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ANALYSIS OF INVESTMENT IN THE DEVELOPMENT OF THE WATU ULO FISHERY PORT IN JEMBER DISTRICT REVIEWED FROM FINANCIAL ASPECTS AND SENSITIVITY ASPECTS

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Abstrak: Watu Ulo Beach is a concentration of fishing communities as a place to fill supplies to catch fish at sea and as a landing place for fish catches. The local government intends to build a fishing port in Watu Ulo to improve facilities and infrastructure for fishermen in catching fish. This study aims to determine the feasibility of investment in the development of fishing ports in terms of financial aspects and sensitivity. The research method uses three scenarios for the value of income, namely the pessimistic scenario, moderate scenario, optimistic scenario. The results of the financial feasibility analysis using the NPV, IRR, BCR, and PP methods were declared feasible for the moderate scenario and optimistic scenario while the pessimistic scenario analysis results were not feasible because the IRR (6.15%) < MARR (7.72%) The results of the sensitivity analysis stated that with three scenarios on the Value of Revenue and Operating Costs obtained the results of Sensitivity The value of revenue for the pessimistic scenario is sensitive at -13.67% if it is smaller than that the investment becomes unfeasible. The revenue value for the moderate sensitive scenario is -39.96% if it is smaller than that the investment becomes unfeasible. The value of income for an optimistic scenario is sensitive at -40.75% if it is smaller than that, the investment becomes unfeasible. The revenue value for the optimistic scenario is sensitive at -40.75%, if it is smaller than that, the investment is not feasible. And if the Operating Cost Sensitivity for the pessimistic scenario is sensitive at -15.96%, if it is smaller than that, the investment is not feasible. Operating Costs for a moderate sensitive scenario at +22.67% if it is greater than that, the investment becomes unfeasible. Operating Costs for the optimistic scenario are sensitive at 25.59% if greater than that then the investment becomes unviable.

Keywords: Fishing Port, Financial Analysis, Sensitivity Analysis

INTRODUCTION

The construction of a fishing port is a way for the Regional Government, namely the East Java Provincial Maritime Affairs and Fisheries Service, to support fishermen so they can catch fish well and get abundant results to increase the potential for regional original income (PAD) from the fisheries sector.

Based on data from the East Java Provincial Maritime Affairs and Fisheries Service as the fisheries port manager, it was found that there were around 63 Payang boats docking at Watu Ulo Beach, and 400 fishing boats using hand line fishing gear or fishing rods. And the types of fish caught are groupers, seaweed and several other types of coral fish. The Payang net catch includes tuna, flying fish, lemuru, trevally, skipjack tuna, baby tuna and several other types of pelagic fish.

In this research, an analysis of the feasibility of investing in the Watu Ulo Fishing Port in Jember Regency was carried out. The investment feasibility analysis carried out is reviewed based on financial aspects and sensitivity aspects. The aim of this research is to test whether or not it is feasible to invest in building a fishing port in Watu Ulo, Jember Regency if it is built. This aims to avoid unfavorable things such as errors in technical building planning, errors in estimating market targets, obstacles in construction implementation, cost overruns, and errors in planning fishery port management.

RESEARCH METHODS

The Watu Ulo Beach research location is in Sumber Rejo Village, Ambulu District, Jember Regency. The data used in this research are primary and secondary data. Primary data was obtained from observations at the research location and interviews with the Related Service, namely the East Java Province Maritime and Fisheries Service to obtain data on the number of ships docked at the port, the number of fish catches and data on the number of fishermen, data on operational costs. Secondary data used includes master plan data, Engineering Estimate data, and several statistical data and regulations that are appropriate to this research. After obtaining such data, an investment feasibility analysis is carried out which is reviewed based on financial aspects and sensitivity aspects.

