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FEASIBILITY ANALYSIS OF INVESTMENT IN SENTUL MARKET REVITALIZATION YOGYAKARTA

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Abstract
Revitalization of traditional markets is carried out to increase economic growth. A large enough investment is needed to realize the project, so it is necessary to conduct an investment feasibility analysis. The purpose of this feasibility analysis is to determine the profitability of an investment with the result in the form of a feasible decision or not. This study reviews financial aspects using the parameters *of Net Present Value* (NPV), *Internal Rate of Return* (IRR), *Benefit-Cost Ratio* (BCR), and *Payback Period* (PP). Then, the sensitivity of kiosk and los levy rates to NPV and PP values was analyzed. Based on the calculation analysis, the NPV value during the economic period was -8,596,409,255, the IRR was 2.746%, and the BCR was 0.6885. PP analysis shows that the capital issued will not return. Based on the results of the analysis, the revitalization of Sentul Market Yogyakarta is classified as unfeasible from a financial point of view. The sensitivity of kiosk and los levy rates to NPV values shows that revitalization will be feasible if kiosk and los levy rates are increased by at least 68.31%

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INTRODUCTION

Economic growth has become one of the main criteria in assessing a country's economic performance (Romhadhoni et al., 2019). Economic growth can be helped by building trade centers. Revitalization includes investment in development that involves outputting costs at the beginning to obtain cash flow greater than the amount of funds invested (Puja, 2015). Project realization requires a lot of investment funds and can potentially pose risks for investors. To minimize losses in investment, it is necessary to analyze the feasibility of investing in the project. The financial aspect is the main focus in every feasibility analysis because it concerns the investment value which is the main component in its realization (Nayoan et al., 2021). The measurement of financial analysis is carried out in monetary value by comparing the flow of income and expenditure over the life of the project (both its construction period and economic life), which is considered from the perspective of investor interests (Sinaga & Risma, 2013). Relevant criteria must be selected to assess the financial feasibility of the project. Using only one criterion to determine eligibility does not give accurate results (Maske & Gaikwad, 2021). The method used to forecast future cash flows is the Discounted Cash Flow (DCF) method. Investment feasibility assessment of a project does not only look at cash flow but must analyze investment feasibility parameters such as Net Present Value (NPV), Internal Rate Return (IRR), Benefit Cost Ratio (BCR), Profitability Index (PI), and Payback Period (PP). Sensitivity analysis is carried out to determine the influence of a decision on changes in variables or parameters that affect it. This study analyzes the investment feasibility of Sentul Market Revitalization Yogyakarta from its financial aspect with planned parameters and analyzes rental price sensitivity to NPV and PP.

METODOTOLOGY

Research Location

The Yogyakarta Sentul Market Revitalization Project is located on Jalan Sultan Agung No. 52, Gunungketur, Pakualaman, Yogyakarta City.

Research Steps

1. Preparation

The preparation phase begins with a literature study of the existing problem, followed by formulating the problem and determining the objectives and methods used.

2. Collecting Data

The data collection process involves interviews to obtain primary data, while secondary data is obtained through browsing official websites and direct requests to related parties.

3. Calculation of Cost and Revenue

The revenue calculation consists of kiosk and los levy rates, bathroom levies, parking levies, and building residual value. Cost calculations consists of investment costs, salaries, electricity, water, cleaning, and maintenance.

4. Investment Feasibility Assessment

Feasibility assessment based on the results of NPV, IRR, BCR, and PP calculations uses the following formula:

a. Net Present Value (NPV)

NPV includes parameters used to express rejection or acceptance of investment activity by considering the net present value of the discount rate (Susanti & Maini, 2019). The feasibility criteria of the NPV value is if the value of the positive calculation results states that the investment is feasible and vice versa. Mathematically, the formula calculation formula Net Present Value (NPV) displayed in Equation (1) (Gray et al., 2007):

$$NPV = \sum_{t=1}^{n} \frac{B_t - C_t}{(1+i)^t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where:

n = Economic life of the project
B_t = admission on t-year
C_t = production on t-year
i = Discount rate

b. Internal Rate of Return (IRR)

