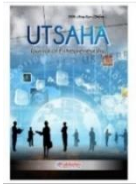

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Financial Feasibility Analysis for Decision-Making in the Yodya Tower Office Building Construction Project in Makassar

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ABSTRACT

In the era of globalization and increasingly intense business competition, investment decision-making has become a key aspect of managing business operations efficiently and sustainably. Investing in office building construction is a strategic move that requires thorough planning and meticulous analysis. Poor investment decisions in such projects can have significant impacts on a company's financial stability and long-term viability. Therefore, the investment in the "Yodya Tower Office Building Construction Project in Makassar" necessitates a financial feasibility analysis based on capital budgeting methods, utilizing investment feasibility indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Discounted Payback Period (DPP), and Payback Period (PP). Based on the financial feasibility calculations for the Yodya Tower Office Building Construction Project with an investment horizon of 20 years, the analysis yielded an NPV of IDR 15,737,034,946, an IRR of 9.73%, a PI of 1.15, a DPP of 18.4 years, and a PP of 11.9 years. According to these five investment parameters, the Yodya Tower Office Building Construction Project is considered financially feasible. Additionally, a sensitivity analysis was conducted to identify the variables that most significantly affect the investment feasibility indicators. This was further elaborated through three possible business scenarios: optimistic, normal, and pessimistic. The analysis revealed that an increase in construction costs is the most sensitive factor impacting the project's cash flow, leading to changes in NPV and other feasibility indicators. Furthermore, the capital structure analysis indicated that utilizing 30% equity and 70% debt financing would result in the most optimal NPV outcome.

Keywords: *Financial Feasibility Analysis, Yodya Tower Office Building Makassar, Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Discounted Payback Period (DPP), Payback Period (PP), Sensitivity Analysis and Scenario Analysis, Capital Structure Analysis*

INTRODUCTION

Data from Indonesia's Central Statistics Agency (BPS) indicates that Indonesia's economic growth remains robust amidst the global economic slowdown. This is reflected in Indonesia's economic growth for the first quarter of 2023, which recorded a year-on-year (YoY) growth of 5.03%, slightly higher than the previous quarter's 5.01% (YoY). Looking ahead, economic growth in 2023 is projected to remain strong, reaching the upper limit of 4.5%–5.3%, driven by improved domestic demand and consistently positive export performance. This optimism is also supported by the Indonesian Government's official revocation of the COVID-19 pandemic status.

Spatially, economic growth in Q1 2023 was sustained across almost all regions of Indonesia. The highest growth was recorded in Kalimantan, followed by Sulawesi-Maluku-Papua (Sulampua), Java, Sumatra, and Bali-Nusa Tenggara (Balinusra).

Such promising economic conditions provide confidence for investors to invest in various sectors, including the property and real estate sector. One of the most targeted investment areas in Indonesia is the eastern region of the country, which has become a primary focus in recent years. Significant growth is evident from the rising economic activities, particularly in agriculture, trade, and commodities sectors. The property business has also shown remarkable development in several primary cities, such as Makassar, which has emerged as a key driver of business growth in Eastern Indonesia. The city has experienced a surge in physical developments, including hotels, office buildings, shopping centers, and residential areas.

As the main business hub and capital city of South Sulawesi Province, Makassar is undergoing rapid and positive transformation. Several analyses even suggest that in the near future, Makassar will become the gateway for investments and a prime destination for business players targeting Eastern Indonesia. In line with this, Makassar's economic growth in 2023 is projected to increase by 5.4% to 6.41%. Over the coming years, Makassar is anticipated to be the largest investment hub in the Eastern Indonesian region.

In this era of globalization and increasingly intense business competition, investment decision-making has become a critical aspect of managing businesses efficiently and sustainably. Investing in office building construction is a strategic move that requires meticulous planning and careful analysis. An incorrect investment decision could significantly impact a company's financial standing and business continuity. Thus, capital budgeting analysis plays a crucial role in assisting corporate managers in making well-informed investment decisions.

PT Yodya Karya (Persero), a state-owned enterprise (BUMN) specializing in engineering consultancy and construction management services, aims to enhance

its revenue by optimizing its land asset located on Jalan A.P. Pettarani, Makassar, with a total land area of 2,016 m², to be developed into a commercial office building. This initiative is intended to diversify income sources beyond the company's core business. According to the proposed prototype concept, the building will consist of one tower with three basement levels for parking and fifteen office floors, supported by additional facilities such as a food court, sports center, and ballroom, designed with a green building architectural concept.

The Yodya Tower Makassar is planned to be constructed with a modern and iconic design, expected to enhance the commercial activities in the area. With a strong captive market, Yodya Tower is projected to become a preferred office space for the people of Makassar and its surrounding regions. The project's financing structure is planned to utilize 30% equity and 70% bank loans, with a business concept involving 47% of the space being sold (saleable area) and 53% leased (non-saleable area). Therefore, the allocation of funds must be carefully evaluated to assess the project's feasibility and potential for success.

In this context, capital budgeting analysis is a vital tool used to evaluate and compare the economic value of the project. This analysis involves several methods such as Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Discounted Payback Period (DPP), and Payback Period (PP). Furthermore, sensitivity analysis, scenario analysis, and capital structure adjustments are also conducted to strengthen the financial feasibility assessment. The selection of appropriate methods and the accuracy of data collection are key factors in this analysis. The primary objective of this analysis is to thoroughly assess whether the investment in constructing the Yodya Tower Office Building in Makassar is financially feasible, serving as a basis for strategic investment decision-making.

