

Feasibility Study Of PT XYZ's Villa Project In Seminyak, Bali

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Abstract

The tourism industry in Bali, a vital economic pillar, underwent a severe downturn during the COVID-19 pandemic but has since exhibited robust recovery, surpassing pre-pandemic tourist arrival levels. This study evaluates the financial feasibility and associated risks of developing a luxury villa by PT XYZ in Seminyak, targeting the middle-to-upper tourist segment, with an initial investment of IDR 2,109,848,475. Methodologically, the study constructs 20-year financial projections analyzes free cash flow (FCF) and terminal cash flow, and discounts future cash flows using the Weighted Average Cost of Capital (WACC). Feasibility is assessed using capital budgeting techniques, and risk evaluation employs sensitivity analysis and Monte Carlo simulations. Results indicate a positive Net Present Value (NPV) of IDR 1.6 billion, an Internal Rate of Return (IRR) of 19.45%, and a profitability index of 1.80, indicating significant value creation and efficient investment recovery with payback periods of 6.06 years and 9.07 years, respectively. Sensitivity analysis and Monte Carlo simulations identify daily occupancy rates as critical variables, with a low probability (3.8%) of yielding a negative NPV. The study concludes that the project offers substantial returns, recommending strategies such as dynamic pricing, enhancing guest experiences through exclusive amenities, and leveraging Online Travel Agencies (OTAs) for increased visibility and bookings. This research underscores Bali's tourism sector resilience and presents a viable investment opportunity that will contribute to sustained local economic growth. Implementing these recommendations can strengthen financial performance and market presence, ensuring long-term project success.

Keywords: Villa Development, Tourism Recovery, Financial Feasibility, Capital Budgeting, Risk Assessment

A. INTRODUCTION

Bali, an Indonesian island celebrated for its natural beauty and cultural richness, is a pivotal global tourist destination. Tourism has been a cornerstone of Bali's economy, contributing significantly to its Gross Regional Domestic Product (GRDP), amounting to 61% in 2019 (Ministry of Finance of the Republic of Indonesia, 2019). Bali consistently attracted a growing number of domestic and international tourists, as reported by the Badan Pusat Statistik (BPS Provinsi Bali, 2019), with a steady annual increase in tourist arrivals from 2015 to 2019. However, the COVID-19 pandemic severely disrupted global travel patterns from 2020 to 2022, impacting Bali's tourism industry. Accommodations in Bali witnessed a 33% decline at the pandemic's peak, with only 30% recovering by 2022, whereas tourist arrivals showed a faster recovery, reaching 47% by the same year (BPS Provinsi Bali, 2022). This disparity underscores an emerging opportunity in Bali's hospitality sector as tourism rebounds post-pandemic.

PT XYZ, founded in 2012 in Bandung, initially focused on real estate development within its hometown, specializing in acquiring land, developing properties, and selling units for profit. With a successful track record of over 20 residential projects, PT XYZ expanded its scope by acquiring a 125 sqm plot in Seminyak, Bali, in 2023. Seminyak, situated on Bali's west coast, is renowned for its beachfront allure and urban sophistication, featuring trendy restaurants, boutiques, spas, and nightlife venues. Market analyses indicate robust growth prospects in Seminyak's property market. A 2023 report by Knight Frank highlighted a 6% annual increase in average rental yields for luxury villas in Seminyak, driven by strong demand from high-end tourists and investors (Knight Frank, 2023). Moreover, Airbnb's 2023 survey identified Seminyak among Bali's top five most sought-after destinations.

Recognizing the burgeoning demand for upscale accommodations in Seminyak, PT XYZ aims to capitalize on this opportunity by developing a luxury villa targeted at middle-to-upper-class tourists. The project, fully financed through equity totaling IDR 2,109,848,475, represents PT XYZ's first foray into villa construction, necessitating a meticulous assessment of financial feasibility and risk management strategies. PT XYZ will

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conduct a comprehensive financial feasibility study to ascertain the project's viability, providing analytical tools and recommendations crucial for informed decision-making (Jebrin, 2017). This study aims to evaluate the financial performance potential of the villa project, ensuring that it generates adequate returns to cover capital costs and aligns with strategic objectives (Bause et al., 2014). Additionally, a thorough risk assessment will identify and mitigate potential risks associated with the project, which is essential for safeguarding investments and maximizing returns in Bali's evolving tourism landscape.

B. RESEARCH METHODS

Data for this study were collected from both primary and secondary sources. Primary data were gathered through semi-structured interviews with key stakeholders involved in PT XYZ's villa project, including the PT XYZ owner, the contractor managing the project, and local house cleaners in Bali. Semi-structured interviews were selected for their flexibility in exploring key topics while ensuring consistency across all interviews. A total of 7 semi-structured interviews were conducted: 5 with the PT XYZ owner, 1 with the contractor, and 1 with a house cleaner. In addition to primary data, extensive secondary data were used to support the feasibility study of PT XYZ's villa project. Secondary data sources included Bali tourism trends obtained from government statistics (Badan Pusat Statistik Provinsi Bali) and scholarly articles (such as those from the Indonesia Tourism Journal). These sources provided insights into tourist arrivals, accommodation numbers, and seasonal trends in Bali. Furthermore, occupancy rates in Seminyak were analyzed using data from AirDNA, an online analytics platform specializing in short-term rental market analytics.