Internal rate of return (IRR) is the magnitude discount rate that makes the present value of cash flow and the present value of investment equal (Hidayati & Warnana, 2017). Mathematically, the formula Internal Rate of Return (IRR) displayed in Equation (2) (Gray et al., 2007):

$$IRR = i_1 + \frac{NPV_1}{(NPV_1 - NPV_2)}(i_2 - i_1) \quad \ldots\ldots\ldots(2)$$

Where:

i_1 = discount rate for NPV+

i_2 = discount rate for NPV-
NPV1 = NPV+
NPV2 = NPV-

c. Benefit-Cost Ratio (BCR)

Benefit Cost Ratio (BCR) is a technique for assessing the financial feasibility of an investment by comparing the present value of all income to the present value of all investment expenses.

The criteria for assessing investment feasibility based on BCR value are as follows (Hermawati, 2011):

- BCR > 1 indicates that the profit gained exceeds the cost, so the construction is feasible.
- BCR = 1 indicates that the profit earned is enough to compensate for the construction cost only.
- BCR < 1 indicates that no profit is made and if there is, it will take a long time.

Mathematically, the current calculation formula Benefit Cost Ratio (BCR) displayed in Equation (3) (Gray et al., 2007):

$$BCR = \frac{\sum_{t=1}^{n} \frac{B_t}{(1+i)^t}}{\sum_{t=1}^{n} \frac{C_t}{(1+i)^t}} \text{.....(3)}$$

Where:

n = Economic life of the project
B_t = admission on t-year
C_t = production on t-year
i = Discount rate

d. Payback Period (PP)

The payback Period (PP) determines the duration of the return of costs incurred at the beginning (Eka Nurus Sakinah et al., 2021). The payback period is used as a risk indicator, and the shorter the period, the less risk of loss that may occur (Putri, 2021). Mathematically, the current calculation formula Payback Period (PP) is displayed in Equation (4):

$$PP = \frac{I}{B} \text{.....(4)}$$

Where:

I = cost of investment
B = net income annually

5. Sensitivity Analysis

Sensitivity analysis uses the concept of modifying the value of a parameter at a certain point in time, intending to see its impact on the acceptance of an alternative investment (Harding & Long, 2018). Sensitivity can also be used to measure different investment parameters (Liu, 2022).The variables tested for sensitivity were kiosk and los rental rates to NPV and PP using the interpolation method. Mathematically, the interpolation formula is described in Equation (5):

$$\frac{y-y_0}{x-x_0} = \frac{y_1-y_0}{x_1-x_0} \text{.....(5)}$$

Where:
x = desired NPV
x_0 = NPV+
x_1 = NPV-
y = calculated levy rate
y_0 = levy rate resulting in positive NPV
y_1 = levy rate resulting in negative NPV

6. Analysis of Calculation Results

Based on the results of calculations using feasibility parameters, conclusions will be drawn regarding whether or not the investment is feasible when viewed from a financial perspective.

ANALYSIS AND RESULTS

1. Financial Analysis

a. Cost of Investment

From the calculation, it is found that the investment cost only consists of the construction cost of the Yogyakarta Sentul Market revitalization project of IDR 23.141.058.000, where this price includes a tax of 11%.

b. Estimated Operational Costs

Salary Costs

The cost of market officer salaries is obtained by multiplying the nominal salary of officers per month by the number of officers, then multiplied by 12 months to obtain the officers' salary per year. In 2024, the total salary of officers will be IDR 260.219.820. For the following years, there will be a salary increase for each position. The salary of janitors is assumed to increase every year according to the inflation rate that has been predicted by the forecasting method. The salary of market managers who are class IIIC of civil servants increases every two years, which is adjusted to Peraturan Presiden Nomor 10 Tahun 2024 tentang Penyesuaian Gaji Pokok Pegawai Negeri Sipil. The salaries of levy collector and security officers follow the UMK Yogyakarta City, whose annual increase is predicted by the forecasting method.

