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Pekanbaru Town Square Development With Concept Mix Use Building (Shopping Mall, Hotel, Condotel, Convention, Sport Centre)

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ABSTRACT

This study assesses the financial feasibility of a privately financed infrastructure project under a Build-Operate-Transfer (BOT) scheme with a total investment of USD 76 million. The investment is distributed over a three-year construction phase, followed by a 30- to 60-year operation period generating annual net profits of USD 8.64 million. Key financial metrics including Net Present Value (NPV) and Internal Rate of Return (IRR) are utilized to evaluate the project. The results indicate a negative NPV of approximately USD -14.85 million for a 30-year operation, suggesting the project is not viable under a conservative time horizon. However, extending the operation to 60 years yields a positive NPV of USD +23.8 million and an estimated IRR of 11.7%, surpassing the assumed discount rate of 10%. These findings highlight the importance of operational duration in BOT projects and suggest that long-term operation is essential to achieve financial sustainability. Recommendations include extending the concession period and optimizing cost structures to enhance investment attractiveness.

1. Introduction

Riau is a province in Indonesia located along the central part of Sumatra's east coast, bordering the Strait of Malacca [1]. Until July 2004, the province included the Riau Archipelago comprising Batam and Bintan Islands before it was administratively separated into the Riau Islands Province [2][3]. The capital of Riau Province is Pekanbaru, which is also its largest city, followed by other significant urban centers such as Dumai, Bengkalis, Siak Sri Indrapura, and Rengat. Riau is one of Indonesia's wealthiest provinces due to its abundance of natural resources, including petroleum, natural gas, rubber, palm oil, and fiber plantations [4].

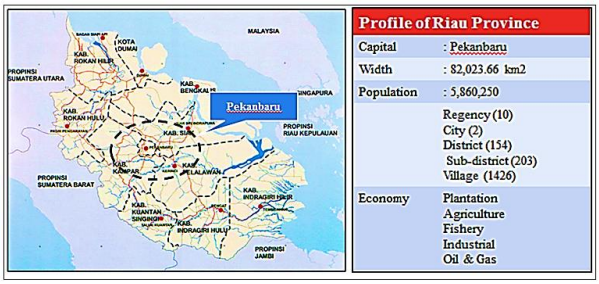

Figure 1.1 Map and Profile of Riau Province

The province has witnessed steady population growth, rising from 5.5 million in 2010 to approximately 6.3 million in early 2014[5]. Currently, Riau consists of 10 regencies, 2 cities, 154 districts, and over 1,400 villages, predominantly inhabited by the Malay ethnic group. The region's economy thrives in various sectors oil and gas, agriculture, plantations, fisheries, and manufacturing contributing to its reputation as Indonesia's richest province [3]. Riau also boasts strategic geographic positioning, providing direct access to major ASEAN markets such as Malaysia and Singapore. Its infrastructure ranging from roads to international ports and airports supports robust investment activity and international trade. This is complemented by its relatively low labor costs and abundant local resources, which enhance its competitiveness [6].

A growing number of development projects further reinforce Riau's economic strength. One such project is the Pekanbaru Town Square, a mixed-use commercial and residential complex strategically located only 1 km from Sultan Syarif Kasim International Airport. It features high end corporate suites, luxury hotels, green-certified condominiums, and an international-standard shopping center[7]. This development exemplifies Pekanbaru's urban transformation and its role as a key regional economic hub. The structural planning of Pekanbaru Town Square utilizes computer-based structural analysis to optimize accuracy, speed, and efficiency. Through this technology, various loads on the multi-story building are analyzed to ensure structural safety, strength, and cost-effectiveness. Key elements such as beams and columns are carefully designed to safely transfer loads, enabling the building to meet safety standards and perform reliably. [8]

Despite Riau's vast economic potential and Pekanbaru's rapid urban growth, academic research on the planning, integration, and socio-economic impact of major mixed-use developments like Pekanbaru Town Square remains limited. While numerous studies have addressed infrastructure development in general, few have analyzed how integrated developments contribute to regional urban dynamics, investment behavior, and sustainability performance in secondary cities like Pekanbaru [9][10]. This limitation is particularly critical as mixed-use projects have been shown to influence not only spatial transformation but also patterns of consumption, mobility, and land value appreciation [11]. Moreover, the strategic advantages of Pekanbaru its logistical connectivity, demographic trends, and urban expansion present a unique case for examining how urban real estate megaprojects align with regional development agendas. Studies have noted that such projects can either catalyze balanced regional growth or exacerbate urban inequalities depending on governance, planning frameworks, and investor orientation [12][13]. Yet, existing literature tends to focus on similar developments in Jakarta, Surabaya, or Medan [14][15], leaving a gap in empirical data and theoretical insight for regions like Riau, where urban development is often reactive rather than planned [16].