RESEARCH METHODOLOGY

The data utilized in this study are categorized into two groups: primary data and secondary data. Primary data were obtained through field studies conducted to gather detailed and in-depth information regarding the project and the associated company, as well as to validate findings from the literature review. The field study undertaken for this analysis involved interviews with the management of PT. Yodya Karya, as the project owner, and the Basic Design Team, which serves as the internal team entrusted with preparing the basic design planning for the Yodya Tower Office Building in Makassar. The results of these interviews were used to analyze both external and internal aspects of the company's environment, including the technical aspects of the project, thereby ensuring that the assumptions made for the feasibility analysis were accurate and well-founded. Secondary data refer to information obtained from various other sources, including literature reviews of

books, journals, magazines, e-books, websites, company financial reports, basic design drawings, consultant reports, and previous research findings.

This study employs both quantitative and qualitative approaches to analyze the feasibility of the Yodya Tower Office Building Development Project in Makassar. The analytical methods applied include capital budgeting, sensitivity analysis, scenario analysis, and the calculation of the cost of capital. The data analysis process is conducted systematically through the following stages:

1. Cash Flow Analysis

   The collected data are processed by categorizing them into cash inflows and cash outflows. Cash outflows are analyzed in terms of investment costs, which include construction costs, professional fees, Value Added Tax (VAT), pre-operational costs, legal and permit fees, contingency costs, as well as launching and promotional expenses. The cost estimation process combines expert opinions, consultations with relevant stakeholders, and comparative analysis of market data from similar property projects in Makassar.

2. Revenue Analysis

   Revenue projections comprise income from property unit sales, property leasing, service charges, and parking fees. Data for these projections are obtained through market price studies of comparable properties in Makassar, as well as direct interviews with property management stakeholders. Furthermore, a sales plan is developed to estimate the revenue generated throughout the investment period.

3. Financial Feasibility Analysis

   The financial feasibility of the project is assessed by calculating several key investment appraisal parameters, including:

   a. Payback Period (PP): Measures the duration required to recover the initial investment through project cash flows.
   b. Discounted Payback Period (DPP): Calculates the time needed to recoup the investment, taking into account the time value of money.
   c. Net Present Value (NPV): Determines the difference between the present value of cash inflows and the initial investment, to assess whether the project enhances the firm's value.
   d. Internal Rate of Return (IRR): Identifies the rate of return at which the project’s NPV equals zero.
   e. Profitability Index (PI): Evaluates the ratio of the present value of cash inflows to the initial investment.

   The decision-making criteria are based on standard investment feasibility benchmarks, wherein a project is deemed viable if NPV > 0, IRR exceeds the cost of capital, and PI > 1.

4. Capital Structure and Cost of Capital Calculation

   The project's capital structure is determined by considering a combination of equity and debt financing. The calculation of the cost of capital, or Weighted Average Cost of Capital (WACC), takes into account the proportional use of each funding source and their respective costs. Additionally, the cost of equity is computed using the Capital Asset Pricing Model (CAPM), while the cost of debt considers the effective interest rate after tax adjustments.

5. Sensitivity and Scenario Analysis

   Sensitivity analysis is performed to evaluate the impact of changes in key input variables—such as selling prices, sales volumes, and variable costs—on the project's NPV. Scenario analysis, on the other hand, is constructed by comparing three primary conditions: the optimistic scenario (best case), the pessimistic scenario (worst case), and the base scenario (most probable case). This approach provides a comprehensive overview of potential risks and the project's resilience to market fluctuations.

In conducting the financial feasibility analysis of the Yodya Tower Office Building Development Project, several key assumptions are established, encompassing both general and project-specific considerations. The project does not involve foreign currency loans, thus eliminating exchange rate risks. Inflation is projected to remain within Bank Indonesia's target range of 3.0±1% in 2023 and 2.5±1% in 2024, influencing rental rates and operational costs. The Bank Indonesia benchmark interest rate is assumed to remain at 5.75%. The company plans to sell 4,068 m² of office space (floors 1 to 15) at Rp 20,000,000 per m², while 4,147 m² will be leased at Rp 150,000 per m² per month. A service charge of Rp 80,000 per m² per month is applied, with an assumed annual increase of 5% to align with inflation. Parking revenue is calculated based on a regional regulation rate of Rp 3,000 per hour per vehicle, with a parking capacity of 145 vehicles (15 m² per vehicle) and an average usage duration of 9 hours per vehicle. The revenue-sharing scheme allocates 70% to the project operator and 30% to the local government, with the parking rate assumed to increase by Rp 500 every five years.

RESULT AND DISCUSSION

The Yodya Tower Office Building Development Project in Makassar is planned to be constructed on a plot of land owned by PT. Yodya Karya (Persero), located at Jalan Andi Pengerang Pettarani No. 74, Makassar. The project design takes into account the prevailing regulations regarding the Building Coverage Ratio (KDB) and Floor Area Ratio (KLB), in accordance with the zoning provisions of the designated area.

The Building Coverage Ratio (KDB) refers to the percentage of the total land area that may be developed as the total ground floor area of a planned building. For the site where the Yodya Tower Office Building is to be constructed, the applicable KDB is 60% of the total land area. Meanwhile, the Floor Area Ratio (KLB) is a constant value used to determine the total allowable floor area of the building. To optimize land utilization, the project is designed with a total building area six times the size of the land plot, amounting to approximately 12,096 square meters.

The Yodya Tower Office Building in Makassar will comprise 15 above-ground floors and 3 basement levels. The basic design concept adopts an iconic visual appearance, featuring a tower structure resting upon a single podium. The podium is designed to appear expansive, providing a solid base, while the tower rises with a slender and prominent profile, maintaining proportional harmony with the podium. Additionally, the podium levels are designed with open space concepts to enhance spatial flexibility and aesthetic appeal.

Figure 1. Prototype Design of Yodya Tower Office Building, Makassar
Source: Personal Documentation by Researcher (2025)

The Yodya Tower Office Building in Makassar will comprise 15 above-ground floors and 3 basement levels. The basic design concept adopts an iconic visual appearance, featuring a tower structure resting upon a single podium. The podium is designed to appear expansive, providing a solid base, while the tower rises with a slender and prominent profile, maintaining proportional harmony with the podium. Additionally, the podium levels are designed with open space concepts to enhance spatial flexibility and aesthetic appeal.