Daily rental rates for similar accommodations in Seminyak were sourced from Airbnb, which was crucial in benchmarking PT XYZ's pricing strategy. Operational expenditures (OPEX) and capital expenditures (CAPEX), covering utilities, cleaning, maintenance, amenities, and furniture expenses, were sourced from reliable online platforms. Indonesia's housing and utilities inflation rate data were sourced from national economic databases, while financial metrics such as the risk-free rate, beta values, and market return rates were integrated from reputable Indonesian financial databases. These metrics were essential for calculating the cost of equity using the Capital Asset Pricing Model (CAPM).

In order to mitigate data invalidity and bias, several strategies were employed. For primary data, efforts focused on selecting diverse stakeholders to provide different perspectives related to the villa project. Standardized interview protocols were used to maintain consistency and reduce interviewer bias. Peer debriefing and member checking were also utilized to validate interpretations and ensure the accuracy of findings. For secondary data, validation involved cross-referencing information from multiple sources to verify consistency and reliability. Critical appraisal techniques were applied to assess the credibility and relevance of each source, ensuring that only trustworthy data informed the study's conclusions. By combining these validation methods and bias mitigation strategies, the study upheld the integrity and validity of both primary and secondary data, providing a robust foundation for analyzing the feasibility of PT XYZ's villa project.

The data analysis process for the feasibility study comprised five stages. First, 20-year pro forma financial statements were constructed, including an income statement, balance sheet, and statement of cash flows, based on assumptions derived from primary and secondary data. Revenue projections were meticulously calculated based on sales quantity (nights rented) multiplied by seasonal daily rental rates. The maximum annual occupancy rate of 74% was sourced from AirDNA, with expectations of reaching its peak in the sixth year of operation following an 11% annual growth rate from year 1 to year 6, mirroring historical increases in tourist arrivals as recorded by Badan Pusat Statistik Provinsi Bali (BPS) from 2015 to 2019. Monthly occupancy rates were computed using a weighted average approach based on 5-year tourist arrival data from BPS, reflecting seasonal variations and aiming for an annual average that aligns with the overall occupancy rate.

Daily rates for each of the five seasons (1st Off-Peak Season, 1st Shoulder Season, Peak Season, 2nd Shoulder Season, and 2nd Off-Peak Season) were derived from an analysis of daily rates observed across ten comparable properties in Seminyak, as referenced in (Maulana, 2020). These rates were adjusted annually to account for economic changes, guided by Indonesia's 5-year average housing and utilities inflation rate of 3.06%. Operating expenses were meticulously detailed to encompass various aspects crucial for villa operations. Cleaning expenses, for instance, were estimated at Rp75,000 per session, adjusted annually to reflect inflation. Sanitation expenses, set at Rp150,000 monthly, covered dumpster collection to maintain property cleanliness. Utility expenses were categorized into variable costs (electricity, water, gas) and fixed costs (Wi-Fi), with variable costs calculated per night under full occupancy and adjusted annually for Indonesia's housing and utilities

inflation. Maintenance expenses, including building and furniture maintenance (3% of initial value annually), pool maintenance, and amenities upkeep, increased by 5% annually to account for inflation based on PT XYZ's experience in property management.

Service expenses, equivalent to 3% of villa revenue, encompassed costs associated with Airbnb services, such as customer support, digital marketing through platforms like Google and social media, and property insurance. A one-time marketing expense of Rp12,000,000 covered professional photography services to enhance the villa's listing attractiveness on Airbnb. Land and building tax expenses adhered to legal requirements stipulated in Law Number 12 of 1985 concerning Land and Building Tax, providing fixed annual operational costs. Depreciation followed the straight-line method with no salvage value, aligning with the asset lifespans outlined in Regulation of the Minister of Finance of the Republic of Indonesia Number 72 of 2023, detailed comprehensively in the appendices. Other income projections were based on gains from the sale of used assets like furniture and amenities, adjusted annually based on Indonesia's 5-year average housing and utilities inflation rate to maintain accuracy relative to market conditions. Tax expenses were computed under Indonesian Income Tax Law No. 36 Year 2008, applying a 10% rate to gross rental income under Article 21 and a 2% rate for income from the sale of used assets under PPh Pasal 23. These detailed assumptions formed the foundation for constructing PT XYZ's villa project income statement, ensuring comprehensive consideration of revenue streams, operational costs, asset management, and tax obligations in the feasibility study.

Balance sheet assumptions for PT XYZ's villa project included current assets such as excess cash, calculated from operational, investing, and financing cash flows after deducting required reserves set at 30% of revenue to cover operating expenses, benchmarked against Hotel Sahid Jaya Internasional (SHID). Accounts receivable reflected income realized upon guest checkout via Airbnb, assuming an average stay of 3 days based on data from Horwath HTL (2024). Fixed assets comprised land valued at the initial investment and not subject to Depreciation, and gross fixed assets encompassing the building, furniture, and amenities. Adjustments to gross fixed assets accounted for additions and disposals based on current market prices, annually adjusted for Indonesia's 5-year average housing and utilities inflation rate of 3.06%. Accumulated Depreciation tracked total recorded Depreciation against fixed assets, adjusted for disposals. Current liabilities included accrued expenses for utilities incurred but not billed by the balance sheet date, expected to be invoiced in subsequent months, and income tax payable reflecting accrued tax liabilities from the previous year. Long-term liabilities were absent as the project was financed entirely through equity, with common stock issued to investors in exchange for capital injection, alongside retained earnings accumulating net income after tax as detailed in the pro forma income statement. The statement of cash flows was prepared based on the income statement and balance sheet interpretation.

