Evaluation Towards Government Assignment to State Owned Enterprise (SOE) on Sumatera Toll Road Operation for 2014-2019 Period

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Abstract: *Evaluation Towards Government Assignment to State Owned Enterprise (SOE) on Sumatera Toll Road Operation for 2014-2019 Period seeks to examine the impact of the government's assignment to company's financial performance during concession period. The object of research are Bakauheni-Terbanggi Besar section, Terbanggi Besar-Pematang Panggang-Kayu Agung section, Palembang-Indralaya section, Pekanbaru-Dumai section, and Medan-Binjai section. This study employs a quantitative research methodology with a case study approach, in which relevant literature is examined and the necessary secondary data is gathered. In order to ascertain if five toll road sections were feasible, analysis was done on previously gathered data using the following criteria: Net Present Value, Adjusted Present Value, Cost and Benefit Analysis, and Economic Benefit Analysis. The effects of the project on business performance and the viability of implementing a toll road project were then determined by balancing the results. From 5 sections, it was concluded that the Bakauheni-Terbanggi Besar, the Palembang-Indralaya and Medan-Binjai section provide additional value to the company's performance during concession period. These five sections offer substantial benefits that should be implemented based on the total economic benefits calculation. Long-term income uncertainty, financial restraints, high interest rates, inappropriate traffic volumes, operational costs that exceed planning, and low willingness to pay are all influencing factors.*

Keywords*: Adjusted Present Value, Cost and Benefit Analysis,Trans Sumatera Toll Road, Economic Benefit Analysis, Net Present Value.*

INTRODUCTION

Indonesia's economy, being an archipelagic nation, faces several challenges, one of which is its inadequate infrastructure, both in terms of number and quality. Referring to the 2015-2016 Global Competitiveness Report data from the World Economic Forum (WEF), Indonesia is ranked 62nd out of 140 countries in terms of infrastructure development. The goal of infrastructure development is to close the gap between the capacity for economic development and the potential for economic growth. Infrastructure accessibility affects how efficiently logistical costs are handled, which directly affects business costs and Indonesia's capacity to compete in the region. It is envisaged that macroeconomic development and infrastructure development would be correlated in some way, with infrastructure development acting as a multiplier for economic growth.

One of Indonesia's larger islands, Sumatera Island, ranks second in terms of its contribution to the country's Gross Domestic Product (GDP), behind Java. The Central Statistics Agency reports that Sumatera Island contributes for 21.66 percent of the country's GDP. Sumatera Island is a promising place for development in the future because of its numerous industrial areas, mining, plantations, tourism, and regional gateways (ports and airports). Building infrastructure that can link critical locations and growth hubs on the island of Sumatera is essential to boosting economic growth since it will save money on transportation, shorten travel times, and facilitate the

flow of people and things more quickly. Toll roads are one kind of infrastructure that may be able to help with this connectivity issue.

The government is working to speed up the process of developing toll road infrastructure on the island of Sumatera, which is economically feasible but not yet financially viable. This includes increasing the budget for infrastructure development and assigning a State-Owned Enterprises (SOE) to take charge of planning, funding, construction, operation, and maintenance related to the Trans Sumatera Toll Road project. The government is facing a complex development context with the availability of funds and existing needs.

Among the ways that the government might use its limited resources to speed up infrastructure construction is through the assignment of SOE. When compared to comparable private corporations, SOE appears to have more financial capacity and assets. It also possesses leverage, which makes it easier to obtain additional funding from foreign syndications as well as national banks. Finally, SOE is eligible for a number of privileges that are allowed by applicable regulations.

One of SOE is a state-owned enterprise that provides construction services, development, and toll road services. The Ministry of BUMN, on behalf of the Government of the Republic of Indonesia, holds 100% ownership of the company. Presidential Regulation Number 100 of 2014, as amended in part by Presidential Regulation Number 117 of 2015, assigned this State Owned Enterprise (SOE) the assignment of operating 24 economically feasible but not yet financially viable sections of the 2,704-kilometer Trans Sumatera Toll Road.

