Management			964	998	1.032	1.068	1.106	1.144	1.184	1.226	1.268	1.313
Labor			1.117	1.156	1.197	1.238	1.282	1.326	1.373	1.421	1.470	1.521
Utilities (Electricity, Water, Telephone,			869	899	931	963	997	1.031	1.067	1.105	1.143	1.183

Internet, Waste)												
General Administration			536	554	574	594	614	636	658	681	705	729
Building Maintenance and Cleanliness			2.142	2.217	2.294	2.374	2.457	2.543	2.632	2.723	2.818	2.917
Maintenance of SIM, PKB and Video Tron					7.796			8.641			9.577	
Mosque Rehabilitation in Terminal						13.736				15.756		
Insurance			2.142	2.217	2.294	2.374	2.457	2.543	2.632	2.723	2.818	2.917
marketing		828	857	887	918	950					1.127	1.167
Tax			369	380	391	403	415	427	440	453	467	481
TOTAL OPEX	0	828	8.995	9.307	17.426	23.700	9.327	18.291	9.985	26.087	21.395	12.228
TOTAL COST	235.514	126.282	8.995	9.307	17.426	23.700	9.327	18.291	9.985	26.087	21.395	12.228
INCOME												
TERMINAL												
Rent Kiosk			884	914	946	979	1.014	1.049	1.086	1.123	1.163	1.203
Terminal Parking			3.924	4.061	4.203	4.350	4.501	4.658	4.821	4.989	5.163	5.344
Other income			33.094	34.249	35.444	36.681	37.961	39.286	40.657	42.076	43.545	45.064
NON-TERMINAL												
Rent an Apartment			3.787	3.900	4.018	4.138	4.262	4.390	4.522	4.657	4.797	4.941
Selling Apartments			32.429	33.402	34.404	35.437	36.500	37.595	38.723	39.884	41.081	42.313
Apartment Parking			2	2	6	10	12	13	13	14	3	7
TOTAL INCOME	0	0	74.120	76.529	79.021	81.595	84.250	86.991	89.821	92.744	95.751	98.873
CASHFLOW												
NPV	-235.514	-126.282	65.125	67.222	61.595	57.895	74.923	68.700	79.836	66.657	74.357	86.645
IRR												
Accumulated Net Cash Flow	IDR5.145											
Positive Indicator	11,86%											
Cumulative Lag Payback Year	-235.514	-361.796	-296.671	-229.448	-167.853	-109.958	-35034,771	33664,747	113.500	180.157	254.514	341.159
TOTAL INCOME	0	0	0	0	0	0	0	1	1	1	1	1
CASHFLOW NPV		0 0	0 0	0 0	0 0	0 0	0 0	0 8	1 0	1 0	1 0	1 0

Source: Analysis results

In calculating the feasibility of the project, there is a feasibility indicator. First, the NPV value is IDR 514,555,000,000, or greater than IDR 0. Second, the IRR project value is 11.86%, or greater than the cost of capital, which is 11.56%. Thus, from these indicators, the TOD project can be said to be a financially viable project.

Tabel 7. Table Economic Calculation

Years	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Total capex	235.514	125.454										
Total opex	0	828	8.995	9.307	17.426	23.700	9.327	18.291	9.985	26.087	21.395	12.228
Total cost	235.514	126.282	8.995	9.307	17.426	23.700	9.327	18.291	9.985	26.087	21.395	12.228
Economic benefits												
Use of local materials	23.551	12.545										
Utilization of unskilled labor			1.117	1.156	1.197	1.238	1.282	1.326	1.373	1.421	1.470	1.521
Increasing GRDP of Bekasi City	0	0	83.281	91.148	99.762	109.193	119.511	130.802	143.161	156.689	171.476	187.690

Total income	23.551	12.545	84.399	92.304	100.959	110.431	120.792	132.128	144.534	158.109	172.946	189.211
Cashflow	-211.963	-113.736	75.404	82.997	83.533	86.731	111.465	113.837	134.548	132.022	151.551	176.983

ENPV	IDR260.082
EIRR	22,98%

Source: Analysis results

Total Capex -10%	Total Capex +10%	Total Capex +20%
379.440,97	312.731,13	279.376,22
28,46%	23,45%	21,43%
Total Opex -10%	Total Opex +10%	Total Opex +20%
353.387,41	338.784,69	331.483,34
26,06%	25,48%	25,19%
Total economic bennefits -10%	Total Economic Bennefits +10%	Total Economic Bennefits +20%
267.115,07	425.057,04	504.028,02
22,66%	28,77%	31,67%

Source: Analysis results

CONCLUSION

The allocation of land for development / planning which refers to the RTRW of Bogor City for optimization of the Barangsiang Terminal is 1.3 hectares of the total land area of the Baranangsiang Terminal area, which is ± 22,231.39 m². Where the 1.3hectare area is the initial stage of developing or optimizing the Baranangsiang Terminal which applies the Land Value Capture financing scheme in the TOD area of Baranangsiang Terminal which uses the LVC mechanism with PPP. The LVC mechanism from the study results determined the role of the private sector and the government in providing facilities and infrastructure in the area around the Baranangsiang Terminal area. So that it can increase the selling value of the land which will go hand in hand with the increased potential for LVC to be used as an alternative financing tool for TOD Baranangsiang. From the analysis of the Land Value Capture financing scheme in the TOD Area of Baranangsiang Terminal, the results show that in calculating the feasibility of the project, there is a feasibility indicator. First, the NPV value is IDR 514,555,000,000, or greater than IDR 0. Second, the IRR project value is 11.86%, or greater than the cost of capital, which is 11.56%. Thus, from these indicators, the TOD project can be said to be a financially viable project. The advantage of the LVC mechanism is, Being a significant factor can increase or provide additional attractiveness to a location, thereby increasing land value, both through the NJOP indicator and market prices. On the other hand, transit-based areas or TOD prioritize increased accessibility as a factor that can provide Value Creation so that there are a number of land increases that the LVC mechanism can use as alternative sources of financing for TOD areas in a sustainable manner. Whereas the weakness of the LVC mechanism is that there needs to be full participation and support from the private sector, government, and local communities, because it has a big impact on the local community on their area which will be planned to become a TOD area.

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