TECHNICAL DATA ANALYSIS

To answer the steps required in this research, what must be done includes:
1. Conduct a literature study
2. Identify investment costs, namely:
    2.1 Investment Costs
    2.2 Operational Costs
    2.3 Value of Income
    2.4 Projecting Costs for 2025
3. Create scenarios based on rental rates, namely Pessimistic Scenario, Moderate Scenario and Optimistic Scenario
4. Carry out Financial Feasibility Analysis Calculations, namely:
4.1 Net Present Value (NPV)
4.2 Internal Rate Return (IRR)
4.3 Payback Periode (PP)
4.4 Benefit Cost Ratio (BCR)
5. Carry out Sensitivity Analysis Calculations, namely:
5.1 Sensitivity Based on Income Value Factor
5.2 Sensitivity Based on Operating Costs

Picture

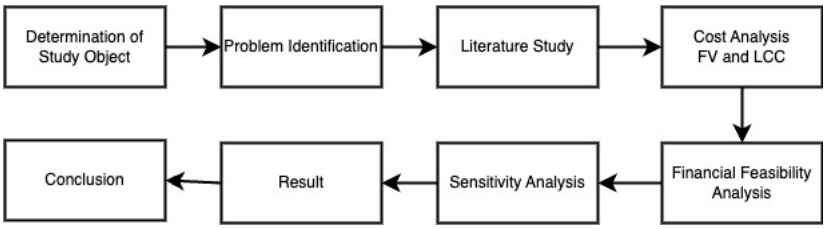

Figure 1. Research Flow Chart.

RESULTS AND DISCUSSION

1. Data Description

In this data description, the researcher tries to collect data in the form of primary data and secondary data. For primary data, researchers made observations at the research location and conducted interviews with the relevant agencies to find out the number of ships docked, the number of fish caught, and data on the number of fishermen at the port. Meanwhile, for primary data, researchers collected data in the form of a Master Plan, Engineering Estimate (EE) data or Cost Budget Plan (RAB), statistical data and appropriate regulations to be applied to this research.

Watu Ulo Beach is located in Sumber Rejo Village, Ambulu District, Jember Regency. Currently, Watu Ulo Beach is used by fishermen to dock their fishing boats and as a place to fill up supplies for fishing. From the latest known data, the total number of ships docked at the beach is 447 units, the number of registered fishermen is 10,250 people and the fish catch is 4950, 375 tons.

Figure 2. Watu Ulo Fishing Harbor Master Plan.

2. Research Findings

Based on the research findings, primary and secondary data were obtained. Primary data includes data in the form of the number of fishermen at Watu Ulo Beach, the number of boats docked at Watu Ulo Beach and the number of fish catches obtained from 2018 to 2023. Which are shown in the following table:

Table 1. Data on the Number of Fishermen 2018-2023

No.	Tahun	Nelayan (Orang)	Selisih dari tahun Sebelumnya	Prosentase dari Tahun Sebelumnya
1	2018	12638	0	0
2	2019	12638	0	0
3	2020	6263	-6375	-50%
4	2021	12638	6375	100%
5	2022	10250	-2388	-19%
6	2023	10250	0	0

Table 2. Data on the Number of Fishermen 2018-2023

No.	Tahun	Kapal (Unit)	Selisih dari tahun Sebelumnya	Prosentase dari Tahun Sebelumnya
1	2018	3085	0	0%
2	2019	3085	0	0%
3	2020	943	-2142	-31%
4	2021	409	-534	-43%
5	2022	447	38	9%
6	2023	447	0	0%

Table 3. Data on Number of Fish 2018-2023

No.	Tahun	Ikan (Ton)	Selisih dari tahun Sebelumnya	Prosentase dari Tahun Sebelumnya
1	2018	**5068,926**		
2	2019	4962,903	-106	-2%
3	2020	6144,065	1181	24%
4	2021	3164,773	-2979	-52%
5	2022	4950,375	1786	56%
6	2023	4950,375	0	0%

Source : DKP JATIM Interview, Processed by the Author (2023).