In the assignment referred to, eight toll roads are targeted for completion in 2019 and the rest will be completed in the 2020-2024 period. However, based on the latest project completion progress data submitted by the Toll Road Regulatory Agency as of October 7 2019, there are five toll sections that are eligible for operation in 2019. These include the Bakauheni-Terbanggi Besar section, the Terbanggi Besar-Pematang Panggang-Kayu Agung section, the Palembang-Indralaya section, the Medan-Binjai section, and the Pekanbaru-Dumai section.

Numerous scientific studies that have been published in various research journals are relevant to the research material, which concerns the viability of toll road operations that are financially feasible but not yet economically viable. It is difficult to bring in private investors to the infrastructure sector, especially for toll road projects for which the Infrastructure Summit in 2005 and 2006 did not succeed in attracting funding. The project must be financially appealing with particular indicators derived from net present value or internal rate of return in order to attract investors (Wibowo, 2011). Development of toll roads in new/commercially undeveloped areas (greenfield) has a critical point regarding financial sustainability. Three potential issues—uncertainty around long-term project revenues, government budget limits, and insufficient government support for land acquisition—were noted as potential sources of unsustainability (Sihombing et al., 2018).

The rate of return on toll road investment is influenced by a number of factors, including SBI, inflation and traffic growth (Alfian, 2013), changes in field investment costs (Fissabil et al., 2014), toll revenues (Truong et al., 2020), service users' willingness or ability to pay (Wraharjo et al., 2021), and the diversion rate as a result of toll road substitution alternatives (Glenn, 1996). The risks that are in line with relevant research results also have a direct connection to the factors that affect toll road operations. These risks include the following: 22 factors that affect the viability of toll road projects in Vietnam (Nguyen et al., 2018) and 13 dominant or related risks close to the Trans Sumatera Toll Road (Pratama et al., 2023).

The absence of research using case studies on the assignment of particular toll road sections within the same project completion period and the additional use of economic benefit parameters to provide alternative feasibility of a project to be implemented are research gaps from prior studies. The Kandis-Dumai stretch (Alfian, 2010), the Pekanbaru-Kandis section (Alfian,

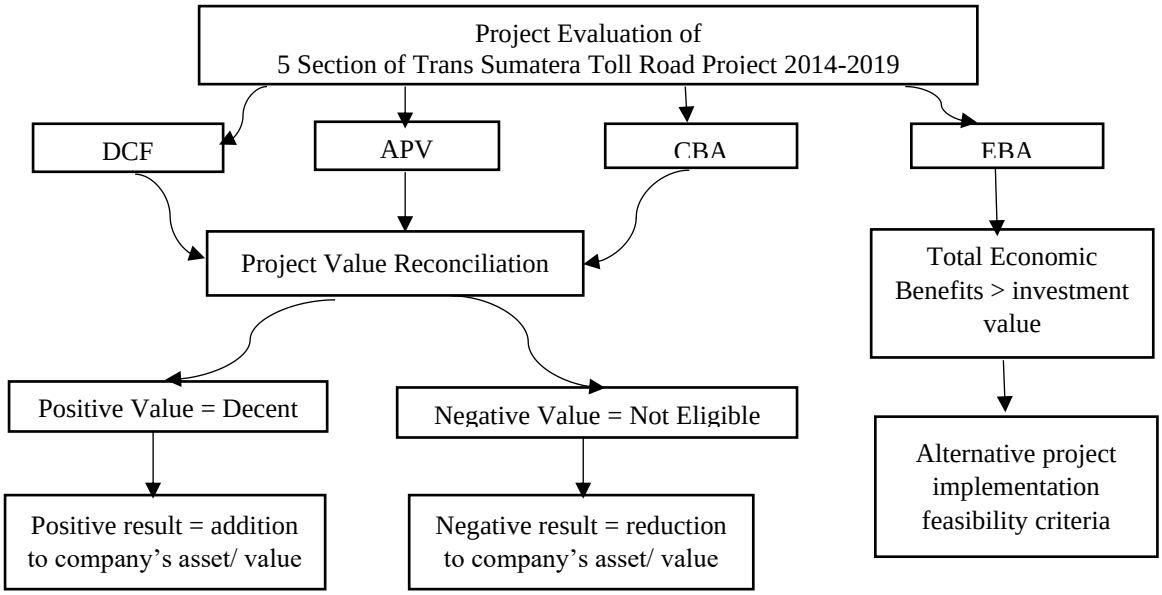
2013), the Palembang-Indralaya section (Marin, 2017), and the Padang-Sicincin toll road section (Primadia & Purnawan, 2023) were focused on researching only one toll road section.