Cash Flow Projection

This project study employs a cash flow projection over a 20-year period, excluding the construction phase. The construction phase is scheduled to commence in the first quarter of 2024 for the design stage, followed by the construction activities during the second and third years. Thus, the total construction period will

span three years. Consequently, the cash flow projection period covers 20 years following the completion of construction, specifically from 2027 to 2046.

Table 1. Cash Flow Projection

Year	2024	2025	2026	2027	2028	2029		2045	2046
	1	2	3	4	5	6		22	23
	Planning	Development							
Development Cost									
Construction Cost	0	48,888,600,000	73,504,400,000						
Professional Fee	1,223,930,000	489,572,000	734,358,000						
Value Added Tax (VAT)	0	5,377,746,000	8,085,484,000						
Pre-Operational Costs			1,223,930,000						
Legal and Permit Costs	1,529,912,500	917,947,500			611,965,000				
Contigencies Cost		977,772,000	1,470,088,000						
Lauching and Promotion Costs		733,329,000	1,102,566,000				**UPTO**		
Total	**(2,753,842,500)**	**(57,384,966,500)**	**(86,120,826,000)**		**(611,965,000)**				
Cash Inflows									

Office Space Sales Revenue		14,672,000,000	26,409,600,00	42,255,360,000	-				
Lease Revenue				1,492,920,000	6,270,264,000	7,406,000,749,350		16,168,004,939	16,976,405,186
Service Charge Revenue				330,448,000	555,979,200	620,354,700		1,354,156,510	1,421,864,336
Parking Revenue				493,834,320	790,134,912	888,901,776		1,431,502,960	1,481,520,960
Total		**14,672,000,000**	**26,409,600,00**	**44,572,562,320**	**7,616,378,112**	**8,916,005,826**		**19,003,664,409**	**19,879,772,481**
Cash Outflows									
Operational Costs				297,403,200	500,381,280	558,319,230		1,218,740,859	1,279,677,902
Marketing Expenses		293,440,000	528,192,000	874,965,000	125,405,280	148,134,987		323,360,099	339,528,104
Total		**293,440,000**	**528,192,000**	**1,172,368,800**	**625,786,560**	**706,454,217**		**1,542,100,958**	**1,619,206,006**
Depreciation				6,119,650,000	6,119,650,000	6,119,650,000		6,119,650,000	6,119,650,000
Pre-Tax Operating Cash Flow		**14,378,560,000**	**25,881,408,000**	**37,280,543,520**	**870,941,552**	**2,089,901,609**		**11,341,913,451**	**12,140,916,475**
Tax		3,163,283,200	5,693,909,760	8,201,719,574	191,607,141	459,778,354		2,495,220,959	2,571,001,625

Post-Tax Operating Cash Flow		**11,215,276,800**	**20,187,498,240**	**29,078,823,946**	**679,334,411**	**1,630,123,255**		**8,846,692,492**	**9,469,914,851**
Depreciation (+)				6,119,650,000	6,119,650,000	6,119,650,000		6,119,650,000	6,119,650,000
Capital Expenditure (-)				44,787,600	188,107,920	222,202,481		**495,040,148**	**509,292,156**
Total Net Cash Flow	**(2,753,842,500)**	**(46,169,689,700)**	**(65,933,327,760)**	**35,153,686,346**	**5,998,911,491**	**7,527,570,775**		**14,481,302,344**	**15,080,272,695**

Source: Processed Data by Researcher (2025)

Project Data

Table 2. Regulations and Assumptions

Item	Description	Coefficient	Area (m^2)
a.	Land Area		2.016 m^2
b.	Building Coverage Ratio (BCR)	60%	1,210
c.	Floor Area Ratio (FAR)	6 ×	12,096
d.	Basement Coverage Ratio (BCR – Basement)	60%	1,210
e.	Green Coverage Ratio (GCR)	30%	605
f.	Infrastructure and Others	10%	202

Source: Processed Data by Researcher (2025)

Table 3. Simulation and Usage Assumptions

Floor/Area	Total GFA (m^2)	Non-Saleable (%)	Non-Saleable Area (m^2)	Saleable (%)	Saleable Area (m^2)	Description
Basement 1	1,210	40%	484	60%	726	Car Parking
Basement 2	1,210	40%	484	60%	726	Car Parking

Floor/Area	Total GFA (m^2)	Non-Saleable (%)	Non-Saleable Area (m^2)	Saleable (%)	Saleable Area (m^2)	Description
Basement 3	1,210	40%	484	60%	726	Car Parking
Total Basement	**3,629**		**1,452**		**2,177**	
1st Floor	1,210	80%	970	20%	240	Bank / Restaurant / Café
2nd Floor	1,210	37%	447	63%	763	Office / Multipurpose Room
3rd Floor	742	29%	218	71%	524	Office
4th Floor	742	29%	218	71%	524	Office
5th Floor	742	29%	218	71%	524	Office
6th Floor	742	29%	218	71%	524	Office
7th Floor	742	29%	218	71%	524	Office
8th Floor	742	29%	218	71%	524	Office (Yodya Karya)
9th Floor	742	29%	218	71%	524	Office
10th Floor	742	29%	218	71%	524	Office
11th Floor	742	29%	218	71%	524	Office
12th Floor	742	29%	218	71%	524	Office
13th Floor	742	29%	218	71%	524	Office
14th Floor	742	29%	218	71%	524	Office
15th Floor	742	29%	218	71%	524	Office
Rooftop	31	100%	31	0%	-	Lift Room

Floor/Area	Total GFA (m^2)	Non-Saleable (%)	Non-Saleable Area (m^2)	Saleable (%)	Saleable Area (m^2)	Description
Total Floors	**12,096**	**35%**	**3,621**	**70%**	**8,475**	

Source: Processed Data by Researcher (2025)

Development Costs

Development costs refer to the total expenditures incurred for project preparation up to the completion of construction. The components of the project development costs are presented in Table 4.