3. Investment Costs, Operational Costs, Income Value

The secondary data obtained is known to be the value of the planned budget (RAB), which is IDR. 212,995,077,900.00 is planned for the 2021 Fiscal Year. The RAB value is used as investment costs. Operational Costs Rp. 1,075,840,000.00 was taken from the Budget Control Document (DPA) belonging to the Puger Technical Services Unit (UPT) which is both located in Jember Regency. The income value is taken from Governor's Regulation Number 23 of 2023 concerning Adjustment of Regional Levy Tariffs, the income value is divided into 3 scenarios, namely the pessimistic scenario, moderate scenario, and optimistic scenario. The income value for the pessimistic scenario is Rp. 11,201,253,567.00. The income value for the moderate scenario is IDR 17,864,065,837.00, the income value for the optimistic scenario is IDR 27,708,540,635.00,

4. Cost Analysis

1. Calculation of Future Value (FV)

Future Value in this research is calculating the value in the coming year if what is known is the current value. It is known that the Secondary Data obtained by researchers is the value in 2021 and 2023, then this value will be projected to 2025:

Table 4. Future Value Calculation Results

No.	Cost component	Total cost	Future Value Value in 2025
1	Investment Costs	Rp. 212,995,077,900.00	Rp. 242,814,388,806.00
2	Operating costs	Rp. 1,075,840,000.00	Rp. 1,226,457,600.00
3	Earnings Value (Pessimistic Scenario)	Rp. 11,201,253,567.00	Rp. 12,545,403,995.00
4	Income Value (Moderate Scenario)	Rp. 17,864,065,837.00	Rp. 20,007,753,737.00
5	Earnings Value (Optimistic Scenario)	Rp. 27,708,540,635.00	Rp. 31,033,565,511.00

Source: Author's Processed Data (2023).

2. Perhitungan Life Cycle Cost (LCC)

Life Cycle Cost (LCC) in this research is to determine all investment costs required for the construction of the Watu Ulo Fishing Port - Jember Regency. Includes investment costs, operational and maintenance costs as well as the value of income obtained if the development is carried out, details are in the following table:

Table 5. Life Cycle Cost Calculation Results

No.	Calculation Components	Nilai Life Cycle Cost
1	Pessimistic Scenario	Rp. 256,586,250,401.00
2	Moderate Scenario	Rp. 264,048,600,143.00
3	Optimistic Scenario	Rp. 275,074,411,917.00

Source: Author's Processed Data (2023).

After obtaining the results of calculating the Future Value and Life Cycle Cost values, the next step is to calculate the Financial Analysis and Sensitivity Analysis.

5. Financial Analysis

1. Cash flow

Before carrying out a Financial Analysis, the cash flow is first calculated. Among them are in the following table:

Table 6. Pessimistic Scenario Cash Flow

TAHUN ke	TAHUN	INVESTASI	OPERASIONAL	PENDAPATAN	NET INCOME
0	2025	Rp 242.814.388.806	0	0	-Rp 242.814.388.806
1	2026		Rp 1.300.045.056	Rp 13.298.128.235	Rp 11.998.083.179
2	2027		Rp 1.373.632.512	Rp 14.050.852.474	Rp 12.677.219.962
3	2028		Rp 1.447.219.968	Rp 14.803.576.714	Rp 13.356.356.746
4	2029		Rp 1.520.807.424	Rp 15.556.300.954	Rp 14.035.493.530
5	2030		Rp 1.594.394.880	Rp 16.309.025.194	Rp 14.714.630.314
6	2031		Rp 1.667.982.336	Rp 17.061.749.433	Rp 15.393.767.097
7	2032		Rp 1.741.569.792	Rp 17.814.473.673	Rp 16.072.903.881
8	2033		Rp 1.815.157.248	Rp 18.567.197.913	Rp 16.752.040.665
9	2034		Rp 1.888.744.704	Rp 19.319.922.152	Rp 17.431.177.448
10	2035		Rp 1.962.332.160	Rp 20.072.646.392	Rp 18.110.314.232
11	2036		Rp 2.035.919.616	Rp 20.825.370.632	Rp 18.789.451.016
12	2037		Rp 2.109.507.072	Rp 21.578.094.871	Rp 19.468.587.799
13	2038		Rp 2.183.094.528	Rp 22.330.819.111	Rp 20.147.724.583
14	2039		Rp 2.256.681.984	Rp 23.083.543.351	Rp 20.826.861.367
15	2040		Rp 2.330.269.440	Rp 23.836.267.591	Rp 21.505.998.151
16	2041		Rp 2.403.856.896	Rp 24.588.991.830	Rp 22.185.134.934
17	2042		Rp 2.477.444.352	Rp 25.341.716.070	Rp 22.864.271.718
18	2043		Rp 2.551.031.808	Rp 26.094.440.310	Rp 23.543.408.502
19	2044		Rp 2.624.619.264	Rp 26.847.164.549	Rp 24.222.545.285
20	2045		Rp 2.698.206.720	Rp 27.599.888.789	Rp 24.901.682.069
21	2046		Rp 2.771.794.176	Rp 28.352.613.029	Rp 25.580.818.853
22	2047		Rp 2.845.381.632	Rp 29.105.337.268	Rp 26.259.955.636
23	2048		Rp 2.918.969.088	Rp 29.858.061.508	Rp 26.939.092.420
24	2049		Rp 2.992.556.544	Rp 30.610.785.748	Rp 27.618.229.204
25	2050		Rp 3.066.144.000	Rp 31.363.509.988	Rp 28.297.365.988
26	2051		Rp 3.139.731.456	Rp 32.116.234.227	Rp 28.976.502.771
27	2052		Rp 3.213.318.912	Rp 32.868.958.467	Rp 29.655.639.555
28	2053		Rp 3.286.906.368	Rp 33.621.682.707	Rp 30.334.776.339
29	2054		Rp 3.360.493.824	Rp 34.374.406.946	Rp 31.013.913.122
30	2055		Rp 3.434.081.280	Rp 35.127.131.186	Rp 31.693.049.906
31	2056		Rp 3.507.668.736	Rp 35.879.855.426	Rp 32.372.186.690
32	2057		Rp 3.581.256.192	Rp 36.632.579.666	Rp 33.051.323.474
33	2058		Rp 3.654.843.648	Rp 37.385.303.905	Rp 33.730.460.257
34	2059		Rp 3.728.431.104	Rp 38.138.028.145	Rp 34.409.597.041
35	2060		Rp 3.802.018.560	Rp 38.890.752.385	Rp 35.088.733.825

Source: Author's Processed Data (2023).

Table 7. Cash Flow Moderate Scenario

TAHUN ke	TAHUN	INVESTASI	OPERASIONAL	PENDAPATAN	NET INCOME
0	2025	Rp 242.814.388.806	0	0	-Rp 242.814.388.806
1	2026		Rp 1.300.045.056	Rp 21.208.218.962	Rp 19.908.173.906
2	2027		Rp 1.373.632.512	Rp 22.408.684.186	Rp 21.035.051.674
3	2028		Rp 1.447.219.968	Rp 23.609.149.410	Rp 22.161.929.442
4	2029		Rp 1.520.807.424	Rp 24.809.614.634	Rp 23.288.807.210
5	2030		Rp 1.594.394.880	Rp 26.010.079.859	Rp 24.415.684.979
6	2031		Rp 1.667.982.336	Rp 27.210.545.083	Rp 25.542.562.747
7	2032		Rp 1.741.569.792	Rp 28.411.010.307	Rp 26.669.440.515
8	2033		Rp 1.815.157.248	Rp 29.611.475.531	Rp 27.796.318.283
9	2034		Rp 1.888.744.704	Rp 30.811.940.756	Rp 28.923.196.052
10	2035		Rp 1.962.332.160	Rp 32.012.405.980	Rp 30.050.073.820
11	2036		Rp 2.035.919.616	Rp 33.212.871.204	Rp 31.176.951.588
12	2037		Rp 2.109.507.072	Rp 34.413.336.428	Rp 32.303.829.356
13	2038		Rp 2.183.094.528	Rp 35.613.801.653	Rp 33.430.707.125
14	2039		Rp 2.256.681.984	Rp 36.814.266.877	Rp 34.557.584.893
15	2040		Rp 2.330.269.440	Rp 38.014.732.101	Rp 35.684.462.661
16	2041		Rp 2.403.856.896	Rp 39.215.197.325	Rp 36.811.340.429
17	2042		Rp 2.477.444.352	Rp 40.415.662.550	Rp 37.938.218.198
18	2043		Rp 2.551.031.808	Rp 41.616.127.774	Rp 39.065.095.966
19	2044		Rp 2.624.619.264	Rp 42.816.592.998	Rp 40.191.973.734
20	2045		Rp 2.698.206.720	Rp 44.017.058.222	Rp 41.318.851.502
21	2046		Rp 2.771.794.176	Rp 45.217.523.447	Rp 42.445.729.271
22	2047		Rp 2.845.381.632	Rp 46.417.988.671	Rp 43.572.607.039
23	2048		Rp 2.918.969.088	Rp 47.618.453.895	Rp 44.699.484.807
24	2049		Rp 2.992.556.544	Rp 48.818.919.119	Rp 45.826.362.575
25	2050		Rp 3.066.144.000	Rp 50.019.384.344	Rp 46.953.240.344