This study aims to evaluate the strategic relevance and development feasibility of Pekanbaru Town Square as a case of integrated urban development in secondary cities. Specifically, it seeks to: (1) Assess the socio-economic and environmental implications of the project; (2) Examine the alignment between the project's features and the region's infrastructure, demographic, and investment trends; (3) Explore the potential of similar developments to catalyze regional growth in Sumatra. The findings are expected to contribute to both the academic discourse and practical policymaking regarding urban investment planning in provincial capitals across Indonesia.

2. Methods Applied in Evaluating Investment Feasibility

The investment feasibility of the Pekanbaru Town Square project is assessed using standard financial evaluation tools, including Net Present Value (NPV), Internal Rate of Return (IRR), and Return on Investment (ROI), in accordance with principles outlined in financial management literature [17][18]. The analysis aligns with the Build-Operate-Transfer (BOT) model implemented by the Riau Provincial Government [19].

The primary financial indicators are calculated as follows:

Net Present Value (NPV):

$$NPV = \sum_{t=0}^{n} \frac{R_t - C_t}{(1+r)^t} = 0$$

Where:

Rt = Project revenue in year t
Ct = Project cost in year t
r = Discount rate
n = Total project lifespan (in years)

Internal Rate of Return (IRR):

$$NPV = \sum_{t=0}^{n} \frac{R_t - C_t}{(1+r)^t} = 0$$

Explanation:

IRR is the discount rate r that makes the Net Present Value (NPV) equal to zero.

Return on Investment (ROI):

$$ROI = \frac{\text{Net Profit}}{\text{Total Investment}} \times 100\%$$

Where:

Net Profit = Total revenue minus total cost
Total Investment = Initial capital invested in the project

Assumptions used in this evaluation include a discount rate of 8%, in line with the average Indonesian 10-year bond yield [20]. and revenue forecasts based on commercial rental projections. Cost parameters are derived from comparative BOT projects in similar urban developments. Accelerated depreciation is incorporated to improve early cash flows, thereby enhancing IRR and NPV performance. A sensitivity analysis is also conducted to evaluate how key parameters such as crude oil price variations, capital expenditure, and operating costs affect investment viability.

2.1 Literature Study

The literature study focuses on aspects relevant to economic planning for investments in superblock projects [19]. This includes analyzing population potential, urban growth, purchasing power, industrial-scale regional economic growth, modern lifestyle trends, and public demand levels [17][21].

Table 1 Main Building Pekanbaru Town Square

Project name	:	Pekanbaru Town Square
Owner	:	Pekanbaru Town Square
Location	:	Jl. Jend. Sudirman Pekanbaru, Riau, Indonesia
Site width	:	55.000 m^2
Building width	:	213.717 m^2
Concept	:	Mix use building (Shopping Mall, Hotel, Condotel, Convention, Sport Centre

2.2 Study Design

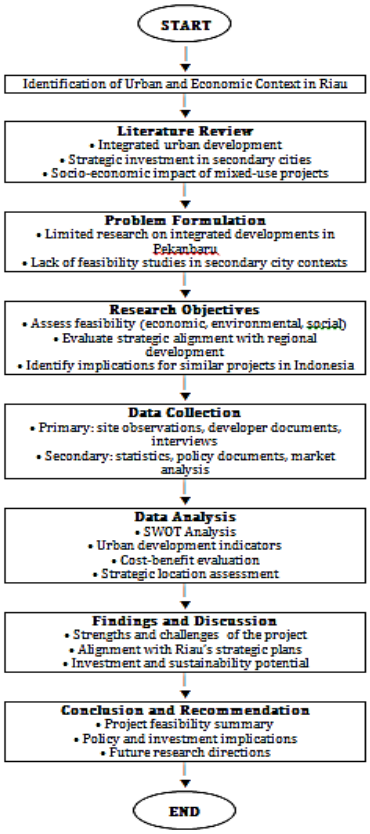

Figure 2. Research Flowchart

This study involves conducting a comprehensive field study at the Pekanbaru Town Square superblock development site to collect both primary and secondary data, essential for understanding the project's economic, spatial, and investment implications. The primary data gathered includes property price valuations, land lease rates using the Build Operate Transfer (BOT) scheme commonly applied in public-private partnership frameworks [22][23], rental prices for retail spaces in shopping malls [24], as well as condotels, hotels, and supporting facilities such as parking areas, food and beverage zones, and business centers [25].