METHOD

According to Sugiyono (2019), research methods are a scientific way to obtain data with specific purposes and uses. When carrying out scientific research, it is necessary to consider scientific methods, data, objectives and uses.The method used in this research is a quantitative method with a case study approach by collecting secondary data originating from literature study documentation in previous studies and secondary data needed in the analysis for modeling the financing of toll road projects which are the object of research.

According to Arikunto (2010), case study is a type of research that is done thoroughly, in-depth, and in detail on a particular organization, institution, or set of symptoms. Case research only covers a very precise and limited region when considered from the geographical perspective; however, when evaluated from the perspective of the research nature, case research is more comprehensive. The Trans Sumatera Toll Road's five toll sections were the subject of quantitative research using a case study approach. Several tools for toll road financing modeling were used, including net present value (NPV) on discounted cash flows, adjusted present value (APV), cost and benefit analysis (CBA), and economic benefit analysis (EBA).

Conceptual framework of this study as follows:



Source: created for this research (2020)

RESULT AND DISCUSSION

The operation of the Trans Sumatera Toll Road as an assignment from the Government to the SOE State Owned Enterprise (SOE) is an example of implementing infrastructure development rapidly using the capabilities of a company that can raise funds or carry out financing for its implementation when the availability of Government's fund is insufficient. The appointment of SOE was motivated by the private sector's reluctance to be involved in the project due to the characteristics of the project being economically feasible but not yet financially viable. Apart from that, the characteristics of infrastructure projects require large funding with uncertainty about long-term sustainability.

The characteristics of the Trans Sumatera Toll Road Project (JTTS) which is economically feasible but not financially feasible means that the return on investment for this project will take a

long time but the people and region of Sumatera Island depend on it economically because it is essential to both the region's economy and transportation system and serves as a lever for regional development. Apart from that, the completion of the Trans Sumatera Toll Road Project (JTTS) is also seen as a strategic political policy that offers fair and balanced development which is not only centered in Java but also in Sumatera. In the development and operation of the Trans Sumatera Toll Road which was assigned in the 2014-2019 period, there are five sections that can be operated in 2019 including the Bakauheni-Terbanggi Besar section, the Terbanggi Besar-Pematang Panggang-Kayu Agung section, the Palembang-Indralaya section, the Medan section - Binjai, and the Pekanbaru-Dumai section.

Table 1. Profile of Trans Sumatera Toll Road Sections 2014-2019

Toll Road Section	Section length (km)	Vehicle traffic volume per day (initial estimate)	Investment cost (trillion)
Bakauheni-Terbanggi Besar	140,93	11.793	16,795
Terbanggi Besar-Pematang Panggang-Kayu Agung	189,2	6.522	21,950
Palembang-Indralaya	21,93	6.655	3,301
Pekanbaru-Dumai	131,47	9.708	16,211
Medan-Binjai	16,72	16.127	2,500

Source: website of the company

Based on the provisions of Presidential Regulation of the Republic of Indonesia Number 100 of 2014 concerning the Acceleration of Toll Road Development in Sumatera in Article 5 it is stated that funding for the assignment given to State Owned Enterprise (SOE) consists of state capital participation (PMN), continuation of loans from government loans originating from abroad and/or domestically, issuance of bonds by State Owned Enterprise (SOE), State Owned Enterprise (SOE) loans from financial institutions (including multilateral financial institutions), loans and/or other forms of funding from government investment agencies, as well as other funding in accordance with statutory provisions.