Electricity Costs

The calculation of electricity costs is done by calculating all equipment that require electricity, then multiplying by the power and usage time. After obtaining the total electricity consumption, it is multiplied by the basic electricity tariff according to PLN's provisions according to its group. The electricity use in Sentul Market Yogyakarta is included in group B-2 / TR with a power limit of 6600VA to 200kVA. The usage fee for group B-2/TR is IDR 1444.70/kWH. So, the total cost of electricity usage in 2024 is IDR 19.767.986,13. For the following years, there has been an increase in the cost of electricity usage, as predicted by the forecasting method.

Water Costs

The estimated use of clean water for kiosks and wet stalls is calculated based on Pergub Prov. DKI Jakarta Nomor 122 Tahun 2005 tentang Pengelolaan Air Limbah Domestik states the

need for clean water for traditional/modern markets of 40 liters/kiosk/day. The water requirement is then multiplied by the number of kiosks and wet stalls and multiplied again by the basic water rate. Based on Peraturan Walikota Yogyakarta No. 93 Tahun 2019, the basic water tariff for traditional markets, including in the large commercial group with usage above 45 m^3, is IDR 20.550. In 2024, the total cost of water use is IDR 30.903.090. For the following years, there has been an increase in the cost of water use, as predicted by the forecasting method.

Hygiene Costs

The estimated cost of hygienes includes the need for hygiene support equipment in the operation of Pasar Sentul Yogyakarta. In 2024, a total cleaning fee of IDR 5.816.000 will be obtained. For the following years, it is predicted to increase by the inflation rate of Yogyakarta City, which was predicted using the forecasting method.

Maintenance Costs

Based on information from the Yogyakarta City Trade Office, the building maintenance budget is held annually with an estimated IDR 1.000.000. The estimated cost of escalator maintenance is also carried out annually, amounting to IDR 3.500.000. In the first year of operation, or 2024, there is no budget for escalator maintenance costs. Maintenance costs are estimated to increase every year based on the inflation rate of Yogyakarta City, which has been predicted by forecasting method.

c. Estimated Revenue

Kiosk and Los Levy

Based on information from the Yogyakarta City Trade Office, there is no classification based on the strategic location of kiosks and stalls, so tariff determination is standardized according to the levy tariff table for kiosks 1 and los 1. The rate that has been set is the rate per m2 per day so that it is adjusted to the area rented by each trader. The levy rate is increased once every three years by 2%.

Table 1. Details of the kiosks and stalls levy rate in Pasar Sentul Yogyakarta

Details		Area (m^2)	Type	Total unit	Levy rate /day/m^2	Levy rate /year/m^2	Sum of levy rate /years
Kiosk	1st floor	174	C	-	IDR 1.000	IDR 365.000	IDR 63.510.000
	2nd floor	162	B	-	IDR 2.000	IDR 730.000	IDR 118.260.000
	3rd floor	-	Foodcourt	50	-	IDR 13.100.000	IDR 655.000.000
Stall	meat & fish	162,67	B	-	IDR 1.100	IDR 401.500	IDR 65.309.998
	general	1334,71	C	-	IDR 500	IDR 182.500	IDR 243.584.758
Sum of levy rate /years							**IDR 1.145.664.755**

Parking Levy

The Yogyakarta City Trade Office involves residents managing parking lots as third parties with profit sharing by the agreement. The distribution of parking lot management results includes

special parking lots with a 50% distribution for parking guards and 50% for the government. Based on Regional Regulation No. 28 of 2009, the motorcycle parking levy rate is IDR 1.000, while box cars / 3-wheeled vehicles / 4-wheeled cars are charged at IDR 2.000. The total parking levy in 2024 is IDR 156.950.000. The levy rate is increased once every three years by 2%.

Bathroom Levy

The Yogyakarta City Trade Office involves residents in managing bathrooms in Pasar Sentul, Yogyakarta, as a third party with profit sharing following the agreement. The distribution of bathroom management results is carried out according to the agreement, with a distribution of 40% for bathroom guards and 60% for the government. Based on Perwali no. 20 of 2012 article 11, the levy rate for the use of bathrooms/toilets is IDR 600,-. The estimated daily bathroom users are 150 people, so the total bathroom levy rate per year is IDR 32,850,000. The levy rate is increased once every three years by 2%.

