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Feasibility and advance scenario analysis of toll road company with low rate of return on investment in Indonesia: case study of the Manado-Bitung toll road

Aldrin Maulana[1], Eka Pria[2]
[1,2]Master of Management, Faculty of Economics and Business, Universitas Indonesia, Salemba, Indonesia

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ABSTRACT
Infrastructure development in developing countries can have a transformative impact on people's lives. Maintaining the speed of infrastructure development in developed countries is one way to maintain economic growth. To maintain development, different types of Government support can attract more investment from business entities to be interested in a Public Private Partnership (PPP) investment, such as the Viability Gap Fund (VGF). Amongst many, Manado-Bitung toll road is one example that has received VGF. In connection with the above matters, it is necessary to conduct an analysis on the feasibility of the sustainability of this toll road and also sensitivity to other factors that may affect the level of investment feasibility. The analysis will be done by gathering historical secondary data, that is used to compare the financial feasibility of the toll road between the existing and the Concession Agreement, a sensitivity study using investment parameters, and scenario analysis according to the results to measure future feasibility using combinations. Conclusions and inputs will then be recommended for usage of the stakeholders of Manado-Bitung toll road.

Corresponding Author:
Aldrin Maulana
Master of Management, Faculty of Economics and Business, Universitas Indonesia, Salemba, Indonesia
aldrin.maulana@ui.ac.id

INTRODUCTION

Infrastructure development is very important for economic growth, both in developed and developing countries. Infrastructure development in developing countries will have a transformative impact on people's lives and generate multiplier effect on the economy. Maintaining the speed of infrastructure development in developed countries is one way to maintain economic growth.

In 2020, the Ministry of Public Works and Public Housing of Indonesia prepared a general plan for the toll road network, where short-term, medium-term and long-term plans have been prepared, namely for a period of 25 years until 2045. As of 2019, around 2,093.45 km toll roads are operating in Indonesia, and is targeted to increase to 18,088.37 km by 2045. This plan is an ambitious target and requires development support from the Government because there are planned toll roads that may not yet be financially feasible.

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To support infrastructure development, different types of Government support can attract more investment from business entities. Based on previous research, government support in the form of capital, income and also subsidies in the form of goods provided directly from the government, can attract more business entities to undertake PPP investment, while indirect support through government guarantee policies has no effect. In addition, a country's institutional quality can increase the positive relationship between direct government support and PPP investment, and risk allocation shares play a mediating role between government support and business entity investment [1]. Direct government support with guaranteed income for infrastructure projects will provide benefits to business entities and infrastructure users at the same time. This will give business entities confidence in the return on investment and at the same time infrastructure users can enjoy more facilities without increasing large costs [2].

Investment in infrastructure such as toll roads has a long return on investment with an average of up to 60 years [3]. In addition, infrastructure projects have a relatively long period of negative cash flow compared to other industries because they have a slow increase in cash flow at the early years of operations, due to relatively large interest payments on loans and income uncertainty [2].

Based on the IDN Times South Sulawesi report, it was explained that the actual traffic volume for the Manado-Bitung toll road was only 5,380 vehicles/day from the plan of 17,000 vehicles/day. The Manado-Bitung (Mabit) Toll Road is the first toll road in North Sulawesi Province. With a length of 39 KM. The Mabit Toll Road Toll Road Concession is owned by PT Jasamarga Manado Bitung which is a subsidiary of PT Jasa Marga (Persero) Tbk. Based on Presidential Regulation (Pelrprels) no. 109 of 2020 concerning the Third Amendment to Presidential Regulation Number 3 of 2016 concerning the Acceleration of Implementation of National Strategic Projects and also based on the 2022 Public Private Partnership Book issued by Bappenas, the Mabit Toll Road Project is included in the National Strategic Project.

In connection with the above matters, it is necessary to conduct a study or analysis on the feasibility of the sustainability of this toll road and also sensitivity to other factors that may affect the level of investment feasibility. This feasibility analysis is very important for road users, Government and investors. For investors, this analysis is carried out in order to measure the ability to pay debts to creditors and provide dividends to shareholders as a return on investments that have been made.

Based on the background presented previously, the author is interested in conducting research regarding Feasibility Analysis and Sustainability Scenario Analysis of Toll Road Investment which are indicated to have a low level of investment feasibility, the influence of sensitivity of Macroeconomic Variables on feasibility and corrective steps that can be taken to ensure the sustainability of toll road investments.