Secondly, capital budgeting cash flows were calculated by determining Free Cash Flow (FCF) through Operating Cash Flow (OCF), Net Fixed Asset Investment (NFAI), and Net Current Asset Investment (NCAI) (Gitman & Zutter, 2015). Terminal cash flow using liquidation value was also calculated at the project end to reflect the total project value using several assumptions. The land would be sold at its initial price, adjusted annually by 1.15% based on Bali's 5-year average residential property inflation rate from 2015 to 2019. The building would be sold at 10% of its initial value, informed by insights from PT XYZ's experienced property manager. Furniture and amenities would be sold at current market prices for second-hand assets, adjusted annually for Indonesia's 5-year average housing and utilities inflation rate of 3.06%. Taxes on asset sales would be levied at 2% for used assets and 2.5% for land/buildings, per Indonesian Income Tax Law No. 36 Year 2008. All accounts receivable would be fully collected through direct Airbnb payments, while accrued expenses and income tax payable would be settled at the time of liquidation. Additionally, liquidation costs were estimated at 1% of the total liquidation value, covering legal and administrative expenses based on PT XYZ's property management experience.

Thirdly, the cost of capital was calculated using the Weighted Average Cost of Capital (WACC). Since PT XYZ relied solely on equity, the Capital Asset Pricing Model (CAPM) was applied to determine the cost of equity. Fourthly, the project's feasibility was evaluated using capital budgeting techniques such as Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Payback Period, and Discounted Payback Period, with all calculations performed using Excel. Net Present Value (NPV) calculations were executed using Excel's NPV function, which summed the present value of all cash flows, including initial investments and future revenues discounted at a specified rate. The discount rate and the series of cash flows over time were input in Excel to compute NPV. Internal Rate of Return (IRR) was determined through Excel's IRR function, identifying the discount rate that equated the NPV of cash flows to zero. Profitability Index (PI) was computed as the ratio of

the present value of cash inflows to the initial investment, employing Excel formulas for present value calculations. The Payback Period was determined manually or by analyzing cumulative cash flows until they covered the initial investment. Like the Payback Period, the Discounted Payback Period accounted for discounted cash flows using a specified discount rate. In Excel, cumulative cash flows were adjusted by discounting them with the discount rate and determining when the discounted cumulative total equaled or exceeded the initial investment.

Finally, risk assessment was conducted through sensitivity analysis and Monte Carlo simulation of 1,000 trials. Sensitivity analysis identified critical variables (risks) affecting NPV by testing the effect of varying certain variables on NPV through adjustments of $\pm 10\%$. Variables selected for sensitivity analysis included Daily Rate, Occupancy Rate, Housing and Utilities Inflation Rate, Corporate Tax Rate, Maintenance Expense, Utilities Expense, Cleaning Expense, Service Expense, Maintenance Expense Inflation Rate, Residential Property Inflation Rate, Land and Building Tax, Sanitation Expense, Marketing Expense, Building Liquidation Value, and Liquidation Cost. These variables were chosen based on their potential to fluctuate and influence project profitability. Monte Carlo's analysis for this study focused on variables most sensitive to project financial outcomes, particularly affecting net present value (NPV), as determined in the sensitivity analysis. Each variable underwent a normality test to confirm its distribution suitability before simulation. Parameters such as mean and standard deviation were assigned based on historical data. The Crystal Ball add-in in Excel conducted 1,000 trials, generating random values from specified distributions for these variables. Results from each simulation iteration were integrated into the project's financial model to compute Net Present Value (NPV).

C. RESULTS AND ANALYSIS

Project Overview

PT XYZ, established in 2012, operates in the real estate sector, primarily focusing on land acquisition, residential development, and sales, initially centered in Bandung. In 2023, PT XYZ expanded its operations to Seminyak, Bali, marking its first venture into villa development amidst a rising trend in tourist arrivals and demand for accommodations outpacing supply recovery. Bali has seen a consistent 11% annual growth in tourist arrivals from 2015 to 2019, positioning it as a premier destination. PT XYZ aims to capitalize on this growth by developing a villa marketed through Airbnb, targeting tourists seeking unique and personalized lodging experiences. The project requires an initial investment of approximately IDR 2.1 billion, covering land acquisition, building construction, and furnishing.

Located strategically on the East side of Seminyak, Kuta, Badung Regency, Bali Province, the region is renowned for its upscale amenities, including beaches, beach clubs, and fine dining, making it a sought-after destination for tourists seeking leisure and cultural experiences. According to (BukitVista, 2024), Seminyak consistently attracts tourists based on online review heatmaps from OTAs. Before construction, PT XYZ conducted market research using Segmenting, Targeting, and Positioning (STP) strategies. The villa targets international and domestic tourists, particularly middle to high-income vacationers aged 25 to 60, including couples, families, and small groups. The villa caters to travelers valuing privacy, convenient access to local attractions, and elegant accommodations reflecting Balinese culture. Positioned as a luxury retreat, PT XYZ's villa features three fully furnished bedrooms, three bathrooms, a private pool, a kitchen, and a carport. The design blends modern amenities with Balinese architecture, offering tranquility and proximity to Seminyak's attractions. PT XYZ aims to meet the growing demand for high-end accommodations in Bali by delivering a distinctive and luxurious villa experience.