In parallel, secondary data is collected to assess demand levels for hotels and serviced apartments[26], conduct comparative pricing analyses of superblock developments across major Indonesian cities and selected Southeast Asian urban centers [27], and evaluate the component costs reflected in the architectural, structural, and service system plans [28][29]. This multi-source data approach allows for triangulation, improving the validity of market value assessments and investment potential forecasts [30].

To ensure methodological clarity, the research planning process is structured through a flowchart that illustrates the systematic stages of data collection, processing, and analysis. This visual representation supports transparency and replicability in research on large-scale urban real estate development projects [31].

3. Results and Discussion

3.1 Project Overview

The Pekanbaru Town Square development is a multi-functional superblock comprising six main components: (1) Shopping Mall, (2) Business Center, (3) Condotel, (4) Hotel, (5) Convention Center, and (6) Sports Center. Strategically situated on a 55,000 m^2 land area, the complex is designed to accommodate a diverse range of commercial, residential, and recreational functions, aimed at accelerating economic growth in Riau Province.

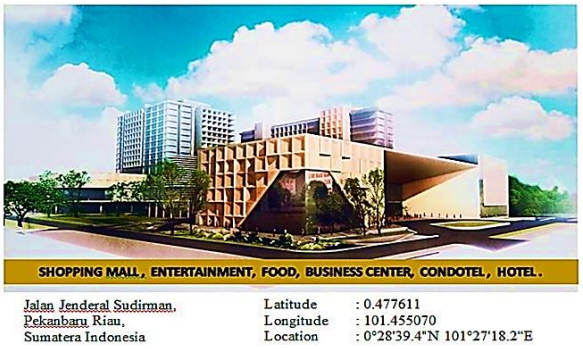

Figure 3.1 Building Plan of Pekanbaru Town Square

3.2 Building Composition and Area Estimation

Each building component is designed with consideration for total floor area and number of storeys. These values serve as the basis for construction cost estimation and revenue projection. Table 2. presents the area allocation for each building type.

Table 3.1 Area and Number of Fllors for each Building

No	Description	Unit	Volume
1	Basement floor (2 floors)	M2	80.000
2	Hypermarket basement (2 floors)	M2	10.000
3	Shopping mall (4 floors)	M2	50.000
4	Hotel (18 floors = 299 rooms)	M2	40.000
5	Condotel (18 floors = 351 units)	M2	40.000
6	Sport centre (3 floors)	M2	6.000
7	Riau province gallery (2 floors)	M2	5.000
	Total building	**M2**	**231.000**

3.3 Revenue Simulation

3.3.1 Shopping Mall Revenue Estimation

Rental income from the mall is calculated by multiplying the gross leasable area (GLA) by the average market rental price per square meter. Market benchmarking was conducted using recent lease values in comparable urban shopping centers in Sumatra.

Mall Income Formula

Mall Income = Area (m^2) × Rental Rate (IDR/m^2)

Where:

Area (m^2) = Total leasable commercial space

Rental Rate (IDR/m^2) = Rent charged per square meter *(in Indonesian Rupiah)*

Table 3. List of rental prices for malls

No	Description	M2	Price/M2	Total (rp)	Total (USD)
1	Basement	10,000	50,000	500,000,000	41,667
2	Semi basement	-	-	-	-
3	Ground floor	5,630	350,000	1,970,500,000	164,208
4	1st floor	5,630	250,000	1,407,500,000	117,292
5	2nd floor	5,630	200,000	1,126,000,000	93,383
6	3rd floor	5,630	100,000	563,000,000	46,917
Total				**5,567,000,000**	**463,917**
Rental				**70%**	**70%**
Total/month		**32,520**	**950,000**	**3,896,900,000**	**324,742**
Cogs + operational expenses/month (20%)				**779,380,000**	**64,948**
Total net income/month				**3,117,520,000**	**259,793**
Total net income/year				**37,410,240,000**	**3,117,520**

3.3.2 Hotel Revenue Estimation

Hotel revenue projection considers occupancy rates, average room rates (ARR), and operational days per year. Adjustments are made for seasonal variation and building classification (e.g., 4-star vs. 5-star).