In this research the author will take a case study of the Manado-Bitung Toll Road Development, this toll road is part of a National Strategic Project which is carried out under a PPP scheme and is indicated to have a relatively low level of financial investment feasibility.

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METHOD

Preparation of Research Questions

This research uses a qualitative and quantitative approach, allowing the use of a wider range of data collection tools.

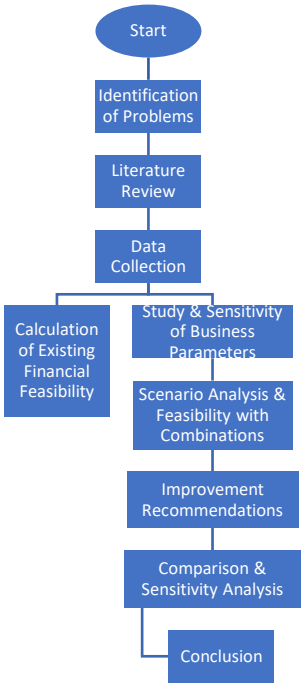

Figure 1. Research Flow

In sub questions A to C to validate the financial modeling assumptions carried out on the Mabit Toll Road. Next, further studies will be carried out. Additionally, this sub-question involves an in-depth case study of a PPP project to gain an overview of the problem and examine real-world practices from various perspectives. Sub questions D to F will evaluate the main factors influencing the Mabit Toll Road operation, the main considerations for continuing the Mabit Toll Road operation and strategies that can be implemented to increase the financial viability of the Mabit Toll Road. The object of this research is the Manado-Bitung Toll Road Concession.

Data Research

The data required is in the form of secondary data which includes:

1. Investment costs (Design costs, construction, financial fees, overhead),
2. Composition of financing structure,
3. Historical data and projections of operational and maintenance costs,
4. Historical data and traffic volume projections,
5. Historical data and projections of loan interest rates,
6. Concession Period,
7. Rates,
8. Historical data and inflation projections,

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9. as well as other supporting documents.

In selecting sources, this research has two criteria that must be met to ensure the information provided is relevant to the research subject. The first is to select individuals from organizations that implement toll road projects using the PPP scheme. Furthermore, the second criterion is that the resource person has been directly involved and can manage and operate PPP projects. Candidate respondents were assigned to three business entities, namely PT Jasa Marga (Persero) Tbk, PT Hutama Karya (Persero), as the private sector which controls 74% of toll road operations in Indonesia as of December 2021. Apart from that, interviews were also conducted with the management of PT Jasamarga Manado Bitung. The list of prospective respondents can be seen in the table below:

Table 1. Interviewee

Code	Institution	Role
P1	PT Hutama Karya (Persero)	Director of Finance and Risk Management
P2	PT Jasa Marga (Persero) Tbk	Concession Business Planning Group Head
P3	PT Jasa Marga (Persero) Tbk	Engineering Planning Group Head
P4	PT Jasamarga Manado Bitung	President Director

Research Variable

The research variables used in this research are financial aspect variables which include Net Present Value (NPV), Internal Rate of Return (IRR) and financial ratios such as EBITDA Margin, interest coverage ratio (ICR), debt service coverage ratio (DSCR).

Data Analysis Method

The analysis will be carried out by conducting in-depth case studies regarding infrastructure projects that have the lowest level of investment feasibility in Indonesia. Case studies are carried out to obtain a clear picture of a problem, as well as identifying the best solution/strategy to increase the feasibility of this project so that it can continue to be operated as well as knowing the impact of implementing the best scenario on its financial feasibility. Collecting and combining quantitative data is carried out to find comprehensive interpretations and to understand specific situations [23].