Stage 1 – Pro Forma Financial Statements Construction

The construction of pro forma financial statements—comprising the income statement, balance sheet, and statement of cash flows—is crucial for capital budgeting. The assumptions for each account are based on interviews with PT XYZ's owner, project contractors, experts, and reliable online sources. These assumptions include revenue, calculated by multiplying monthly sales by seasonal daily rates. The occupancy rate derived from AirDNA data for properties in Seminyak reached a maximum of 74% in the sixth year, with annual growth reflecting tourist arrival trends. Sales quantity is determined by multiplying monthly occupancy rates by the number of days in each month, while daily rates sourced from 10 similar properties in Airbnb are adjusted annually based on a five-year average inflation rate of 3.06%. Operating expenses include cleaning, sanitation, and utility expenses adjusted annually based on the inflation rate and maintenance expenses adjusted annually by

5% based on PT XYZ's experience in property management. Service expenses amount to 3% of revenue for Airbnb-related services, with a one-time marketing expense for professional photography and taxes and Depreciation calculated per relevant Indonesian laws using the straight-line method.

Balance sheet assumptions include assets such as cash, accounts receivable aligned with Airbnb's payment process, which is paid when the guests check out, and fixed assets like land, buildings, and furniture. PT XYZ has no long-term liabilities as the project is financed entirely by equity, reflecting the invested capital and accumulated retained earnings. Based on these assumptions, yearly pro forma financial statements were constructed, showing initial revenue growth driven by increased occupancy and rising daily rates, with steady growth from year six onwards. Operating expenses initially spike due to marketing costs, followed by variable cost increases correlated with occupancy, and stabilize due to inflationary pressures. Net income shows a sharp initial increase due to occupancy growth, with significant spikes in years 5, 10, and 15 due to second-hand asset sales. These projections provide a comprehensive overview of PT XYZ's financial outlook based on detailed and realistic assumptions.

Stage 2 – Capital Budgeting Cash Flow Calculation

Two components of capital budgeting cash flow need to be calculated, Free Cash Flow (FCF) and terminal cash flow, to depict the capital budgeting cash flow. Free Cash Flow (FCF) can be calculated based on the pro forma financial statements prepared in the previous stage. The equation for Free Cash Flow can be seen in the equations below.

Equation 1. Free Cash Flow:

$$FCF = \text{Operating Cash Flow (OCF)} - \text{Net fixed asset investment (NFAI)} - \text{Net current asset investment (NCAI)}$$

Equation 2. Operating Cash Flow

$$OCF = [\text{EBIT} \times (1 - T)] + \text{Depreciation}$$

Equation 3. Net Fixed Asset Investment

$$NFAI = \text{Change in net fixed assets} + \text{Depreciation}$$

Equation 4. Net Current Asset Investment

$$NCAI = \text{Change in current assets} - \text{Change in (accounts payable + accruals)}$$

The calculation of free cash flow utilizes data from the prepared pro forma financial statements. The calculation of the total cash flow can be seen in the table below.

Table 1. Total Cash Flow Calculation

Year	Operating Cash Flow	Net Fixed Asset Investment	Net Current Asset Investment	Free Cash Flow	Terminal Cash Flow	Total Cash Flow
	(1)	(2)	(3)	(4) = (1) - (2) - (3)	(5)	(6) = (4) + (5)
0	Rp -	Rp 2,109,848,475	Rp -	Rp (2,109,848,475)	Rp -	Rp (2,109,848,475)
1	Rp 254,918,431	Rp -	Rp 88,647,853	Rp 166,270,578	Rp -	Rp 166,270,578
2	Rp 310,251,718	Rp -	Rp 17,877,767	Rp 292,373,951	Rp -	Rp 292,373,951
3	Rp 360,031,198	Rp -	Rp 14,697,728	Rp 345,333,470	Rp -	Rp 345,333,470
4	Rp 417,195,111	Rp -	Rp 16,823,811	Rp 400,371,300	Rp -	Rp 400,371,300
5	Rp 495,851,456	Rp 142,250,555	Rp 18,976,418	Rp 334,624,482	Rp -	Rp 334,624,482
6	Rp 557,363,967	Rp -	Rp 22,323,189	Rp 535,040,778	Rp -	Rp 535,040,778
7	Rp 573,551,389	Rp -	Rp 5,494,275	Rp 568,057,114	Rp -	Rp 568,057,114
8	Rp 590,184,471	Rp -	Rp 5,662,592	Rp 584,521,879	Rp -	Rp 584,521,879
9	Rp 607,274,353	Rp -	Rp 5,836,065	Rp 601,438,289	Rp -	Rp 601,438,289
10	Rp 644,377,367	Rp 182,899,721	Rp 5,593,972	Rp 455,883,674	Rp -	Rp 455,883,674
11	Rp 641,738,128	Rp -	Rp 6,619,996	Rp 635,118,132	Rp -	Rp 635,118,132
12	Rp 660,210,814	Rp -	Rp 6,389,026	Rp 653,821,788	Rp -	Rp 653,821,788
13	Rp 679,184,193	Rp -	Rp 6,584,753	Rp 672,599,440	Rp -	Rp 672,599,440
14	Rp 698,670,343	Rp -	Rp 6,786,477	Rp 691,883,866	Rp -	Rp 691,883,866
15	Rp 735,688,883	Rp 192,354,577	Rp 6,614,637	Rp 536,719,669	Rp -	Rp 536,719,669
16	Rp 737,550,213	Rp -	Rp 7,588,396	Rp 729,961,818	Rp -	Rp 729,961,818
17	Rp 758,565,197	Rp -	Rp 7,429,489	Rp 751,135,708	Rp -	Rp 751,135,708