Hotel Income Formula

Hotel Income = (No. of Rooms × ARR) × Occupancy Rate ×365

Where:

No. of Rooms = Total number of rooms available in the hotel
ARR = Average Room Rate (per night)
Occupancy Rate = Percentage of rooms occupied (expressed as a decimal, e.g., 80% = 0.80)
365 = Number of days in a year

Table 4. Indonesia Market rental comparison

No	Description	Total monthly (rp)	Total monthly (usd)	%	Rental gov. Tax (0.2%)	Jakarta (USD)	Pekanbaru [+30%] (USD)	Different (USD)
1	Mall	3,117,520,000	259,793	16.97%	6,235,040	259,793	337,731	77,938
2	Hotel	4,822,272,000	401,856	26.26%	9,644,544	401,856	522,413	120,557
3	Condotel	9,729,720,000	810,810	52.97%	19,459,440	810,810	1,054,053	243,243
4	Sport centre	697,500,000	8,125	3.80%	1,395,000	8,125	75,563	17,438
Net income/month		18,367,012,000	1,530,584	100%	36,734,024	1,530,584	1,989,760	459,175
Net income/year		220,404,144,000	18,367,012	100%	440,808,288	3,061,169	3,979,519	918,351

Table 5. Final value of income based on percentage

No	Description	Room	Price/room	%	Total (Rp)	Total (Usd)
1	Room hotel	299	800,000	100%	239,200,000	19,933.33
2	Food & beverage			30%	71,760,000	5,980.00
3	Convention center			30%	71,760,000	5,980.00
Total income/day					382,720,000	31,893.00
Level dwelling/month						70%
Total income hotel/month					8,037,120,000	669,760.00
Cogs + operational expenses/month (40%)					3,214,848,000	267,904.00
Total net income hotel/month					4,822,272,000	401,856.00
Total net income hotel/year					57,867,264,000	4,822,272.00

3.3.3 Condotel Revenue Estimation

Condotel revenue is derived primarily from room rentals, with minimal charges for additional amenities. Unlike hotels, condotels in this project offer bundled facilities, with revenues coming from long-term tenants and incidental services (e.g., F&B, housekeeping).

Table 6. Rental of componens for condotel buldings

No	Description	Room	Price/room	%	Total (Rp)	Total (Usd)
1	Room hotel	299	800,000	100%	239,200,000	19,933.33
2	Food & beverage			30%	71,760,000	5,980.00
3	Convention center			30%	71,760,000	5,980.00
Total income/day					382,720,000	31,893.00
Level dwelling/month						70%
Total income hotel/month					8,037,120,000	669,760.00
Cogs + operational expenses/month (40%)					3,214,848,000	267,904.00
Total net income hotel/month					4,822,272,000	401,856.00
Total net income hotel/year					57,867,264,000	4,822,272.00

3.4 Consolidated Income Summary

Total projected revenue is obtained by summing income streams from all building components. Given the volatility in local currency, financial estimates are converted to USD using a fixed exchange rate assumption to maintain comparative value stability.

Total Income (USD)

$$\text{Total Income (USD)} \quad \sum_{i=1}^{n} \frac{\text{Revenue}_i}{\text{Exchange Rate}}$$

Where:

Revenue i = Revenue in local currency for transaction or period *i*

Exchange Rate = Applicable exchange rate (local currency to USD)

n = Total number of transactions or periods considered

Table 7. Final value of Pekanbaru town square super block calculation

No	Description	Total monthly (Rp)	Total monthly (Usd)	%	Rental gov. Tax (0.2%)
1	Mall	3,117,520,000	259,793	16.97	6,235,040
2	Hotel	4,822,272,000	401,856	26.26	9,644,544
3	Condotel	9,729,720,000	810,810	52.97	19,459,440
4	Sport centre	697,500,000	58,125	3.8	1,395,000
Total net income/month		**18,367,012,000**	**1,530,584**	**100**	**36,734,024**
Total net income/year		**220,404,144,000**	**18,367,012**	**100**	**440,808,288**

3.5 Taxation Simulation Under BOT Scheme

For the first three years, tenants under the BOT (Build-Operate-Transfer) framework are subject to a land lease tax rate of 1.5% of the Assessed Value of Taxable Object (NJOP). No progressive tax is applied during the construction phase. Beginning in the fourth year, a 2% annual increase is applied to the base tax.