Financial Aspect Analysis

The financial aspect analysis was carried out from the Manado-Bitung Toll Road Project investment data that had been collected, cash flow projections were prepared, consisting of cash inflow and cash outflow. The calculation steps in preparing a financial cash flow analysis during the concession period are as follows:

1. Calculate the initial investment costs for the toll road;
2. Divide the use of funding sources in funding initial investment;
3. Calculate toll road revenues during the concession period;
4. Enter cell operational and maintenance costs at the toll road concession period;
5. Calculate income before depreciation, amortization, interest, and tax (ElBITDA), namely by reducing income from operational and maintenance costs;
6. Calculate EBITDA margin;

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7. Calculate interest expense;
8. Calculate the tax burden;
9. Calculating earnings after tax;
10. Carry out cash flow calculations for operations, investments, and funding;
11. Calculate the balance sheet;
12. After carrying out the cash flow analysis, the next step is to assess the investment or feasibility of the project;
13. Investment assessment by calculating the parameter values of NPV and IRR, as well as financial ratios such as EBITDA Margin, ICR and DSCR.

Scenario Analysis and Sensitivity Analysis

Scenario analysis is a forecasting technique in which experts present their views on current and future opportunities and then identify key trends and challenges. Integrated scenarios can be developed by examining strategic alternatives and challenging existing assumptions and practices. The scenarios that will be used include:

1) Scenario A: Efficient Operation and Maintenance (OM) Expenses
2) Scenario B: Paying Off Debt
3) Scenario C: Proposing Concession Period Negotiations
4) Scenario D: Proposing an Availability Payment Scheme

The sensitivity analysis that will be carried out in this research is by varying macroeconomic parameters, including inflation, interest rates and discount rates for each business cycle scenario. From each variation, the level of financial feasibility will be calculated to provide recommendations for companies in making future investment decisions. By knowing the sensitivity of macroeconomic parameters to each business cycle scenario, it can help companies to take corporate business policies in each scenario or condition that occurs [9], [20].

RESULT AND DISCUSSION

General Aspect

The Manado-Bitung (Mabit) Toll Road is the first toll road in North Sulawesi Province. With a length of 39 KM. The Mabit Toll Road Toll Road Concession is owned by PT Jasamarga Manado Bitung which is a subsidiary of PT Jasa Marga (Persero) Tbk. Based on Presidential Regulation (Perpres) no. 109 of 2020 concerning the Third Amendment to Presidential Regulation Number 3 of 2016 concerning the Accelerated Implementation of National Strategic Projects and based on the 2022 Public Private Partnership Book issued by Bappenas, the Mabit Toll Road Project is included in the National Strategic Project

Qualitative Aspect

Qualitative analysis was carried out by conducting semi-structured interviews with several sources who have experience and expertise in toll road operations in Indonesia.

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Interview Process

Table 2. Interviewee

Code	Institution	Role
P1	PT Hutama Karya (Persero)	Director of Finance and Risk Management
P2	PT Jasa Marga (Persero) Tbk	Concession Business Planning Group Head
P3	PT Jasa Marga (Persero) Tbk	Engineering Planning Group Head
P4	PT Jasamarga Manado Bitung	President Director

Interviews with sources are arranged in a certain schedule to show the sequence of information in the research. The main speakers involved the Director of Finance of the Committee for the Acceleration of Priority Infrastructure Provision, Concession Business Planning Group Head of PT Jasa Marga (Persero) Tbk, and the President Director of PT Jasamarga Manado Bitung. The process began with interviews with the President Director of PT Jasamarga Manado Bitung and the Concession Business Planning Group Head of PT Jasa Marga (Persero) Tbk, focusing on the financial impact and gaining insights from key players in the private sector.

Interview Result

1) Traffic Volume Projection:
   The actual growth in traffic volume on the Manado-Bitung Toll Road is currently above 4% (P5), influenced by economic growth, community activities and the operation of the Bitung Port. Other growth potential comes from the Bitung Special Economic Zone development plan (P4, P5). However, the presence of the Soekarno Toll Road as a direct competitor can influence future traffic projections (P5).
2) Toll Road Tariff Validation:
   The rates currently applied consider the return on investment made by ATP and WTP (P3, P4, P5). However, the Manado-Bitung Toll Road has high tariff sensitivity, considering that there are non-toll roads that are competitors and are in good condition (P3, P5). Attempts to make special rate adjustments are unlikely to increase revenues (P4, P5).
3) Validation of Load Projections:
   The operating costs of the Manado Bitung Toll Road are above IDR 1 billion per km, influenced by inflation, wages, and have been optimized through operational efficiency, maintenance programs and organizational structure (P2, P3, P5).
4) Toll Road Business Validation:
   There are several main parameters that influence the feasibility of toll roads. The first parameter is the amount of investment costs. In infrastructure projects, large investments will affect the need for capital deposits and loans at the start of business (P1, P2, P3). The need for loans for investment costs will affect the amount of interest expense that must be paid during the operating period (P2, P3, P4) and is one of the
   , so that funding support from shareholders is needed during the operating period.
   maintenance costs and the more toll gates, the higher the toll road operating costs.
5) Sustainability of Toll Road Business:

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The parameters that are usually used as a reference for toll road sustainability are Project IRR, Equity IRR, NPV and payback period. The project IRR is expected to be greater than the WACC. So that investors can receive returns on investment according to expectations. Apart from that, NPV also greatly influences the sustainability of toll road operations, because this value will describe the amount of return on shareholder investment which will be reflected in the amount of dividends that will be received. The payback period is also one of the main parameters because it will be a reference for the enjoyment period that investors will experience. The faster the payback period, the smaller the negative period and the faster the return on investment that shareholders will receive.

6) Feasibility Improvement Strategy:
Internal efforts involve optimizing revenue, operating/maintenance expense efficiency, and organizational structure. Government support can also play a role in increasing feasibility (P1, P2, P3, P4, P5).

Additionally, capital structure changes can be sought to optimize cash flow for shareholders. This optimization aims to obtain the optimal portion of debt, reduce interest expenses, and increase dividends for shareholders [22], [24], [25]. Additional measures may involve special tariff adjustments and extension of concession periods. However, tariff adjustments must be considered considering the ATP and WTP values to obtain optimal income (P4, P5). Although the concession period can increase viability, it does not overcome the problem of negative equity during the initial period of operation (P1, P2, P3).

Quantitative Analysis

Macroeconomic

1) Economic Growth
The Indonesian economy continues to experience growth, in 2022 the Indonesian economy will experience growth of 5.31%, higher than the achievement in 2021, namely 3.70%. The Indonesian economy needs to grow by 5.5 percent (YoY) in the second semester of 2023 to achieve the 2023 RKP target. Considering this performance and the downside risks originating from global economic conditions, Indonesia's economic growth is predicted to decrease from the 2023 RKP target of 5.3 percent (YoY) to 5.2 percent (YoY). Even though various international institutions project that the global economy will experience a slowdown in 2023, the Indonesian government remains optimistic, targeting Indonesia's economic growth of 5.3% in 2023.

Table 3. Gross Domestic Product Growth Projections

Region	FY 2021	FY 2022	TW II 2023
Indonesia	3,7%	5,31%	5,03%
North Sulawesi	4,16%	5,20%	6,28%

If look at the period 2021 to the second quarter of 2023, the economic growth of North Sulawesi Province is better than the national economic growth.

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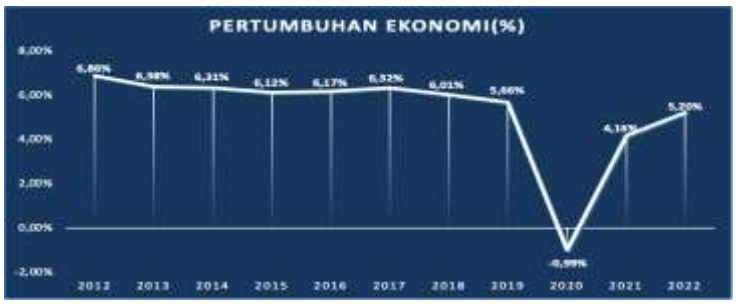

Figure 2. Economic Growth of North Sulawesi Province 2012 – 2022

2) Inflation Rate

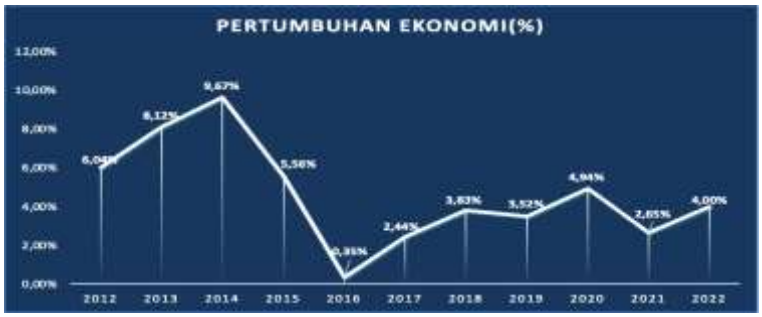

Figure 3. Manado Inflation Value 2012 – 2022

Based on data on inflation values in North Sulawesi Province, the average inflation value from 2012 to 2019 was 4.94%.