Year	Operating Cash Flow	Net Fixed Asset Investment	Net Current Asset Investment	Free Cash Flow	Terminal Cash Flow	Total Cash Flow
18	Rp 780,139,111	Rp -	Rp 7,657,091	Rp 772,482,020	Rp -	Rp 772,482,020
19	Rp 802,284,835	Rp -	Rp 7,891,665	Rp 794,393,170	Rp -	Rp 794,393,170
20	Rp 825,015,432	Rp -	Rp 8,133,426	Rp 816,882,006	Rp 1,784,951,528	Rp 2,601,833,534

Sources: Research data, 2024

Stage 3 – The Cost of Capital Calculation

The author uses the Weighted Average Cost of Capital (WACC) to calculate the cost of capital. Since the project is fully financed by equity, WACC equals the cost of equity. The Capital Asset Pricing Model (CAPM) is used to calculate the cost of equity. PT XYZ operates in the real estate industry, especially in operations and services. Given that PT Bukit Uluwatu Villa Tbk (BUVA) is not representative due to stagnant stock prices, the author uses average levered beta data from 57 real estate companies in emerging markets in 2024 collected by Damodaran, which consists of companies operating in the real estate industry (operations and service). The unlevered beta calculation is shown below.

Table 2. Unlevered Beta Calculation

Levered Beta	D/E Ratio	Tax Rate	Unlevered Beta
0.86	75.96%	13.30%	0.55

Sources: Research data, 2024

Since the project is financed by equity, the levered beta equals the unlevered beta. Using a 20-year project lifespan, the risk-free rate is the 20-year Indonesia Government Bond yield of 7.09%. The 20-year average market return is the JKSE return of 15.13%. Using the JKSE return of 15.13% as the market return rate, it reflects the historical average return of the Indonesian stock market, providing a benchmark for expected returns from investing in equities in Indonesia. Based on this data, the project's Weighted Average Cost of Capital (WACC) is 11.52%.

Stage 4 – Feasibility Analysis

After having the capital budgeting cash flow and the cost of capital, a feasibility analysis using capital budgeting techniques can be conducted. The author uses Excel for all capital budgeting techniques calculation. The feasibility analysis result can be seen in the table below.

Table 3. Capital Budgeting Result

Capital Budgeting Techniques	Result	Decision Criteria	Conclusion
Net Present Value	Rp 1,677,421,081	Positive	Feasible
Internal Rate of Return	19.45%	> WACC (11.52%)	Feasible
Profitability Index	1.80	> 1.0	Feasible
Payback Period	6.06	< 20 years (project's useful life)	Feasible
Discounted Payback Period	9.07	< 20 years (project's useful life)	Feasible

Sources: Research data, 2024

The decision criterion for NPV is that it should be positive. A positive NPV indicates that the project's expected earnings, when discounted at the Weighted Average Cost of Capital (WACC), exceed the initial investment, thereby adding value to the company. The IRR decision criterion must be greater than the WACC. This comparison ensures that the project's return surpasses its cost of capital. The criterion for PI is that it should be greater than 1.0. A PI above 1.0 suggests that the present value of future cash flows exceeds the initial investment, demonstrating profitability. The payback period and discounted payback period decision criterion require it to be less than the project's useful life of 20 years.

Based on the table above, the project has a Net Present Value (NPV) of IDR 1,677,421,081, an Internal Rate of Return (IRR) of 19.45%, a Profitability Index (PI) of 1.80, a Payback Period (PP) of 6.06 years, and a Discounted Payback Period (DPP) of 9.07 years. A positive NPV suggests the project will generate more value than the initial investment. An IRR greater than the WACC indicates that the project's return exceeds the minimum return required by investors or the cost of capital. A PI greater than 1.0 shows that the project is profitable. A Payback Period and Discounted Payback Period less than the project's useful life shows the project's

ability to generate sufficient cash flow to cover the initial investment within the project's useful life. Since the capital budgeting results of the project meet all the decision criteria, the project is considered feasible.

Stage 5 – Risk Assessment

Based on the results in the previous stage, PT XYZ's villa project in Seminyak is feasible to execute. However, many risks can happen in the future that might affect the feasibility of the project. In assessing the risk of the project, the author uses sensitivity analysis and Monte Carlo simulation.

1. Sensitivity Analysis

Sensitivity analysis identifies variables significantly impacting the project's Net Present Value (NPV). All variables that have the potential to fluctuate and influence project profitability are tested with a $\pm 10\%$ swing input. The analysis reveals that daily and occupancy rates are the most sensitive variables affecting NPV.