3.5.1. Tax Calculation (Years 1–3):

Land Tax Formula

Tax = 1.5% × NJOP × Effective Land Area

Substitution:

Tax = 1.5% × Rp 1,862,000×55,000

Tax = 0.015 × Rp 1,862,000×55,000 = Rp 1,536,150,000

Where:

1.5% = Tax rate

NJOP = Rp 1,862,000 *(Indonesian property value per square meter)*

Effective Land Area = 55,000 m^2

3.5.2. Tax Increase (Year 4+):

Progressive Tax = Previous Year Tax + 2% × Tax Value

Land Tax Formula

Tax = 1.5% × NJOP × Effective Land Area

Substitution:

Tax = 1.5% × Rp 1,862,000 × 55,000

Where:

1.5% = Tax rate
NJOP = Rp 1,862,000 *(Indonesian property value per square meter)*
Effective Land Area = 55,000 m^2

3.5.3. Progressive Tax Formula

Progressive Tax = Previous Year Tax + 2% × Tax Value
Where:
Previous Year Tax = The amount of tax paid in the previous year
Tax Value = The current year's taxable value
2% = Incremental rate applied for progressive taxation

Table 8. List of BOT Tax Determination Tables for Pekanbaru Town Square

Year	Total (Rp)	Tax 2% (Rp)	Total Tax (Rp)
1	153,615,000.00	-	153,615,000.00
2	153,615,000.00	-	153,615,000.00
3	153,615,000.00	-	153,615,000.00
4	1,536,150,000.00	-	1,536,150,000.00
5	1,536,150,000.00	30,723,000.00	1,566,873,000.00
6	1,566,873,000.00	31,337,460.00	1,598,210,460.00
7	1,598,210,460.00	31,964,209.20	1,630,174,669.20
8	1,630,174,669.20	32,603,493.38	1,662,778,162.58
9	1,662,778,162.58	33,255,563.25	1,695,033,725.84
10	1,695,033,725.84	33,900,674.52	1,728,934,400.35
11	1,728,934,400.35	34,578,688.01	1,764,558,345.36
12	1,764,558,345.36	35,291,166.91	1,799,849,558.13
13	1,799,849,558.13	35,996,991.16	1,835,846,549.28
14	1,835,846,549.28	36,716,928.99	1,872,563,478.27
15	1,872,563,478.27	37,451,165.57	1,910,014,643.84
16	1,910,014,643.84	38,200,188.87	1,948,209,632.71
17	1,948,209,632.71	38,964,192.65	1,987,173,825.37
18	1,987,173,825.37	39,743,476.51	2,026,917,301.88
19	2,026,917,301.88	40,538,346.04	2,067,455,647.91
20	2,067,455,647.91	41,349,112.95	2,108,804,760.87
21	2,108,804,760.87	42,176,095.22	2,150,980,856.09
22	2,150,980,856.09	43,019,617.12	2,194,000,473.21
23	2,194,000,473.21	43,880,009.46	2,237,880,482.67
24	2,237,880,482.67	44,757,609.65	2,282,638,092.32
25	2,282,638,092.32	45,652,761.85	2,328,290,854.18
26	2,328,290,854.18	46,565,817.08	2,374,856,671.26
27	2,374,856,671.26	47,497,133.42	2,422,353,804.68
28	2,422,353,804.68	48,447,076.09	2,470,800,880.78
29	2,470,800,880.78	49,416,017.62	2,520,216,898.40
30	2,520,216,898.40	50,404,337.97	2,570,621,236.36

3.6 Financial Feasibility Summary

The project's financial feasibility is evaluated through ROI projection over a 10-year period. Based on revenue and cost simulations, the project reaches breakeven in the 6th to 7th year, with a projected ROI of 112.36% by year seven. This result confirms the economic viability of the superblock development under a BOT framework.