Analysis of Financial Aspects

Basic Assumptions

a) Revenue Projections

Generally, toll road tariffs are based on class 1 vehicle rates, with groups 2 and 3 being charged 1.5 times class 1, and groups 4 and 5 being charged 2 times class 1. In this study, the rate data used is the current rate. on the Manado Bitung Toll Road, IDR 44,000 for the longest distance or IDR 1,006/km. In addition, the author uses data on revenue and traffic volume on the Manado Toll Road which is documented in the financial reports of PT Jasa Marga (Persero) Tbk.

Table 4. Manado Bitung Toll Road Revenue

No	Year	Total (Rp Million)	Information	Source
1	2020	6.653	From 30 October 2020	Financial Report PT Jasa Marga Year 2020
2	2021	35.718		Financial Report PT Jasa Marga Year 2021
3	2022	51.226		Financial Report PT Jasa Marga Year 2022
4	2023	28.734	until 30 June 2023	Financial Report PT Jasa Marga Q II Year 2023

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Table 5. Manado Bitung Toll Road traffic volume

No	Year	Total (Million Vechicle.)	Information	Source
1	2020	3,0	Sejak 30 Oktober 2020	Financial Report PT Jasa Marga Year 2020
2	2021	16,0		Financial Report PT Jasa Marga Year 2021
3	2022	20,0		Financial Report PT Jasa Marga Year 2022

b) Discount Rate

The discount rate value is calculated based on the WACC calculation. Each capital category is weighted proportionally. The funding scheme agreed upon was 30% own capital and 70% bank loan.

$$R_e = R_f + \beta\,(R_m - R_f)$$
$$R_e = 7{,}11\% + 0{,}96\,(9{,}23\%)$$
$$R_e = 15{,}98\%$$
$$WACC = 30\%\ x\ R_e + 70\%\ x\ R_D\,(1 - T)$$
$$WACC = 30\%\ x\ 15{,}98\% + 70\%\ x\ 8{,}56\%\,(1 - 22\%)$$
$$WACC = 9{,}47\%$$

From the calculation above, the discount rate used to calculate the NPV of the project is around 9.47%.

c) Operation and Maintenance Cost Assumptions

The author uses the operating and maintenance costs mentioned in the annual report of PT Jasa Marga (Persero) Tbk in 2020. For the following year, it is assumed that there will be an increase in operating and maintenance costs equal to inflation or 4.94% per year.

d) Investment Cost Assumptions

Table 6. Investment Cost Assumptions

No	Year	Investment Cost (Rp Million)	Source
1	2017	411.470,0	Financial Report PT Jasa Marga Year 2017
2	2018	1.195.708,0	Financial Report PT Jasa Marga Year 2018
3	2019	1.038.191,0	Financial Report PT Jasa Marga Year 2019
4	2020	1.142.833,0	Financial Report PT Jasa Marga Year 2020
5	2021	789.347,0	Financial Report PT Jasa Marga Year 2021
6	2022	122.305,0	Financial Report PT Jasa Marga Year 2022

Financial Feasibility Analysis and Scenario Analysis

1) Analysis of the Financial Feasibility of the Existing Manado Bitung Toll Road

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Table 7. Calculation Assumptions for the Feasibility of the Manado Bitung Toll Road

No	Description	Value	Source
1	Investment Cost	Rp 4.699.854.000.000	Financial Report PT Jasa Marga Year 2022
2	Assumption of Tariff Increase	9,88%	Manado Inflation Average 2012 - 2019
3	Assumption of Average Traffic Growth	6,23%	Average economic growth for North Sulawesi 2012 - 2019
4	Toll Road Revenue		
	2020	Rp 6.653.000.000	Financial Report PT Jasa Marga Year 2020
	2021	Rp 35.718.000.000	Financial Report PT Jasa Marga Year 2021
	2022	Rp 51.226.000.000	Financial Report PT Jasa Marga Year 2022
	2023	Rp 57.468.151.715	Financial Report PT Jasa Marga Year 2023 Q2
5	Operation and Maintenance Costs		
	2020	Rp 18.253.000.000	Financial Report PT Jasa Marga Year 2020
	2021	Rp 36.506.000.000	Processed
	2022	Rp 37.601.180.000	Processed
	2023	Rp 38.729.215.400	Processed
6	Interest Rate Assumptions	8,56%	BI 7 days reporate (2017) + 2%
7	Concession period	40 Years	Financial Report PT Jasa Marga Year 2020
8	WACC	9,47%	Processed