Source: Author's Processed Data (2023).

Table 8. Optimistic Scenario Cash Flow

TAHUN ke	TAHUN	INVESTASI	OPERASIONAL	PENDAPATAN	NET INCOME
0	2025	Rp 242.814.388.806	0	0	-Rp 242.814.388.806
1	2026		Rp 1.300.045.056	Rp 32.895.579.442	Rp 31.595.534.386
2	2027		Rp 1.373.632.512	Rp 34.757.593.373	Rp 33.383.960.861
3	2028		Rp 1.447.219.968	Rp 36.619.607.303	Rp 35.172.387.335
4	2029		Rp 1.520.807.424	Rp 38.481.621.234	Rp 36.960.813.810
5	2030		Rp 1.594.394.880	Rp 40.343.635.165	Rp 38.749.240.285
6	2031		Rp 1.667.982.336	Rp 42.205.649.095	Rp 40.537.666.759
7	2032		Rp 1.741.569.792	Rp 44.067.663.026	Rp 42.326.093.234
8	2033		Rp 1.815.157.248	Rp 45.929.676.957	Rp 44.114.519.709
9	2034		Rp 1.888.744.704	Rp 47.791.690.887	Rp 45.902.946.183
10	2035		Rp 1.962.332.160	Rp 49.653.704.818	Rp 47.691.372.658
11	2036		Rp 2.035.919.616	Rp 51.515.718.749	Rp 49.479.799.133
12	2037		Rp 2.109.507.072	Rp 53.377.732.679	Rp 51.268.225.607
13	2038		Rp 2.183.094.528	Rp 55.239.746.610	Rp 53.056.652.082
14	2039		Rp 2.256.681.984	Rp 57.101.760.541	Rp 54.845.078.557
15	2040		Rp 2.330.269.440	Rp 58.963.774.471	Rp 56.633.505.031

Source: Author's Processed Data (2023).

2. Investment Feasibility Analysis Using NPV, IRR, BCR and PP Methods

Table 9. Investment Analysis Results

No.	Investment Analysis	Pessimistic	Moderate	Optimistic	Is
1	Investment Age	35 years old	25 years	15 years	-
2	NPV	Rp. 1,841,984,707.00	Rp. 505,817,875.00	Rp. 16,042,456,566.00	>0 Worthy
3	IRR	6,15%	9,68%	11,91%	Pessimistic Scenario IRR <MARR 7.72%, Not feasible. IRR Moderate Scenario, Optimistic>MARR 7.72, Feasible.
4	BCR	1,1596	1,5314	1,643	>1 Worthy
5	PP	27 years	14 years	9 years	<Investment Age, Eligible

Source: Author's Processed Data (2023).