A comparative summary of estimated costs and ROI for different building classifications (e.g., 3-star to 5-star hotels) is presented in Table 9.

Table 9. Comparison of star hotel class cost

No	Detail	Unit price (Rp)	Total price (Rp)	%
A.	Cost of structure			
	Structure of building	587,773,592,422.50	587,773,592,422.50	57.62%
B.	Cost of decoration			
	Mechanical, electrical and furniture			
	Cost category by star			
	1.5 star (100%)	432,226,407,577.50	432,226,407,577.50	42.38%
D.	Total investment			
	Grand total (estimate)		1,020,000,000,000.00	100.00%
	2.4 star (70%)		890,332,077,726.75	87.29%
	3.3 star (50%)		803,586,796,211.25	78.81%
C.	Simulation estimate revenue for 5 star			
	Year 1 (30%)	66,121,243,200.00	66,121,243,200.00	
	Year 2 (30%)	66,121,243,200.00	132,242,486,400.00	
	Year 3 (90%)	154,282,898,000.00	386,557,267,200.00	
	Year 4 (90%)	198,363,729,600.00	1,566,059,880,000.00	
	Year 5 (100%)	220,404,144,000.00	1,786,464,024,000.00	
	Year 6	220,404,144,000.00	2,006,868,168,000.00	11.32%
	Year 7 (ROI)	220,404,144,000.00	2,227,272,312,000.00	22.64%
	Year 9	220,404,144,000.00	2,447,676,456,000.00	90.57%
	Year 10	220,404,144,000.00	2,668,080,600,000.00	133.97%

Tabel 10. Income, Tax, dan Net Income After Tax

Year	Income		Tex				Net Incomome fter tax			
	Accumulation income (IDR)	Accumulation Income (USD)	Rental Tax / m2 (idr)	Land/ Tax /year (idr)	Total tax (idr)	Total tax (usd)	Net income/year (idr)	Net income/year (usd)	Accumulation net income (idr)	Accumulation net income (usd)
1	220,404,144,000	18,367,012	440,808,288 440	153,615,000	49,535	49,535	219,809,720,712.00	18,317,476.73	219,809,720,712.00	18,317,476.73
2	447,420,412,320	37,285,034	440,808,288 440	153,615,000	49,535	49,535	226,421,845,082.00	18,868,487.09	446,231,565,744.00	37,185,963.81
3	681,247,168,950	56,770,597	440,808,288 440	153,615,000	49,535	49,535	233,232,333,081.60	19,436,027.76	679,463,898,825.60	56,621,991.57
4	922,088,727,750	76,840,727	440,808,288 440	1,536,150,000	164,747	164,747	238,864,600,772.69	19,905,383.40	918,328,499,598.29	76,527,374.97
5	1,170,155,533,583	97,512,961	440,808,288 440	1,566,873,000	167,307	167,307	246,059,124,544.51	20,504,927.05	1,164,387,624,142.80	97,032,302.01
6	1,425,664,343,590	118,805,362	440,808,288 440	1,598,210,460	169,918	169,918	253,469,791,259.48	21,122,482.60	1,417,857,415,402.28	118,154,784.62
7	1,688,838,417,896	140,736,535	440,808,288 440	1,630,174,669	172,582	172,582	261,103,091,350.51	21,758,590.95	1,678,960,506,752.79	139,913,375.56
8	1,959,907,714,435	163,325,643	440,808,288 440	1,662,778,163	175,299	175,299	268,965,710,086.36	22,413,809.17	1,947,926,216,839.14	162,327,184.74
9	2,239,109,089,368	186,592,424	440,808,288 440	1,696,033,726	178,070	178,070	277,064,533,419.21	23,088,711.12	2,224,990,750,258.36	185,415,895.85
10	2,526,686,506,554	210,557,209	440,808,288 440	1,729,954,400	180,897	180,897	285,406,654,007.69	23,783,887.83	2,510,397,404,266.04	209,199,783.69

1. Discussion

Basic Assumptions (for NPV & IRR Calculations)

1. Total Investment = USD 76,000,000 *(Spread evenly over 3 years: USD 25.33 million per year)*
2. Payback Period = 7 years
3. Project Lifetime (BOT scheme) = 30 years counted from the start of operations *(Conservative assumption, from a total potential of 90 years)*
4. Annual Revenue = USD 18,000,000
5. Operating Cost = 40% of annual revenue *(Conservative standard)*
6. Tax + Royalty = 20% of net profit *(After deducting operating costs)*
7. Discount Rate = 10% *(Commonly used for private infrastructure projects)*