Residual Value of the Building

The building age is assumed to be 50 years with economic age of 20 years.

$$\text{Residual value} = \frac{\text{building age} - \text{economic age}}{\text{building age}} \text{x investment costs}$$

$$= \frac{50 - 20}{50} \text{x } 23.141.058.000 \ = \text{IDR } 13.884.634.800$$

d. Cash Flow

Cash flow is the turnover of all revenues (Cash In) and costs (Cash Out) within a certain period. Current to future cash flows can be known by applying the time value of money so that the present cash flow value is also called Discounted Cash Flow (DCF). Cash flows in this investment project are shown in Table 2 to Table 7.

Table 2. Discounted Cash Flow (DCF)

Details	Number of year			
	0	1	2	3
Investment costs	-IDR 23.141.058.000			
Revenue			IDR 1.335.464.755	IDR 1.335.464.755
Operational costs			-IDR 317.706.896	-IDR 323.859.487
Residual Value				
Net Cash Flow			IDR 1.017.757.859	IDR 1.011.605.268
Discount Rate	1,0000	1,0600	1,1236	1,1910
DCF	-IDR 23.141.058.000		IDR 905.800.871	IDR 849.363.290
NPV	-IDR 23.141.058.000		-IDR 22.235.257.129	-IDR 21.385.893.839

Table 3. Continuation Discounted Cash Flow (DCF)

Details	Number of year			
	4	5	6	7
Investment costs				
Revenue	IDR 1.335.464.755	IDR 1.362.174.050	IDR 1.362.174.050	IDR 1.362.174.050

Details	Number of year			
	4	5	6	7
Operational costs	-IDR 338.039.055	-IDR 351.446.903	-IDR 367.941.955	-IDR 380.405.465
Residual Value				
Net Cash Flow	IDR 997.425.700	IDR 1.010.727.147	IDR 994.232.095	IDR 981.768.585
Discount Rate	1,2625	1,3382	1,4185	1,5036
DCF	IDR 790.054.576	IDR 755.274.121	IDR 700.894.395	IDR 652.932.181
NPV	-IDR 20.595.839.263	-IDR19.840.565.142	-IDR 19.139.670.747	-IDR 18.486.738.565

Table 4. Continuation Discounted Cash Flow (DCF)

Details	Number of year			
	8	9	10	11
Investment costs				
Revenue	IDR 1.389.417.531	IDR 1.389.417.531	IDR 1.389.417.531	IDR 1.417.205.882
Operational costs	-IDR 396.016.510	-IDR 410.875.313	-IDR 427.626.597	-IDR 444.953.269
Residual Value				
Net Cash Flow	IDR 993.401.021	IDR 978.542.218	IDR 961.790.934	IDR 972.252.612
Discount Rate	1,5938	1,6895	1,7908	1,8983
DCF	IDR 623.272.090	IDR 579.197.636	IDR 537.059.034	IDR 512.170.548
NPV	-IDR 13.688.925.466	-IDR12.627.784.579	-IDR 11.636.062.101	-IDR 10.686.385.220

Table 5. Continuation Discounted Cash Flow (DCF)

Details	Number of year			
	12	13	14	15
Investment costs				
Revenue	IDR 1.417.205.882	IDR 1.417.205.882	IDR 1.445.549.999	IDR 1.445.549.999
Operational costs	-IDR 460.417.203	-IDR 477.107.909	-IDR 496.000.349	-IDR 513.346.419
Residual Value				
Net Cash Flow	IDR 956.788.679	IDR 940.097.973	IDR 949.549.650	IDR 932.203.581
Discount Rate	2,0122	2,1329	2,2609	2,3966
DCF	IDR 475.494.661	IDR 440.754.614	IDR 419.986.726	IDR 388.975.984
NPV	-IDR15.759.544.597	-IDR 15.318.789.983	-IDR 14.898.803.257	-IDR 14.509.827.273

Table 6. Continuation Discounted Cash Flow (DCF)