Table 4. Sensitivity Analysis Result

Input Variable	Swing of Input		Swing of NPV	
	Downside	Upside		
Daily Rate	-10%	10%	-28.23%	28.23%
Occupancy Rate	-10%	10%	-26.10%	26.10%
Housing and Utilities Inflation Rate	-10%	10%	-5.43%	5.43%
Corporate Tax Rate	-10%	10%	3.03%	-3.03%
Maintenance Expense	-10%	10%	2.68%	-2.68%
Utilities Expense	-10%	10%	1.31%	-1.31%
Cleaning Expense	-10%	10%	1.03%	-1.03%
Service Expense	-10%	10%	1.01%	-1.01%
Maintenance Expense Inflation Rate	-10%	10%	0.95%	-0.95%
Residential Property Inflation Rate	-10%	10%	-0.23%	0.23%
Land and Building Tax	-10%	10%	0.18%	-0.18%
Sanitation Expense	-10%	10%	0.10%	-0.10%
Marketing Expense	-10%	10%	0.07%	-0.07%
Building Liquidation Value	-10%	10%	-0.04%	0.04%
Liquidation Cost	-10%	10%	-0.01%	0.01%

Sources: Research data, 2024

The sensitivity analysis identified the daily and occupancy rates as the most sensitive variables in the villa project. These variables are classified as sensitive because a $\pm 10\%$ change in either results in a greater NPV swing than other variables. PT XYZ needs to mitigate the risks associated with these variables. To illustrate the sensitivity analysis more clearly, the results are visualized using a Tornado chart.

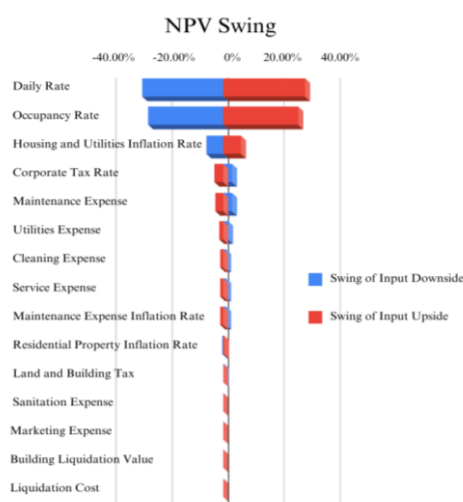


Figure 1. Tornado Chart of Sensitivity Analysis Result

Sources: Research data, 2024

2. Monte Carlo Simulation

After the sensitive variables have been identified, these variables will be used as the inputs in Monte Carlo simulation. The parameters can be seen in the table below.

Table 5. Monte Carlo Simulation Variables

Variable	Parameter		Description
	Mean	StDev	
Occupancy Rate	Mean	74%	Based on similar properties in Seminyak data sourced from AirDNA (2024).
	StDev	9.63%	
Daily rate (1 st Off Peak Season)	Mean	Rp 2,410,751	Data was sourced from Airbnb (2025) based on ten properties similar to Seminyak.
	StDev	Rp 271,464	
Daily rate (1 st Shoulder Season)	Mean	Rp 2,421,491	
	StDev	Rp 277,160	
Daily Rate (Peak Season)	Mean	Rp 2,461,910	
	StDev	Rp 315,238	
Daily rate (2 nd Shoulder Season)	Mean	Rp 2,435,346	
	StDev	Rp 299,473	
Daily rate (2 nd Off Peak Season)	Mean	Rp 2,518,755	
	StDev	Rp 359,557	

Sources: Research data, 2024

The author conducts a Monte Carlo simulation with 1,000 trials to evaluate the impact of uncertainties in the occupancy rate and daily rate on the project's Net Present Value (NPV) using the parameters above. The results of the Monte Carlo simulation can be seen in the figure and table below.

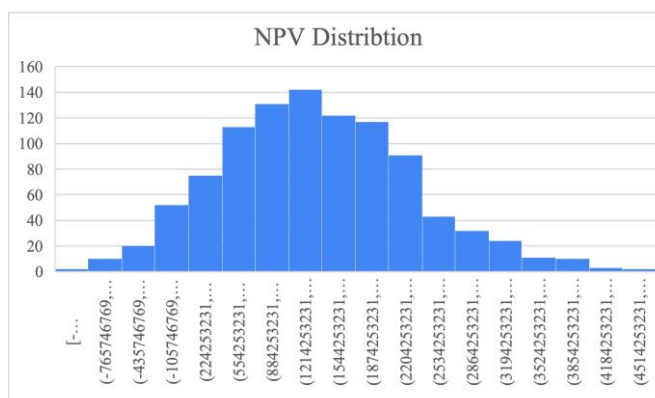


Figure 2. NPV Distribution

Sources: Research data, 2024

Table 6. Monte Carlo Simulation Result

Mean	Rp1,542,211,016
Max	Rp4,527,656,613
Min	Rp(923.450.020)
Std. Deviation	Rp945,009,441
Probability of NPV < 0	3.8%

Sources: Research data, 2024

The project is expected to generate a positive NPV of approximately IDR 1.54 billion based on the results. The maximum NPV observed in the simulation is approximately IDR 4.52 billion. This value represents the best-case scenario among the 1000 trials. The minimum NPV observed is approximately IDR -923 million. This value represents the worst-case scenario among the 1000 trials. The standard deviation of the NPV is approximately IDR 945 million. It indicates the variability of the NPV outcomes around the mean. The probability that the NPV will be negative is 3.8%. A probability of 3.8% shows that there is a very low chance of the project generating a negative NPV.