Table 4. Total Development Cost

Assumption	Size (m^2)	Cost/Unit Base Year 2023	Total	
Land Acquisition	2,016	17,500,000	IDR	35,280,000,000
Construction Costs				
Building Construction	12,096	8,000,000	IDR	96,768,000,000
Basements 1 to 3	3,629	7,000,000	IDR	25,403,000,000
Infrastructure	202	500,000	IDR	101,000,000
Landscaping	605	200,000	IDR	121,000,000
Sub-Total Construction			**IDR**	**122,293,000,000**
Pre-Operational Costs				
Professional Fees		2.00% of construction	IDR	2,447,860,000.00
Value Added Tax (VAT)		11% of construction	IDR	13,463,230,000.00
Pre-Operational Costs		1.00% of construction	IDR	1,223,930,000.00
Licensing and Permits		2.50% of construction	IDR	3,059,825,000.00
Project Contingency		2.00% of construction	IDR	2,447,860,000.00
Banking and Promotion Fees		1.50% of construction	IDR	1,835,895,000.00
Sub-Total Pre-Operational			IDR	24,478,600,000.00
Total Development Costs			**IDR**	**146,871,600,000.00**

Source: Processed Data by Researcher (2025)

Revenue

The office space to be sold amounts to 3,668 m^2, located on the 1st to 15th floors, at a selling price of IDR 20,000,000 per square meter.

Table 5. Total Development Costs

Description	Year 2 (IDR)	Year 3 (IDR)	Year 4 (IDR)
Sales Rate	20%	30%	40%
Property Units	14,672,000,000	26,409,600,000	42,255,360,000

Source: Processed Data by Researcher (2025)

Table 6. Validity and Reliability Test

Year		2027	2028	2029
Year		4	5	6
Leasable Area (m^2)	4,147			
Occupacy Rate		20%	80%	90%
Area Leased per Year (m^2)		829	3,318	3,732
Annual Lease Revenue (IDR)	**1,800,000**	**1,492,920,000**	**6,270,264,000**	**7,406,749,350**

Source: Processed Data by Researcher (2025)

The Yodya Tower office building has a parking area of 2,177 m², of which 60% is assumed to be effectively utilized for vehicle parking, while the remaining 40% serves as circulation space. The revenue calculation assumes full occupancy (100%) of the effective parking area, as follows:

Table 7. Projected Parking Revenue

Operating Year	4–8	9-13	14-18	19-23
Total Available Area	m^2	3,629	3,629	3,629
Net area for parking (60% of total area)	m^2	2,177	2,177	2,177
Parking lots available (15 m² per vehicle	Lots	145	145	145
Parking rate per vehicle per hour	IDR	3,000	3,500	4,000
Total vehicle hours per day	Hours	9	9	9
Total monthly parking revenue	IDR	117,579,600	137,176,200	156,772,800

Total annual parking revenue	IDR	1,410,955,200	1,646,114,400	1,881,273,600

Source: Processed Data by Researchers (2025)

For the analysis, parking revenue is assumed to correspond with the sales and leasing occupancy rates, with 50% utilization in the fourth year, 90% in the fifth year, and 90% occupancy for both sales and leasing thereafter. Additionally, 30% of the parking revenue must be remitted to the local government.

The net leasable area of Yodya Tower is 4,147 m², while the area for sale is 3,668 m². Applying an average service charge of IDR 80,000 per m² per month, the total annual service charge revenue—assuming full occupancy—is IDR 8,271,396,000. The service charge revenue is aligned with the building's occupancy rate, estimated at 50% in the first year of operation, 90% in the second year, and reaching 100% in the third year. Of the total service charge, the company retains a 10% profit margin, while 90% is allocated for building operations. For this project, the service charge is assumed to increase by 5% annually to account for inflation.

Table 8. Service Change Revenue Projection

Operational Year			**Year 4**	**Year 5**	**Year 6**
Area of building sold (m²)	3,668	m²			
Area of building leased (m²)	4,147	m²			
Total area sold and leased (m²)	7,815	m²	4,351	6,619	7,034
Service charge rate per m²/month (IDR)	80,000		330,448,000	555,979,200	620,354,700
Service charge rate per m²/year (12 months)	**12**	**months**	**3,965,376,000**	**6,671,750,400**	**7,444,256,400**

Source: Processed Data by Researchers (2025)

Upon the commencement of Yodya Tower's operations, several categories of expenses will arise. Operating expenses are assumed to account for 90% of the

service charge collected from tenants, which varies in proportion to the building's occupancy rate. The remaining 10% of the service charge is considered the company's profit margin for managing the property. Marketing expenses include costs incurred for the promotion and sale or lease of office units, such as advertising, survey costs, and sales contract fees. These expenses are estimated at 2.0% of the annual revenue derived from property sales and leasing activities.

In addition, the management of PT Yodya Karya (Persero) assumes an annual capital expenditure of 3% of the total revenue to maintain the building and ensure operational sustainability. Depreciation is calculated using the straight-line method, as it is considered the most appropriate approach for office buildings, with the computation based on the building's useful life.

Table 9. Depreciation Estimation

Total Construction Cost	IDR 122,393,000,000
Economic Life of the Building	20 years
Annual Depreciation Expense	IDR 6,199,650,000

Source: Processed Data by Researchers (2025)

All income earned by the company is subject to taxation in accordance with Indonesian tax regulations. Under the Harmonized Tax Law (UU HPP), the corporate income tax rate (PPh Badan) was revised to 22% starting from the 2022 fiscal year. This new rate represents a 2% increase compared to the previous rate of 20% as stipulated in Law No. 2/2020. For the purpose of this study, a tax rate of 22% is applied as the basis for the investment calculation.