Details	Number of year			
	16	17	18	19
Investment costs				
Revenue	IDR 1.445.549.999	IDR 1.474.460.999	IDR 1.474.460.999	IDR 1.474.460.999
Operational costs	-IDR 536.030.222	-IDR 552.056.404	-IDR 573.073.398	-IDR 593.592.836
Residual Value				
Net Cash Flow	IDR 909.519.777	IDR 922.404.595	IDR 901.387.601	IDR 880.868.163
Discount Rate	2,5404	2,6928	2,8543	3,0256
DCF	IDR 358.029.080	IDR 342.548.246	IDR 315.795.549	IDR 291.138.388
NPV	-IDR 14.151.798.193	-IDR 13.809.249.947	-IDR 13.493.454.397	-IDR 13.202.316.009

Table 7. Continuation Discounted Cash Flow (DCF)

Details	Number of year
	20
Investment costs	
Revenue	IDR 1.503.950.219
Operational costs	-IDR 616.818.087
Residual Value	IDR 13.884.634.800
Net Cash Flow	IDR 14.771.766.933
Discount Rate	3,2071
DCF	IDR 4.605.906.754
NPV	-IDR 8.596.409.255

e. Feasibility Analysis

a. Net Present Value (NPV)

Based on the data in Table 2 to Table 7, the NPV values are obtained as follows:

$$NPV = \sum_{t=1}^{n} \frac{B_t - C_t}{(1+i)^t} = -8.596.409.255 < 1$$

Following the calculation results above, the NPV value obtained is -8,596,409,255, which means that NPV < 0 indicates that the project investment is not feasible.

b. Internal Rate of Return (IRR)

Based on Equation (2), the IRR value is obtained as follows:

$$IRR = 1\% + \frac{4.612.760.021}{(4.612.760.021 - (-8.596.409.255))}(6\% - 1\%) = 2{,}746\% < 6\%$$

Following the calculation results above, the IRR value obtained is 2.746%, which means that the IRR < discount rate indicates that the project investment is not feasible.

c. Benefit-Cost Ratio (BCR)

Based on Equation (3), the BCR value is obtained as follows:

$$BCR = \frac{18.998.316.996}{27.594.726.251} = 0{,}6885 < 1$$

Following the calculation results above, the BCR value obtained is 0.6885, which means that BCR < 1 indicates that the project investment is not feasible.

d. Payback Period (PP)

Based on cash flow calculations, in year 46, it becomes a minus, which can be interpreted as a loss even before the return on investment. Therefore, the *payback period* (PP) cannot be calculated, or it can be said that it will not return on investment, so it is not feasible to implement.

f. Sensitivity Analysis

a. Sensitivity of Kiosk and Stall Levy Rates to NPV

The relationship between the effect of changes in kiosk and stall levy rates and NPV can be identified using the interpolation method. The interpolation method requires a kiosk and stall

levy rate that produces a positive NPV and a negative NPV, so a microsoft excel auxiliary program is needed to calculate it. The levy rate that produces a negative NPV is used according to the initial calculation in this final project, namely the total kiosk and stall levy rate of IDR 1.145.664.755 with an NPV value of -8.596.409.255. The levy rate that produces a positive NPV is a total kiosk and stall levy rate of IDR 2.000.000.000 with an NPV value of 787.786.515. According to Equation (5), the interpolation calculation is obtained with the result that the total kiosk and stall levy rate to achieve NPV=0 or feasible must be at least IDR 1.928.280.078, or equivalent to an increase in the levy rate of 68.31%. An increase in rental rates of up to 76% can still be accepted by traders provided if there are adequate facilities (M. R. Ramadhani et al., 2020). Yogyakarta Sentul Market can certainly have adequate facilities because it is included in the category of Type I markets.