Tabel 2. Funding Scheme for the Trans Sumatera Toll Road Project 2014-2019

Toll Road Section	Investment costs (trillion)	Equity (trillion)	Loan (trillion)	Asset securitization and/or construction support (trillion)
Bakauheni-Terbanggi Besar	16,795	2,217	8,078	6,500
Terbanggi Besar-Pematang Panggang-Kayu Agung	21,950	4,000	9,574	8,376
Palembang-Indralaya	3,301	2,311	0,990	
Pekanbaru-Dumai	16,211	5,227	6,484	4,500
Medan-Binjai	2,500	1,014	1,486	

Source: website of the company

The amount of toll rates paid by toll service customers is the primary source of revenue for toll road operations and is received by the Toll Road Business Entity (BUJT). Based on the expected daily traffic volume (LHR), the volume of annual traffic must be included when determining the amount of revenue inflow. The amount of daily traffic as a reference for calculating toll road revenue is based on the results of an analysis of the total traffic volume in one month (vehicles per month) divided by the number of days in one month. The total BUJT revenue is calculated by multiplying the annual traffic volume, which is the aggregate, by the toll rate. According to Law Number 38 of 2004 concerning Roads, toll rate adjustments are made every two years. In essence, these adjustments reflect inflation-related declines in the value of the currency. The Toll Road Regulatory Agency (BPJT) adjusts tariffs in accordance with Government Regulation Number 15 of 2005 concerning Toll Roads Article 68. The formula used to adjust for

inflation is New toll tariff = Old toll tariff (1+inflation). The toll rate adjustment projection may experience its own adjustments if the latest secondary data is found as a result of Government policy in a particular year in the projections made.

Table 3. Average Annual Provincial Inflation at Trans Sumatera Toll Road Locations

Province	Annual Inflation						Average Inflation
	2014	2015	2016	2017	2018	2019	
Lampung	8,36	4,65	2,75	3,14	2,92	N/A	4,36
Sumatera Selatan	8,38	3,05	3,68	2,85	2,75	N/A	4,14
Riau	8,53	2,71	4,19	4,07	2,54	N/A	4,40
Sumatera Utara	8,24	3,32	6,60	3,18	1,00	N/A	4,46

Source: website of the Provincial Central Statistics Agency in each province

Meanwhile, to determine the increase in daily traffic flow (cumulative annual) using the average increase in Gross Regional Domestic Product (PDRB) in Lampung Province, South Sumatera Province, Riau Province and North Sumatera Province for the 2012-2019 period.

Table 4. Average provincial PDRB at the Trans Sumatera Toll Road location

Year	2014	2015	2016	2017	2018	2019	Average
Lampung	5,08	5,13	5,14	5,16	5,25	N/A	5,15%
Sumatera Selatan	7,18	9,77	7,01	8,37	7,36	N/A	7,93%
Riau	N/A	9,16	3,83	2,80	3,55	4,18	4,70%
Tahun	2012	2013	2014	2015	2016	2017	
Sumatera Utara	8,25	7,41	5,57	5,68	6,07	7,35	6,72%

Source: website of the Provincial Central Statistics Agency in each province

Other income in toll road concession projects can be in the form of other income obtained from advertising/billboards and rest areas assuming a multiplier of 1.5% of toll revenue. Furthermore, due to limited data relating to the amount of loan interest charged on loans made by State Owned Enterprise (SOE) in this assignment, the average corporate basic credit interest rate (SBDK) (in percent per year) for the period 2014- 2019 from state-owned banking, in this case PT Bank Rakyat Indonesia (Persero) Tbk, PT Bank Mandiri (Persero) Tbk, and PT Bank Negara Indonesia (Persero) Tbk taken from the Financial Services Authority (OJK) website. The amount of the risk premium is considered zero because there is a guarantee from the Government for the risk of loan default (default risk) carried out by State Owned Enterprise (SOE) in carrying out the assignment of the Trans Sumatera Toll Road (JTTS) project.

Table 5. Average Basic Credit Interest Rate (SBDK) for SOE Banking

Bank	2014	2015	2016	2017	2018	2019	Average	Total Average
Bank BRI (Persero)	N/A	10,75	10,5	10,95	10,5	9,95	10,53	10,41%
Bank Mandiri (Persero)	N/A	10,5	10,25	10,95	9,95	9,95	10,32	
Bank BNI (Persero)	N/A	10,75	10,25	10,80	10,25	9,95	10,40	

Sumber ; website Financial Services Authority (OJK)

According to Yukeiko et al. (2014), financing is the total of all expenses incurred; this is also known as cash out or outcash flow. Outcash flow in research on toll road construction scenarios comprises construction-related costs as well as operating and maintenance costs. The operational load calculation assumptions are calculated by taking comparative data on the Projected Operation and Maintenance Costs in the Business Plan Document for the Terbanggi Besar-Pematang Panggang Section (Purwanti, 2017). To adjust the operational and maintenance costs between sections in the Trans Sumatera Toll Road Project, the percentage of construction costs for each section will be compared with the Terbanggi Besar-Pematang Panggang Section (part of the Terbanggi Besar-Pematang Panggang-Kayu Agung Section) as a basic index = 100 .