3. Sensitivity Analysis of Revenue Value and Operational Costs

4. Table 10. Sensitivity Analysis Results

No.	Sensitivity Analysis	Pessimistic	Moderate	Optimistic
1	Investment Age	35 years old	25 years	15 years
2	NPV Income Value = 0	-13,67%	-39,96%	-40,75%
3	Operating costs NPV = 0	-15,96%	+22,67%	+25,59%

Source: Author's Processed Data (2023).

CONCLUSION

1. Calculation Analysis Cost analysis has been carried out for the Watu Ulo Fishing Port Development Planning work, Jember Regency if carried out in 2025 using the FV (Future Value) method for an investment value of IDR. 242,814,388,806.00, Operational Costs Rp. 1,226,457,600.00. Income Value for the Pessimistic Scenario Rp. 12,545,403,995, Moderate Scenario Rp. 20,007,753,737, Optimistic Scenario Rp. 31,033,565,511.00. Meanwhile, for the LCC (Lyfe Cycle Cost) value in the pessimistic scenario, Rp. 256,586,250,401.00 moderate scenario Rp. 264,048,600,143.00 optimistic scenario Rp. 275,074,411,917.00.

2. From the 3 Pessimistic, Moderate and Optimistic Scenarios, the Investment Analysis is obtained if the NPV, BCR, PP Analysis states that the Development is Feasible to be implemented. Meanwhile, the IRR Analysis states that the Pessimistic Scenario is Not Feasible to be implemented. Meanwhile, the Optimistic and Moderate Scenarios state that it is Feasible to be implemented.
3. From the results of the Sensitivity Calculation Analysis, the income value for the pessimistic scenario is sensitive at -13.67% if it is smaller than that, the investment becomes unfeasible. The income value for the moderate sensitive scenario is -39.96%, if it is smaller than that, the investment becomes unfeasible. The income value for the optimistic scenario is sensitive at -40.75%, if it is smaller than that, the investment will not be feasible. And if the Operational Cost Sensitivity for the pessimistic scenario is sensitive at -15.96%, if it is smaller than that, the investment will not be feasible. The income value for the moderate sensitive scenario is +22.67%, if it is greater than that, the investment will not be feasible. The income value for the optimistic scenario is sensitive at 25.59%. If it is greater than that, the investment will not be feasible. This template is made for the consistency of the format of articles published by Journals at our institution. Collaboration and willingness of the author to follow the writing guidelines are highly expected.

REFERENCES

Book

[1] Giatman, M. *Economics Technology*. Jakarta : Raja Gravindo Persada, 2006, 129.

[2] East Java Provincial Government, East Java Governor Regulation Number 23 of 2023 concerning Adjustment of Regional Retribution Rates, Surabaya

[3] Indonesian Government, Law no. 45 of 2009 concerning Amendments to Law Number 31 of 2004 concerning Fisheries, Jakarta

[4] Indonesian Government, Law no. 17 of 2008 concerning Shipping, Jakarta.

[5] State of Alaska, (2018), *"Life Cycle Cost Analysis",* Department of Education & Early Development, Handbook – 2nd Edition.

Journal

Author. "Title Article". *Journal Name*, vol., Page, Date/Year, DOI.

[6] Berawi, M.A., Putri, C.R., Sari, M., Salim, A.V., Saroji, G., Miraj, P.,. "Infrastructure Financing Scheme Towards Industrial Development." *International Journal of Technology*, Volume 12(5), 2021, Pages 935-945.

[7] Frederika, Ariany ; Candra Dharmayanti, G.A.P; K.H, Yandi Kurniawan;K. "Investment Evaluation of Mantra Hotel Nusa Dua Bali." *Civil Engineering Scientific Journal*, Vol. 21(1), 2017, pp. 34-32.

Thesis

Author. "Title Tesis." Grade Lulusan, University Name, Location, Year.

[8] Nur Rasid, Pratama Hajar. "Analysis of Heavy Equipment Investment in the Indonesian Islamic University Waqf Foundation Self-Managed Project." Indonesian Islamic University, Yogyakarta, 2020.