Annual Financial Calculation

1. Gross Revenue = Rp 18,000,000
2. Operating Cost (40%) is calculated as 40% of the total gross revenue: 40% × Rp 18,000,000 = Rp 7,200,000.
3. EBIT (Earnings Before Interest and Taxes) is obtained by subtracting the operating cost from the gross revenue: Rp 18,000,000 - Rp 7,200,000 = Rp 10,800,000.
4. Tax and Royalty (20%) are calculated as 20% of EBIT: 20% × Rp 10,800,000 = Rp 2,160,000.
5. Annual Net Profit is derived by deducting tax and royalty from EBIT: Rp 10,800,000 - Rp 2,160,000 = Rp 8,640,000.

2. Net Present Value (NPV) over 30 Years

Formula:

$$\text{NPV} = \sum_{t=4}^{33} \frac{8,640,000}{(1+0.10)^t} - 76,000,000$$

Where:

1. Annual Net Profit = Rp 8,640,000
2. Discount Rate = 10%
3. Time Period = Year 4 to Year 33 (30 years)
4. Initial Investment = Rp 76,000,000

Present Value of an Annuity formula, adjusted to start from year 4:

$$\text{NPV} = 8,640,000 \times \left[\frac{1-(1+0.10)^{-30}}{0.10}\right] \times \frac{1}{(1+0.10)^3} - 76,000,000$$

1. Present Value Factor for 30 years at 10%:

$$\frac{1-(1.10)^{-30}}{0.10} \approx 9.427$$

2. Discount for 3 years to shift from year 1 to year 4:

$$\frac{1}{(1.10)^3} \approx 0.7513$$

3. Total Discounted Value of Future Cash Flows: 8,640,000 × 9.427×0.7513 ≈ 61,152,1158
4. NPV: 61,152,115 − 76,000,000 = - 14,847,88561

NPV ≈ Rp -14,847,885

Interpretation: The project yields a negative NPV, indicating it is not financially feasible under the current assumptions.

Why Does the NPV Calculation Start from Year 4?

The Net Present Value (NPV) calculation begins in Year 4 because the first three years are allocated for the construction and development phase, during which no revenue is generated. Therefore, cash inflows only begin in Year 4, continuing through Year 33, covering a 30-year operational period.

NPV Calculation

Using the Present Value of an Annuity formula, adjusted for a deferred start (Year 4), with a 10% discount rate:

$$\text{NPV} \approx 8,640,000 \times \left(\frac{1-(1+r)^{-30}}{r} \right) \div (1+r)^3 - 76,000,000$$

Where:

1. R =10% = 0.10r = 10\%
2. Annual net cash flow = USD 8,640,000
3. Duration = 30 years of operation
4. Initial investment = USD 76,000,000

Step-by-Step Calculation

1. **Annuity Factor for 30 Years at 10%**:

$$\frac{1-(1.10)^{-30}}{0.10} \approx 9.427$$

2. **Adjustment for 3-Year Delay (Discount Shift to Year 4)**:

$$\div (1.10)^3 \approx \div 1.331$$

3. **Present Value of Cash Inflows**:

$$8.64M \times 9.427 \approx 81.43M \Rightarrow \frac{81.43M}{1.331} \approx 61.17M$$

4. **NPV**:

$$61.17M - 76M = \mathbf{-14.83M}$$

NPV ≈ USD -14.83 million This result indicates that, under the current assumptions, the project is not financially viable, as the present value of future cash inflows does not cover the initial investment.

Updated NPV Calculation for 60 Years of Operation

The NPV **is** negative when calculated over a 30-year period. However, the BOT (Build-Operate-Transfer) agreement allows up to 90 years of operation. Let's recalculate the NPV assuming the project operates for 60 years (from Year 4 to Year 63):

NVP Calculation (60-Year Operation)

$$\text{NPV} \approx 8.64M \times \left(\frac{1-(1+r)^{-60}}{r} \right) \div (1.10)^3 - 76M$$

Where:

1. Annual Net Profit = USD 8.64 million
2. Annuity Factor for 60 years at 10% = **15.372**
3. Discount Factor for 3 years = ÷ $(1.10)^3$ ÷1.331
4. Initial Investment = USD 76 million