CONCLUSION

PT XYZ plans to develop a luxury villa in Seminyak, Bali, driven by the sustained growth in tourist arrivals and the slower recovery of accommodations compared to demand. The project requires an initial investment of IDR 2,109,848,475 to establish a villa on a 125 square meter land area with a building area of 140 square meters. The villa aims to provide upscale accommodations in Seminyak, one of Bali's premier destinations, featuring three bedrooms, three bathrooms, a kitchen, and a private pool. A feasibility analysis is crucial to assess the financial viability of the project. The feasibility of PT XYZ's villa project in Seminyak is evaluated using capital budgeting techniques, including Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Payback Period (PP), and Discounted Payback Period. The project exhibits a positive NPV of approximately IDR 1.6 billion, indicating financial feasibility. The project is also financially viable, with an IRR of 19.45%, surpassing the WACC. A PI of 1.80 reflects a return greater than the initial investment, supporting the project's feasibility. The Payback Period of 6.06 years and Discounted Payback Period of 9.07 years both fall within the villa's 20-year lifespan, affirming feasibility based on these metrics.

Furthermore, sensitivity analysis and Monte Carlo simulation were used to conduct a comprehensive risk assessment. Sensitivity analysis identified daily and occupancy rates as critical factors affecting NPV, highlighting the need for risk mitigation strategies. Monte Carlo simulation indicated a low probability (3.8%) of generating a negative NPV, classifying the project as promising. Based on these findings, the author recommends practical steps for PT XYZ to optimize revenue and occupancy rates. Firstly, implementing Airbnb's Smart Pricing feature can maximize revenue by aligning pricing with market demand and seasonality. Setup and registration can be completed within one month, with ongoing adjustments based on market dynamics. Challenges include maintaining consistent pricing accuracy and managing guest expectations.

Secondly, enhancing the guest experience through high-quality amenities, cleanliness standards, and personalized services is crucial. Implementing a feedback mechanism and training staff to uphold service excellence are recommended within three months, with continuous improvement based on guest feedback. Challenges may include maintaining service consistency and timely feedback management. Lastly, diversifying distribution by listing the villa on multiple OTAs such as Booking.com, Expedia, and Agoda can broaden visibility and attract a wider audience. Setting up and managing listings across platforms should be completed within two months, with ongoing updates to ensure availability accuracy. Challenges include coordinating bookings and maintaining listing consistency. By executing these steps and addressing associated challenges, PT XYZ can enhance revenue potential, elevate guest satisfaction, and optimize occupancy rates for its villa in Seminyak.

REFERENCES

- Ahmed, F., Rahman, M. U., Rehman, H. M., Imran, M., Dunay, A., & Hossain, M. B. (2024). Corporate capital structure effects on corporate performance pursuing a strategy of innovation in manufacturing companies. *Heliyon*. Doi: <https://doi.org/10.1016/j.heliyon.2024.e24677>.
- Anand, M. (2002). Corporate finance practices in India: A survey. *Vikalpa: The Journal for Decision Makers*.
- Badan Pusat Statistik Provinsi Bali. (2024). Banyaknya Wisatawan Mancanegara Bulanan ke Bali Menurut Pintu Masuk (Orang), 2023. <https://bali.bps.go.id/indicator/16/106/2/banyaknya-wisatawan-mancanegara-bulanan-ke-bali-menurut-pintu-masuk.html>.
- Badan Pusat Statistik Provinsi Bali. (2024). Number of Domestic Visitor to Bali by Month, 2004-2023. <https://bali.bps.go.id/statictable/2018/02/09/29/kunjungan-wisatawan-domestik-ke-bali-per-bulan-2004-2018.html>.
- Badan Pusat Statistik Provinsi Bali. (2022). Banyaknya Tempat Tidur pada Hotel Non Bintang dan Akomodasi Lainnya Menurut Kelompok Kamar dan Kabupaten/Kota di Provinsi Bali 2020-2022. <https://bali.bps.go.id/indicator/16/313/1/jumlah-tempat-tidur-pada-hotel-non-bintang-dan-akomodasi-lainnya-menurut-kelompok-kamar-dan-kabupaten-kota-di-provinsi-bali.html>.