Cost of Capital

1. Cost of Equity

   The cost of equity (r_e) is calculated using the Capital Asset Pricing Model (CAPM), expressed by the following formula:

$$r_e = r_f + \beta 8 r_m + r_f)$$

   The data used in this calculation are as follows:

   a. r_f (Risk-Free Rate): Estimated using the Bank Indonesia Certificate (SBI) interest rate of 5.75% (source: BPS.go.id).
   b. β (Beta Coefficient): Represents the stock's risk relative to the market, determined by factors such as economic conditions, risk profile, operational aspects, market policies, etc. Since PT Yodya Karya (Persero) is a non-public company, the industry beta for the property sector is used, specifically a levered beta of 1.52 based on the 2022 Emerging Market Real Estate Development sector (source: www.Damodaran.com).
   c. $r_m + r_f$ (Equity Market Risk Premium): For Indonesia, this value is estimated at 2.89%, which represents the 2022 country risk

premium (source: www.Damodaran.com). Using these estimates, the resulting cost of equity (r_e) is calculated at 10.14%**.**

2. Cost of Debt

PT Yodya Karya (Persero) has established partnerships with banking institutions to assist in financing this project. Based on historical projects undertaken by the company, the funding structure typically consists of 30% equity and 70% bank financing. Accordingly, this analysis adopts the same proportion. The interest rate applied to the debt component is 8.5%, based on the average investment loan interest rate from state-owned banks in 2022 (Source: Sekilas i.26).

3. Weighted Average Cost of Capital (WACC)

Using the previously determined cost of equity and cost of debt, the Weighted Average Cost of Capital (WACC) for the Yodya Tower Makassar Office Building project is calculated with the following formula:

$$\text{WACC} = w_e\, r_e + w_d\, r_d(1 - t)$$

Where:

a. w_e = proportion of equity financing, 30%
b. r_e = cost of equity, 10.14%
c. w_d = proportion of debt financing, 70%
d. r_d = cost of debt**,** 8.5%
e. t = corporate income tax rate, 22%

Investment Appraisal

1. Net Present Value (NPV) Method

The Net Present Value (NPV) method is used to calculate the difference between the present value of cash inflows and the present value of cash outflows. Since the project is financed through two sources—equity capital and third-party debt (bank loan)—the required rate of return applied is the Weighted Average Cost of Capital (WACC), which has been determined to be 7.68%. Accordingly, the NPV for the Yodya Tower development project is calculated based on this discount rate.

Table 10. Projected Net Cash Flow – NPV Analysis

Year	Net Cash Flow (IDR)	Present Value (IDR)
1	(2,753,842,500)	(2,753,842,500)

Year	Net Cash Flow (IDR)	Present Value (IDR)
2	(46,169,689,700)	(42,875,225,939)
3	(65,933,327,760)	(56,859,616,696)
4	35,153,686,346	28,152,649,360
5	5,998,911,491	4,461,391,320
6	7,527,570,775	5,198,788,829
7	7,801,965,994	5,003,810,437
8	8,090,080,974	4,818,358,726
9	8,598,036,781	4,755,487,298
10	8,915,683,547	4,579,307,829
11	9,249,212,651	4,411,633,479
12	9,599,418,211	4,251,958,703
13	9,967,134,048	4,099,811,509
14	10,481,632,600	4,003,796,447
15	10,887,039,311	3,861,911,472
16	11,312,716,358	3,726,566,599
17	11,759,677,256	3,597,384,487
18	12,228,986,200	3,474,012,491
19	12,850,157,514	3,389,993,284
20	13,367,570,624	3,274,856,993
21	13,910,854,390	3,164,777,069
22	14,481,302,344	3,059,471,454
23	15,080,272,695	2,958,676,248
Total NPV		**IDR 1,755,958,900**

Source: Processed Data by Researchers (2025)

Based on the calculation results, the project yields a Net Present Value (NPV) of Rp 1,755,958,900. Since the NPV is positive, this indicates that the project is expected to generate more cash inflows than the amount required to fund the investment. Therefore, the project is considered financially feasible and viable for implementation.

2. Internal Rate of Return (IRR) Method

The Internal Rate of Return (IRR) is a method used to determine the discount rate at which the present value of all projected cash inflows equals the present value of the expected cash outflows. In other words, the IRR is the interest rate that makes the Net Present Value (NPV) of an investment equal to zero. Based on the calculation of PT Yodya Karya (Persero)'s investment in the development of the Yodya Tower office building in Makassar, the IRR is determined to be 7.91%.

Table 11. Net Cash Flow Projection – Internal Rate of Return (IRR)

Years	Net Cash Flow (IDR)	NPV (IDR)
1	(2,753,842,500)	(2,753,842,500)
2	(46,169,689,700)	(42,785,203,717
3	(65,933,327,760)	(56,621,098,748
4	35,153,686,346	27,975,690,767
5	5,998,911,491	4,424,040,031
6	7,527,570,775	5,144,439,802
7	7,801,965,994	4,941,103,417
8	8,090,080,974	4,747,985,759
9	8,598,036,781	4,676,193,632
10	8,915,683,547	4,493,497,260
11	9,249,212,651	4,319,875,684
12	9,599,418,211	4,154,780,126
13	9,967,134,048	3,997,698,898
14	10,481,632,600	3,895,878,127
15	10,887,039,311	3,749,927,483
16	11,312,716,358	3,610,909,675
17	11,759,677,256	3,478,418,064
18	12,228,986,200	3,352,073,081
19	12,850,157,514	3,264,135,082
20	13,367,570,624	3,146,652,669
21	13,910,854,390	3,034,497,427
22	14,481,302,344	2,927,367,441
23	15,080,272,695	2,824,980,541
	NPV	(0)
	IRR	7.91%

Source: Processed Data by Researchers (2025)

Since the IRR of 7.91% is greater than the Cost of Capital of 7.68%, the project is therefore considered feasible and suitable for implementation.