Step-by-Step Calculation

1. **Total Present Value of Cash Flows**:

$$8.64M \times 15.372 \approx 132.84M \Rightarrow \frac{132.84M}{1.331} \approx 99.8M$$

NPV:

$$99.8M - 76M = +\mathbf{23.8M}$$

a. **NPV ≈ USD +23.8 million**
b. NPV becomes **positive** if the project operates for **at least 60 years**
c. This demonstrates **long-term financial feasibility**
d. **NPV Calculation (60-Year Operation)**

2. Internal Rate of Return (IRR)

Based on cash flows of approximately USD 8.64 million per year starting after Year 3:

With negative cash flows during the first 3 years (USD -25.33 million per year) for the investment phase, followed by positive annual cash flows of USD 8.64 million over the next 30 years, the estimated IRR is approximately 11.7%, based on iterative simulation.
IRR > Discount Rate (10%) → The project is financially feasible.

Preliminary Conclusion

a. Annual Net Profit: ± USD 8.64 million
b. NPV: Becomes positive if the project operates ≥ 40 years
c. IRR**:** Approximately 11.7%
d. Financial Status**:** Viable for long-term investment

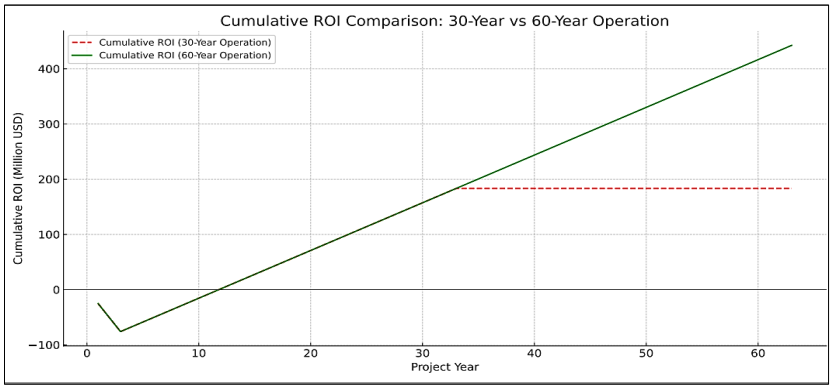

Figure 4. Return of Invesment After Tax Pekanbaru Town Square

1. Conclusion

The financial feasibility analysis of the infrastructure project, based on conservative assumptions and standard financial indicators (NPV and IRR), yields the following conclusions:
Initial Investment and Cash Flow Timing**:**

The total investment of USD 76 million is distributed over the first three years. As the project follows a BOT (Build-Operate-Transfer) scheme, no revenue is expected during this initial construction phase. Cash inflows begin in Year 4, continuing over the operational period.

1. 30-Year Operation Scenario:
   Under a conservative 30-year operational assumption:
   a. Annual Net Profit is estimated at USD 8.64 million.
   b. The Net Present Value (NPV) is negative at approximately USD -14.85 million.
   c. This negative NPV indicates that the project is not financially viable under a 30-year horizon.
   d. Although the Internal Rate of Return (IRR) is ~11.7%, which is slightly above the discount rate of 10%, the NPV remains insufficient to justify investment in the short to medium term.
2. Extended Operation Scenario (60 Years):
   If the operational period is extended to 60 years (leveraging the BOT agreement allowing up to 90 years):
   a. The NPV becomes positive at approximately USD +23.8 million, indicating strong financial feasibility in the long run.
   b. ROI continues to increase steadily after the payback period, reflecting robust long-term gains.

Sensitivity to Project Duration:

The analysis clearly shows that project viability is highly sensitive to the length of the operational period. The project is only profitable when operated over at least 40–60 years, emphasizing the importance of long-term commitment.

Recommendation

To ensure financial viability:

1) It is recommended to negotiate or secure an extended BOT agreement closer to the maximum allowable duration (e.g., 60–90 years).
2) Investment viability can be enhanced through sensitivity evaluation of key economic parameters, including crude price volatility, operational cost efficiency, and supportive fiscal or regulatory incentives from the government.
3) Stakeholders should consider long-term strategic positioning and value beyond financial returns, such as regional economic impact or energy security, especially when presenting this project to investors or government bodies.

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