Table 8. Feasibility of the Manado Bitung Toll Road

No	Description	Value (Initial Scenario)
1	IRR Project	5,72%
2	NPV (Rp juta)	(2.282.682)
3	Payback period (year)	26,60
4	IRR Equity	5,23%
5	Cash Deficit (Rp Million)	3.019.768

In this research, several scenarios will be used, including the following:

a) Scenario A: Efficient Operation and Maintenance (OM) Expenses
b) Scenario B: Paying Off Debt

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c) Scenario C: Proposing Concession Period Negotiations
d) Scenario D: Proposing an Availability Payment Scheme

2) Analysis of the Financial Feasibility of the Manado Bitung Toll Road with OM Load Efficiency

Table 9. Feasibility Comparison of Initial Scenario and Scenario A

No	Description	Initial Scenario	Scenario 1	Deviation
1	IRR Project	5,72%	5,88%	0,16%
2	NPV (Rp million)	(2.282.682)	(2.199.779)	82.903
3	Payback period (year)	26,60	25,76	(0,84)
4	IRR Equity	5,23%	5,67%	0,43%
5	Cash Deficit (Rp million)	3.019.768	2.749.071	(270.698)

Based on the results of the analysis, it was found that by carrying out operational and maintenance load efficiency of 20% starting in 2024, it increases the feasibility of the Manado Bitung Toll Road. The project IRR value increased 0.16% and NPV increased IDR 82.9 billion. This is due to the efficiency of OM expenses, which will reduce the cash outflow from the company so that the EBITDA value will increase. However, increasing the feasibility of toll roads with an OM load efficiency of 20% only slightly affects feasibility. This can be seen from the project IRR value below WACC, the NPV value is still negative. So other efforts need to be made to improve the feasibility of toll roads.

Analysis of the Financial Feasibility of the Manado Bitung Toll Road with Debt Repayment

Analysis is carried out by making the analysis sensitivity as follows:

a) Scenario B1: If 50% of debt is paid off in 2024.
b) Scenario B2: If 75% of debt is repaid in 2024.
c) Scenario B3: If 100% of the debt is repaid in 2024.

Table 10. Feasibility Comparison of Initial Scenario and Scenario B

No	Description	Initial Scenario	Scenario B1	Scenario B1	Scenario B2
1	IRR Project	5,72%	5,72%	5,72%	5,72%
2	NPV (Rp million)	(2.282.682)	(2.282.682)	(2.282.682)	(2.282.682)
3	Payback period (year)	26,60	28,20	25,88	24,96
4	IRR Equity	5,23%	5,10%	5,35%	5,47%
5	Cash Deficit (Rp million)	3.019.768	2.072.392	2.960.148	3.847.904

Analysis of the Financial Feasibility of the Manado Bitung Toll Road with Concession Period Negotiations

Analysis is carried out by making the analysis sensitivity as follows:

a) Scenario C1: If the Concession Period Becomes 50 Years

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b) Scenario C2: If the Concession Period Becomes 75 Years
c) Scenario C3: If the Concession Period Becomes 100 Years
d) Scenario C4: If the Concession Period Becomes 150 Years

Table 11. Feasibility Comparison of Initial Scenario and Scenario C

No	Description	Initial Scenario	Scenario C1	Scenario C2	Scenario C3	Scenario C4
1	IRR Project	5,72%	7,17%	8,74%	9,25%	9,42%
2	NPV (Rp million)	(2.282.682)	(1.834.952)	(916.700)	(349.557)	(84.029)
3	Payback period (tahun)	26,60	26,84	27,10	27,18	27,23
4	IRR Equity	5,23%	7,02%	8,81%	9,36%	9,54%
5	Cash Defisit (Rp million)	3.019.768	3.028.996	3.040.895	3.045.234	3.047.431