3. Profitability Index (PI) Method

The Profitability Index (PI) is a ratio that compares the present value of future cash inflows to the present value of the initial investment (cash outflows). It serves as an indicator of the project's value creation per unit

of investment. Based on the analysis conducted, the resulting calculation shows that:

Table 12. Projected Net Cash Flow – Profitability Index (PI)

Year	Net Cash Flow (IDR)	NPV (IDR)
1	(2,753,842,500)	(2,753,842,500)
2	(46,169,689,700)	(42,875,225,939)
3	(65,933,327,760)	(56,859,616,696)
	Cumulative NPV (Year 1–3)	**(102,488,685,135)**
4	35,153,686,346	28,152,649,360
5	5,998,911,491	4,461,391,320
6	7,527,570,775	5,198,788,829
7	7,801,965,994	5,003,810,437
8	8,090,080,974	4,818,358,726
9	8,598,036,781	4,755,487,298
10	8,915,683,547	4,579,307,829
11	9,249,212,651	4,411,633,479
12	9,599,418,211	4,251,958,703
13	9,967,134,048	4,099,811,509
14	10,481,632,600	4,003,796,447
15	10,887,039,311	3,861,911,472
16	11,312,716,358	3,726,566,599
17	11,759,677,256	3,597,384,487
18	12,228,986,200	3,474,012,491
19	12,850,157,514	3,389,993,284
20	13,367,570,624	3,274,856,993
21	13,910,854,390	3,164,777,069
22	14,481,302,344	3,059,471,454
23	15,080,272,695	2,958,676,248
	Cumulative NPV (Year 4–23)	**104,244,644,035**

Source: Processed Data by Researchers (2025)

$$PI = \frac{104.244.644.035}{102.488.685.135}$$
$$PI = 1{,}02$$

Since the calculated Profitability Index (PI) is greater than 1, it indicates that the return on investment exceeds the amount of capital invested. Therefore, the proposed project is considered profitable and feasible for implementation.

4. Discounted Payback Period Method

The Discounted Payback Period method takes into account the time value of money by discounting the projected cash inflows at the project's

cost of capital, which in this case is 7.68%. This method estimates the time required for the project to recover its initial investment in present value terms. The calculation for this project as follows:

Table 13. Projected Net Cash Flow – Discounted Payback Period (DPP)

Year	Net Cash Flow (IDR)	NPV (IDR)	Cumulative Present Value Cash Flow (IDR)
1	(2,753,842,500)	(2,753,842,500)	(2,753,842,500)
2	(46,169,689,700)	(42,875,225,939)	(45,629,068,439)
3	(65,933,327,760)	(56,859,616,696)	(102,488,685,135)
4	35,153,686,346	28,152,649,360	(74,336,035,775)
5	5,998,911,491	4,461,391,320	(69,874,644,454)
6	7,527,570,775	5,198,788,829	(64,675,855,625)
7	7,801,965,994	5,003,810,437	(59,672,045,189)
8	8,090,080,974	4,818,358,726	(54,853,686,463)
9	8,598,036,781	4,755,487,298	(50,098,199,164)
10	8,915,683,547	4,579,307,829	(45,518,891,335)
11	9,249,212,651	4,411,633,479	(41,107,257,856)
12	9,599,418,211	4,251,958,703	(36,855,299,153)
13	9,967,134,048	4,099,811,509	(32,755,487,644)
14	10,481,632,600	4,003,796,447	(28,751,691,197)
15	10,887,039,311	3,861,911,472	(24,889,779,725)
16	11,312,716,358	3,726,566,599	(21,163,213,125)
17	11,759,677,256	3,597,384,487	(17,565,828,638)
18	12,228,986,200	3,474,012,491	(14,091,816,147)
19	12,850,157,514	3,389,993,284	(10,701,822,863)

Year	Net Cash Flow (IDR)	NPV (IDR)	Cumulative Present Value Cash Flow (IDR)
20	13,367,570,624	3,274,856,993	(7,426,965,871)
21	13,910,854,390	3,164,777,069	(4,262,188,801)
22	14,481,302,344	3,059,471,454	(967,632,457)
23	15,080,272,695	2,958,676,248	1,991,043,792
Discounted Payback Period (DPP)			**22.33 years**

Source: Processed Data by Researcher (2025)

5. Payback Period

The Payback Period method is used to determine the length of time required to recover the initial investment through the cash inflows generated by the Yodya Tower Office Building project in Makassar. This period is measured from the time the company disburses the investment funds until the cumulative cash inflows equal the initial cash outflows. The payback period for this project is as follows:

Table 14. Projected Net Cash Flow – Payback Period (PP)

Year	Net Cash Flow (IDR)	Cumulative Net Cash Flow
1	(2,753,842,500)	(2,753,842,500)
2	(46,169,689,700)	(48,923,532,200)
3	(65,933,327,760)	(114,856,859,960)
4	35,153,686,346	(79,703,173,614)
5	5,998,911,491	(73,704,262,124)
6	7,527,570,775	(66,176,691,349)
7	7,801,965,994	(58,374,725,355)
8	8,090,080,974	(50,284,644,381)
9	8,598,036,781	(41,686,607,600)
10	8,915,683,547	(32,770,924,053)
11	9,249,212,651	(23,521,711,402)
12	9,599,418,211	(13,922,293,191)
13	9,967,134,048	(3,955,159,143)
14	10,481,632,600	6,526,473,457
15	10,887,039,311	17,413,512,768
16	11,312,716,358	28,726,229,126
17	11,759,677,256	40,485,906,382
18	12,228,986,200	52,714,892,582
19	12,850,157,514	65,565,050,095
20	13,367,570,624	78,932,620,719
21	13,910,854,390	92,843,475,108
22	14,481,302,344	107,324,777,452
23	15,080,272,695	122,405,050,147