Table 8. Recommended Kiosk and Los Levy Rates

Details		Area (m^2)	Type	Total unit	Levy rate /day/m^2	Levy rate /year/m^2	Sum of levy rate /years
Kiosk	1st floor	174	C	-	IDR 1.683	IDR 614.335	IDR 106.894.331
	2nd floor	162	B	-	IDR 3.366	IDR 1.228.670	IDR 199.044.617
	3rd floor	-	Foodcourt	50		IDR 22.048.744	IDR 1.102.437.206
Stall	meat & fish	162,665	B	-	IDR 1.851	IDR 675.769	IDR 109.923.925
	general	1334,711	C	-	IDR 842	IDR 307.168	IDR 409.979.999
Sum of levy rate /years							**IDR 1.928.280.078**

Table 9. Comparison of new levy rates against merchant profits

Type	New levy rates /month	Initial levy rates /month	Minimum Profits /month	Maximum Profits /month	New levy rates/ minimum profits	New levy rates/ maximum profits
Stall B ($2m^2$)	IDR 52.176	IDR 30.000	IDR 3.000.000	IDR 6.000.000	1,74%	0,87%
Stall B ($3m^2$)	IDR 78.265	IDR 45.000	IDR 3.000.000	IDR 6.000.000	2,61%	1,30%
Stall D ($2m^2$)	IDR 114.788	IDR 60.000	IDR 3.000.000	IDR 9.000.000	3,83%	1,28%
Stall D ($3m^2$)	IDR 172.182	IDR 90.000	IDR 3.000.000	IDR 9.000.000	5,74%	1,91%
Stall D ($4m^2$)	IDR 229.576	IDR 120.000	IDR 3.000.000	IDR 9.000.000	7,65%	2,55%
Kiosk 1 ($6m^2$)	IDR 313.059	IDR 180.000	IDR 3.000.000	IDR 6.000.000	10,44%	5,22%
Kiosk 1 ($9m^2$)	IDR 469.588	IDR 270.000	IDR 3.000.000	IDR 6.000.000	15,65%	7,83%
Kiosk 2 ($9m^2$)	IDR 939.176	IDR 540.000	IDR 3.000.000	IDR 6.000.000	31,31%	15,65%
Kiosk 3	IDR 1.837.395	IDR 1.091.667	IDR 3.000.000	IDR 9.000.000	61,25%	20,42%

According to the case example presented by the Ministry of Finance of the Republic of Indonesia, a fair rental value ratio for kiosks to traders' profits was obtained by 11.62%. Therefore, the rental value is reasonable if the new levy's percentage to the maximum and minimum profit is

more than 11.62%. Based on Table 9, it can be seen that the percentage that still meets the fair rental value is found in the new levy rate against the minimum profit at all stall B merchants, stall D merchants, and 1st-floor kiosk with an area of 6 m^2. If the trader earns the maximum profit, then those who meet the percentage of fair rent value to the maximum profit are general all stall B merchants, stall D merchants, and 1st-floor kiosk in all area.

b. Sensitivity of Kiosk and Los Levy Rates to PP

With an increase in the total levy rate to IDR 1.928.280.078, the NPV value = 0 in the 20th year, so the payback period becomes only 20 years.

CONCLUSION

Based on feasibility analisis of investment in revitalization of Pasar Sentul Yogyakarta, it is concluded that:

1. Based on the calculation results with several feasibility parameters, NPV = -8.596.409.255, IRR=2.746%, and BCR=0.6885 were obtained.
2. Based on the payback period analysis results, the investment in revitalizing Pasar Sentul Yogyakarta could not reach the Break Event Point (BEP) and instead suffered losses in the 46th year and beyond. A break Event point can be achieved in the economic life of the building for 20 years if the kiosk and los levy rate is increased by 68.31% or a total of IDR 1.928.280.078.
3. Based on the analysis results with NPV, IRR, and BCR value parameters, it can be concluded that the investment in revitalizing the Yogyakarta Sentul Market is financially not feasible. NPV<0, IRR< discounted rate, and BCR<1 values do not match the feasibility criteria. The sensitivity analysis results show that to achieve the feasible criteria, at least the kiosk and los levy rates must be increased by 68.31% with a total of IDR 1.928.280.078. This value is still feasible for traders who rent general stalls, meat stalls, and kiosks on the 1st floor with an area of 6 m^2. This value is feasible for a 1st floor kiosk with an area of 9 m^2 if maximum profit can be achieved.

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