Analysis of the Financial Feasibility of the Manado Bitung Toll Road by Proposing Availability Payment

Table 12. Feasibility Comparison of Initial Scenario and Scenario D

No	Description	Initial Scenario	Scenario D
1	IRR Project	5,72%	9,47%
2	NPV (Rp million)	(2.282.682)	-
3	Payback period (year)	26,60	16,05
4	IRR Equity	5,23%	10,29%
5	Cash Deficit (Rp million)	3.019.768	860.741
6	Total Deviden (Rp million)	2.038.958	3.128.792

Based on the analysis results, it was found that an AP of IDR 370.336 billion is needed from 2024 to 2038 or for 15 years so that the project IRR can reach WACC. It is assumed that the AP value that the company will get will increase by inflation every year. Based on the results of the analysis, it was found that the existence of AP starting in 2024 could reduce the cash deficit from IDR 3.019 trillion to IDR 860.741 billion. Apart from that, AP can accelerate the payback period to 16.05 years.

Sensitivity Analysis

The sensitivity analysis carried out is a deterministic sensitivity analysis, where only one variable changes, while the other variables have a fixed value.

Sensitivity of Inflation and Traffic Volume to Project IRR

To determine the effect of changes in the inflation value and traffic volume on the financial feasibility of the Manado Bitung Toll Road, it is assumed that the inflation value will change from -45% to +45% of the actual value so that there will be a change in the Net Present Value (NPV), IRR Project and Payback Period.

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Figure 4. Sensitivity of Changes in Inflation Values and Traffic Volumes to Changes in IRR Project Values

From the graph above it can be concluded that a decrease in traffic volume and inflation will reduce project IRR. In addition, changes in traffic volume have a higher sensitivity than inflation. This is indicated by the same percentage change value; the Project IRR value of the project will have a greater deviation from traffic volume compared to inflation.

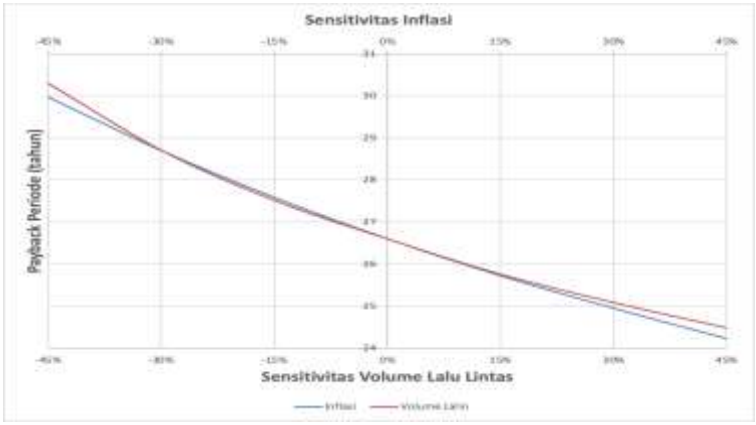

Figure 5. Sensitivity of Changes in Inflation Values and Traffic Volumes to Changes in Payback Period

From the graph above it can be concluded that a decrease in traffic volume and inflation will increase the payback period. In addition, a decrease in inflation of up to 30% will have a greater impact on the payback period compared to a decrease in traffic volume of up to 30%. Meanwhile, a decrease in inflation of more than 30% will have a smaller impact compared to traffic volume when linked to the payback period. Meanwhile, an increase in inflation above 0% will have a greater impact than traffic volume on the payback period.

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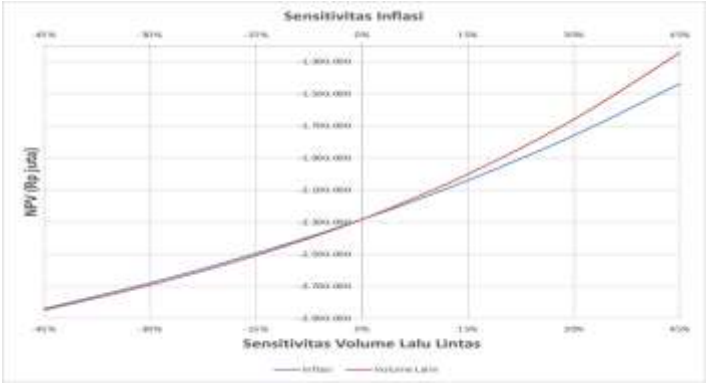