Source: Processed Data by Researchers (2025)

$$Payback\ Period = 13 + \frac{3{,}955{,}159{,}143}{10{,}481{,}632{,}600}$$
$$= 13{,}38 \text{ tahun}$$

Based on the above calculations, it is determined that the initial project investment of Rp 146,871,600,000 can be recovered within 13.38 years, indicating that the project is financially feasible for implementation. Following the financial analysis conducted using capital budgeting methods, the summary table is presented below:

Table 15. Summary of Financial Analysis

Method	Result	Criterion	Feasibility
Net Present Value (NPV)	1,755,958,900	NPV > 0	Feasible
Internal Rate of Return (IRR)	7.91%	IRR > 7.68%	Feasible
Profitability Index (PI)	1.02	PI > 1	Feasible
Discounted Payback Period (DPP)	22.33 years	<20 years	Feasible
Payback Period (PP)	13.38 years	<20 years	Feasible

Source: Processed Data by Researchers (2025)

Capital Structure Analysis

The choice of capital structure as the source of project funding will affect the resulting Net Present Value (NPV) of the project. Funding sources may come from equity and loans, each having its own advantages and disadvantages. In this analysis, all assumptions except for the capital structure are considered constant and unchanged. The discount rate will be adjusted according to changes in the proportion of equity in the capital structure. The maximum loan proportion required by the bank is 70% of the total funding, thus changes in capital structure will be made by varying the equity portion.

Table 16. Project Feasibility Indicators Based on Changes in Capital Structure

Feasibility Indicator	30% Equity	50% Equity	70% Equity	100% Equity
Total Investment	IDR 146,871,600,000	IDR 146,871,600,000	IDR 146,871,600,000	IDR 146,871,600,000
Equity Contribution	IDR 44,061,480,000	IDR 73,435,800,000	IDR 102,810,120,000	IDR 146,871,600,000
Bank Loan	IDR 102,810,120,000	IDR 73,435,800,000	IDR 44,061,480,000	IDR 0

Net Present Value (NPV)	IDR 1,755,958,900	IDR (3,494,657,299)	IDR (8,207,891,737)	IDR (14,398,020,218)
Discount Rate	7.68%	8.39%	9.09%	10.14%
Internal Rate of Return (IRR)	7.91%	7.91%	7.91%	7.91%
Profitability Index (PI)	1.02	0.97	0.92	0.85
Discounted Payback Period (Years)	22.33	24.28	26.69	30.89
Payback Period (Years)	13.38	13.38	13.38	13.38

Source: Processed Data by Researchers (2025)

The analysis of four simulated capital structures reveals a clear relationship between the proportion of debt financing and key financial metrics. Specifically, increasing the share of debt financing results in a higher Net Present Value (NPV), a lower discount rate, an increased profitability index, and a shorter discounted payback period relative to the asset's economic life. This is primarily because the optimal utilization of bank loans, which constitute cheaper capital at an annual interest rate of 8.5% and offer tax-deductible benefits, reduces the Weighted Average Cost of Capital (WACC). In contrast, the cost of equity is higher at 10.14%.

According to the results presented, the capital structure that maximizes NPV consists of 30% equity and 70% debt financing. This structure produces an Internal Rate of Return (IRR) that exceeds the discount rate, a profitability index greater than one, and overall project feasibility. Conversely, capital structures with equity shares of 50%, 70%, and 100% are associated with negative NPVs, IRRs below the discount rate, and profitability indices less than one, indicating that such configurations render the project financially unviable.

Sensitivity Analysis

Sensitivity analysis is employed to identify the dominant factors influencing the financial feasibility of the project, assessed using Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Discounted Payback Period (DPP), and Payback Period (PP). These key factors are subsequently used as adjustment variables in scenario analysis.

The selection of adjustment variables is based on their substantial contribution and significant impact on cash flow composition, namely construction costs, sales percentage, selling price, rental price, and rental occupancy rate. Additionally, adjustments are made for service charge costs. A comprehensive overview of the sensitivity analysis results is presented in Table 18.

Table 17. Sensitivity Analysis (in thousands)

Description		NPV	IRR	PI	PP		DPP	
					Years	Months	Years	Months
Construction Cost								
Increase	10%	(5,041,480)	7.12%	0.96	14	0	24	6
Decrease	5%	12,822,853	9.35%	1.13	12	3	19	2
Sales Percentage								
Increase	0%	6,868,076	8.53%	1.57	12	9	20	9
Decrease	15%	(1,873,705)	7.46%	0.98	13	9	23	5
Rental Percentage								
Increase	0%	6,868,076	8.53%	1.57	12	9	20	9
Decrease	15%	(2,347,458)	7.38%	0.98	13	7	23	8
Selling Price								
Increase	5%	9,492,286	10.18%	1.09	12	6	20	2
Decrease	15%	(1,004,556)	7.57%	0.99	13	7	23	2
Rental Price								
Increase	5%	10,140,623	8.01%	1.10	12	6	20	1
Decrease	15%	(2,949,566)	7.31%	0.97	13	8	24	0
Service								
	5%	6,898,007	8.53%	1.07	12	9	20	9
	20%	6.784.350	9.73%	1.15	11	9	18	4

Source: Processed Data by Researchers (2025)

The results of the sensitivity analysis presented in Table 18 indicate that the service charge is not a dominant factor influencing the financial feasibility of the Yodya Tower Makassar project. Instead, the key determinants affecting financial viability are construction costs, sales percentage, selling price, rental price, and rental occupancy rate. Each of these factors yields a negative Net Present Value (NPV) upon adjustment, with magnitudes as follows: a negative NPV of Rp. 2,059,031 thousand for a 15% increase in construction costs; Rp. 1,240,695 thousand negative NPV for a 25% decrease in sales percentage; Rp. 2,694,033 thousand negative NPV for a 30% decrease in rental occupancy rate; Rp. 96,458 thousand negative NPV for a 25% decrease in selling price; and Rp. 625,702 thousand negative NPV for a 25% decrease in rental price.