- Badan Pusat Statistik Provinsi Bali. (2022). Banyaknya Kamar pada Hotel Bintang Menurut Kelas dan Kabupaten/Kota di Provinsi Bali 2020-2022. <https://bali.bps.go.id/indicator/16/223/1/banyaknya-kamar-pada-hotel-bintang-menurut-kelas-dan-kabupaten-kota-di-provinsi-bali.html>.
- Bank Indonesia. (2019). Survei Harga Properti Residential. https://www.bi.go.id/id/publikasi/laporan/Documents/SHPR_Tw1_2019.pdf
- Batra, R., & Verma, S. (2014). An Empirical Insight into Different Stages of Capital Budgeting. *Global Business Review*. Doi: <https://doi.org/10.1177/0972150914523588>.
- Bodenhorn, D. (1964). A Cash-flow Concept of Profit. *The Journal of Finance*. doi: <https://doi.org/10.2307/2977477>.
- Bowen, D. J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Linnan, L., Weiner, D., Bakken, S., Kaplan, C. P., Squiers, L., Fabrizio, C., & Fernandez, M. (2009). How We Design Feasibility Studies. *American Journal of Preventive Medicine*. doi: <https://doi.org/10.1016/j.amepre.2009.02.002>.
- Brealey, R. A., Myers, S. C., & Allen, F. (2019). *Principles of Corporate Finance*. McGraw-Hill Education.
- Brigham, E. F., & Ehrhardt, M. C. (2017). *Financial Management: Theory & Practice*. Cengage Learning.
- Damodaran, A. (2012). *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*, University Edition. Wiley.
- Damodaran, A. (2024). Beta, Unlevered beta and other risk measures in emerging markets. Damodaran ONLINE. https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datacurrent.html#discrate.
- El-Sharkawy, A. (2005). *Economic Feasibility Studies. Pathways to Higher Education*.
- Gitman, L. J., & Zutter, C. J. (2015). *Principles of Managerial Finance*, PDF EBook, Global Edition. Pearson Education.
- Green, H., & Moore, T. (2020). Effective Interest Rate: A Comprehensive Measure of Borrowing Costs. *Financial Practices Review*.
- Horwathhtl.com. (2004). Bali Hotel & Branded Residences. <https://horwathhtl.com/publication/bali-hotel-branded-residences/>.
- Indonesia Stock Exchange. (2024). Indonesia Government Securities Yield Curve (IGSYC). <https://www.idx.co.id/en/market-data/bonds-sukuk/indonesia-government-securities-yield-curve-igsyc/>
- Jebrin, A. H. (2017). The Theoretical Strategic Approach in the Feasibility Study. *Journal of Economics, Management and Trade*. doi: <https://doi.org/10.9734/JEMT/2017/36268>.
- Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*. doi: <https://doi.org/10.2139/ssrn.99580>.
- Johnson, A. (2023). Sensitivity Analysis in Risk Management. *Journal of Risk Management*.
- Kementrian Keuangan Republik Indonesia. (2021). Kajian Fiskal Regional Provinsi Bali. https://djp.kemenkeu.go.id/portal/images/file_artikel/file_pdf/kfr/2021/22_Bali.pdf.
- Knight Frank. (2023). *Luxury Property Market Report: Bali*. Knight Frank.
- Leon, F. M., Isa, M., & Kester, G. W. (2008). *Capital Budgeting Practices of Listed Indonesian*

- Companies. *Asian Journal of Business and Accounting*.
- Maulana, A., & Koesfardani, C. F. P. P. (2020). Seasonal Pattern of Foreign Tourist Arrivals to Bali. *Jurnal Kepariwisata Indonesia*.
- Ministry of Finance of the Republic of Indonesia. (2023). Regulation of the Minister of Finance No. 72/PMK.03/2023 on Depreciation of Tangible Assets and/or Amortization of Intangible Assets. <https://jdih.kemenkeu.go.id/download/46cededa-86ae-4cc9-93e5-b6bef8892074/2023pmkeuangan072.pdf>.
- Newlove, G.H. (1927). Depreciation. *Journal of Accountancy*.
- Penman, S. H. (2010). *Financial Statement Analysis and Security Valuation*. McGraw-Hill/Irwin.
- President of the Republic of Indonesia. (2017, September 11). Government Regulation of the Republic of Indonesia Number 34 of 2017 on Income Tax on Income from the Rental of Land and/or Buildings. Ministry of Law and Human Rights of the Republic of Indonesia.
- Rayburn, J. (1986). The association of operating cash flow and accruals with security returns. *Journal of Accounting Research*.
- Richardson, S. (2020). Sensitivity Analysis in Capital Budgeting: A Practical Guide. *Journal of Business Forecasting*.
- Santos, A. M., Cincera, M., & Cerulli, G. (2023). Sources of financing: Which ones are more effective in innovation–growth linkage? *Economic Systems*. doi: <https://doi.org/10.1016/j.ecosys.2023.101177>.
- Shen, L.-Y., Tam, V. W.Y., Tam, L., & Ji, Y. (2009). Project feasibility study: the key to successful implementation of sustainable and socially responsible construction management practice. *Journal of Cleaner Production*. doi: <https://doi.org/10.1016/j.jclepro.2009.10.014>.
- Smith, J. (2019). The enduring relevance of traditional capital budgeting techniques. *Finance Today*.
- Toit, M. J. D., & Pienaar, A. (2005). A Review of The Capital Budgeting Behavior of Large South African Firms. *Meditari Accountancy Research*. doi: <https://doi.org/10.1108/10222529200500002>.
- Weston, J. F., & Brigham, E. F. (1981). *Managerial Finance*, Dryden Press.
- Whitfield, R.I., & Duffy, A.H.B. (2013). Extended revenue forecasting within a service industry. *Int. J. Production Economics*. doi: <https://doi.org/10.1016/j.ijpe.2011.11.015>.
- Wilson, R. (2021). Tax Benefits of Debt Financing. *Corporate Finance Journal*.
- Zhang, X., & Liu, H. (2018). Understanding Yield to Maturity: Implications for Corporate Debt Management. *Journal of Financial Analysis*.