Figure 6. Sensitivity of Changes in Inflation Values and Traffic Volumes to Changes in NPV Values

Based on the graph above, it can be concluded that the lower the inflation value and traffic volume, the lower the NPV will be. Changes in traffic volume will influence changes in NPV more than inflation. This is because traffic volume will directly affect revenue. Although an increase in traffic volume will also affect operation and maintenance costs, not all costs will be directly proportional to the increase in volume, such as HR, BUA, PBB and other costs. This is different from inflation, which will directly affect income as well as operating and maintenance costs.

Strategy to Increase the Feasibility of Toll Road Projects that Have Low Feasibility

The following is a comparison of PPP scheme arrangements in Indonesia and Canada:

Aspect	Indonesia	India	Canada
Object of Collaboration	There are 12 Economic Infrastructure Sectors and 6 Social Infrastructure Sectors	Roads, Bridges, Railways, Seaports, airports, deep water, Power, Transportation, Water Supply, Sewerage, Waste Management, Areas, International Convention Centers, Health, Education	Roads, Bridges, Health, Management of water and waste systems, Education, Transportation, justice facilities
Return on Investment	1. Payment from users 2. Payment for service availability (Availability Payment) 3. Other forms as long as they do not conflict with statutory provisions	1. Payment from users 2. Hybrid Annuity Concession Model 3. Other forms as long as they do not conflict with statutory provisions	1. Payment from users 2. Payment for service availability (Availability Payment) 3. Shadow tolls

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Aspect	Indonesia	India	Canada
Payment Availability Criteria	1. The return on investment does not come from payments by users for service fees 2. In the event that a PPP project receives income from payments by users for service rates, the GCA cannot take into account the amount of income from payments from service users to make payments for service availability to the Implementing Business Entity 3. 15 Year Concession Period	1. There are payments in the form of annuities throughout the concession period and partial payments from the Government 2. 60% of construction is borne by the private sector 3. Concession period of 15 years	1. Almost all PPP projects in Canada 2. Return on investment, a combination of payments by users for service rates and availability payments. 3. Concession period 20 to 30 years

In Indonesia, projects that are economical but not financially viable can use the PPP financing scheme with Availability Payment or BUMN Assignment. The Availability Payment Agreement in Indonesia includes performance indicators, calculation formulas and effective monitoring for 15 years.

In India, the Hybrid Annuity Concession Model was introduced, like Availability Payment. Investment costs are shared 40% by the Government and 60% by the private sector, with annuity payments and a portion from the Government over the 15-year concession.

In Canada, almost all PPPs use the Availability Payment scheme for 20-30 years. There are additional incentives for service providers who use high-quality materials. In 2020, the Government of Canada developed the Integrated Project Delivery/Alliance concept, a collaborative approach to construction with compensation based on project stage milestones.

CONCLUSION

The feasibility analysis of the Manado-Bitung Toll Road reveals critical strategies to enhance the viability of toll road infrastructure projects facing low feasibility. The research explores various approaches, including Scenario A, focusing on Operation and Maintenance (OM) Expense Efficiency, which proposes a 20% reduction in costs from 2024 onward. This results in an increased project Internal Rate of Return (IRR) by 0.16% and a Net Present Value (NPV) boost of IDR 82.9 billion. Scenario B emphasizes Debt Repayment, showcasing that while it doesn't directly impact IRR and NPV, clearing debt accelerates the

payback period. The study indicates that repaying up to 75% of the debt is feasible, supported by an enhanced IRR equity and reduced cash deficit. Scenario C explores Concession Period Negotiations, revealing that extending the concession period can enhance project feasibility by boosting IRR. However, the impact diminishes with an extended concession period, leading to a negative NPV even at 150 years. Lastly, Scenario D introduces the Availability Payment Scheme (AP), showing that an AP of IDR 370.336 billion from 2024 to 2038 aligns with the project IRR according to Weighted Average Cost of Capital (WACC). With AP implementation, the cash deficit decreases substantially, and the payback period shortens to 16.05 years, proving to be the sole scenario increasing IRR>WACC and NPV>0, with the potential for optimal results through scenario combination.

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