Scenario Analysis

The dominant factors identified from the sensitivity analysis are utilized as adjustment variables in the scenario analysis. Typically, sensitivity analysis involves three distinct scenarios: optimistic, normal, and pessimistic. These scenarios provide a framework to evaluate the project's financial performance under varying conditions.

1. Optimistic Scenario

   Based on the calculation results, under the optimistic scenario, the project is financially feasible for implementation. The analysis yields a positive Net Present Value (NPV), an Internal Rate of Return (IRR) of 11.52%, which exceeds the discount rate (WACC), and relatively short investment recovery periods—a Discounted Payback Period (DPP) of 15.6 years and a Payback Period (PP) of 10.7 years. The likelihood of this scenario occurring is assumed to be 25.

Table 18. Optimistic Scenario Analysis

	Variable	Assumption	NPV (IDR)	IRR	PI	DPP (Years)	PP (Years)	Probability	Expected NPV (IDR)
PESSIMISTIC	Construction Cost	-5%	27,554,144,094	11.52%	1.29	15.6	10.7	25%	(1,053,575,340
	Sales Percentage	100%							
	Rental Occupancy Rate	100%							
	Decrease in Selling Price	5%							
	Decrease in Rental Place	5%							

Source: Processed Data by Researchers (2025)

2. Normal Scenario

Based on the calculation results, under the normal scenario, the project remains financially feasible. The analysis shows a positive Net Present Value (NPV), an Internal Rate of Return (IRR) of 7.91%, which is above the discount rate (WACC), and moderate investment recovery periods—a Discounted Payback Period (DPP) of 22.3 years and a Payback Period (PP) of 13.4 years, which is approximately half of the asset's economic life. The probability of this scenario occurring is estimated at 60%.

Table 19. Normal Scenario Analysis

	Variable	Assumption	NPV (IDR)	IRR	PI	DPP (Years)	PP (Years)	Probability	Expected NPV (IDR)
PESSIMISTIC	Construction Cost	+5 %	1,755,958,900	7.91	1.02	22.3	13.4	60%	1,053,575,340
	Sales Percentage	85 %							
	Rental Occupancy Rate	85 %							
	Decrease in Selling Price	5%							
	Decrease in Ren	5%							

	tal Pla ce								

Source: Processed Data by Researchers (2025)

3. Pessimistic Scenario

Based on the calculation results, under the pessimistic scenario, the project is not financially feasible. The analysis produces a negative Net Present Value (NPV), an Internal Rate of Return (IRR) of 5.75%, which is below the discount rate (WACC), and extended investment recovery periods—a Discounted Payback Period (DPP) of 28.8 years, which exceeds the asset's economic life, and a Payback Period (PP) of 15.4 years. The probability of this scenario occurring is estimated at 15%.

Table 20. Pessimistic Scenario Analysis

	Variable	**Assumption**	**NPV (IDR)**	**IRR**	**PI**	**DPP (Years)**	**PP (Years)**	**Probability**	**Expected NPV (IDR)**
PESSIMISTIC	Construction Cost	+5 %	(15,929,742,914)	.75%	.86	8.8	5.4	5%	(2,389,461,437)
	Sales Percentage	85 %							
	Rental Occupancy Rate	85 %							
	Decrease in Selling Price	5%							

	Decrease in Rental Place	5%							

Source: Processed Data by Researchers (2025)

The expected NPV, calculated by incorporating the assigned probabilities of each scenario, results in a positive total value of Rp 2,797,235,517. This indicates that, even when accounting for varying risk conditions, the project remains financially feasible and viable for implementation.

Table 21. Summary of Scenario Analysis Result

Scenario	NPV (IDR)	IRR	PI	DPP (Years)	PP (Years)	Feasibility
Optimistic	27,554,144,094	11.52%	1.29	15.61	10.67	Feasible
Normal	1,755,958,900	7.91%	1.02	22.30	13.38	Feasible
Pessimistic	(15,929,742,914)	5.75%	0.86	28.78	15.35	Not Feasible

Source: Processed Data by Researcher (2025)

CONCLUSION

Based on the capital budgeting analysis using Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Payback Period (PP), and Discounted Payback Period (DPP), with results as follows: NPV of IDR 1,755,958,900, IRR of 7.91%, PI of 1.02, DPP of 22.3 years, and PP of 13.4 years, it is evident that the Yodya Tower Office Building Construction Project, which will be financed through a combination of equity and bank loans, meets the required feasibility parameters (NPV, IRR, PI, PP, and DPP). Therefore, this project is considered financially feasible and recommended for development to enhance the company's value.

Sensitivity analysis identified the dominant factors influencing financial feasibility in the following order: construction costs, sales percentage, rental occupancy rate, rental price, and sales price, whereas service charges were found to have an insignificant impact. These dominant factors were further tested through scenario analysis by applying three conditions—optimistic, normal, and pessimistic. The findings revealed that these five factors are highly sensitive to changes in financial feasibility indicators (NPV, IRR, PI, DPP, and PP). Under the pessimistic scenario, the combination of these factors renders the project financially unfeasible. However, overall, with an expected positive NPV of IDR

2,797,235,517, the Yodya Tower Office Building Project can still be deemed feasible for execution.

Based on the capital structure analysis, the financing scheme of 30% equity and 70% debt yields the most optimal NPV. This is in line with the leveraging concept, where an appropriate debt-to-equity ratio enhances project returns.

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