Consider using construction costs per kilometer as a comparison figure for maintenance costs because construction costs are closely related to the difficulty of construction or the technology used and natural contours that influence future maintenance.

Table 6. Multiplier Index for Operational Costs and Maintenance Costs

Sections	Terbanggi Besar-P.Panggang	Medan-Binjai	Palembang-Indralaya	Bakauhuni-T.Besar	Pekanbaru-Dumai
Construction Cost	Rp 16,65 T	Rp 1,29 T	Rp 2,63 T	Rp 12,22 T	Rp 12,18 T
Length	189,2	16,72	21,93	140,7	131,5
Construction Cost per KM	Rp 88,002 Billion	Rp77,153 Billion	Rp119,927 Billion	Rp86,851 Billion	Rp92,623 Billion
Index	100	87,67	136,28	98,69	105,25

Source: secondary data analysis

Apart from operational costs and maintenance costs, there are other costs taken into account in the analysis which can vary from one section to another, namely securitization interest expenses and loan interest expenses.In the meantime, weighted average cost of capital (WACC) calculations are used to determine the amount of discount rate that will be used in the net present value calculations from the difference in cash flow (cash flow) entry and exit on each section. WACC accounts for the cost of capital (cost of equity) and loan costs (cost of debt) based on the proportion between loans (bonds or bank loans), equity, and related tax rates.

Formula:

a. *Cost of debt* = interest rate x (1- applicable tax rate)
b. *Cost* of equity for funds obtained from asset securitization is assumed to be the same as the rate of return on PT Jasa Marga's asset securitization (KIK-EBA Mandiri JSMR01-Jagorawi Toll Revenue Securities in August 2017) namely 8.4% with an interest and principal repayment period of 25 years.
c. *Cost of equity* for funds obtained from state capital participation (PMN) are calculated using the CAPM formula, namely cost of equity = Rf + β*(Rm – Rf). Rf (risk free rate) using the reference of Government Securities (SUN) Saving Bond Retail (SBR) Series SBR005 with a coupon rate of 8.15%, the beta is assumed to be equal to the beta of Wijaya Karya (Persero) Tbk (taking into account the size of profit) as of 22 November 2019 (Pefindo Beta Stock) of 1.982 and the return on the infrastructure sector stock index as of March 19 2019 was 11.42%. Calculation results cost of equity This is multiplied by the premium for closed company information bias of 20% -40% as stated by KJPP Tri, Santi and Partners (2011). In this research, the lowest value was taken because BUMN is considered to have credibility so that the information and data presented can be accounted for.
   Cost of equity = Rf + β*(Rm – Rf)
   Cost of equity of closed company = (1 + information bias premium) x CoE
d. In determining the discount rate, WACC is used with the equation WACC = $(w_d \times k_d) + (w_e \times k_e)$.

Table 7. Discount Rate on the Trans Sumatera Toll Road Project

Section	CoD of Loan	CoD Construction Support	CoE Asset Securitization	CoE PMN	Discount Rate
Bakauheni-Terbanggi Besar	7,80%		8,4%	17,56%	9,29%
Terbanggi Besar-Pematang Panggang-Kayu Agung	7,80%	8,25%		17,56%	8,7%
Palembang-Indralaya	7,80%			17,56%	14,63%
Pekanbaru-Dumai	7,80%		8,4%	17,56%	11,09%
Medan-Binjai	7,80%			17,56%	11,8%

Source: secondary data analysis

Based on the secondary data that has been collected, calculations are then carried out using net present value on discounted cash flows, adjusted present value, cost and benefit analysis, and analysis of economic benefits on each toll road section that is the object of study.

According to Rangkuti (2012), net present value is one of the measuring tools to determine the profitability of the investment we invest. The formula used to calculate the NPV in the Trans Sumatera Toll Road Project (JTTS) is:

$$NPV = \left[\frac{CF_1}{(1+k)} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n}{(1+k)^n}\right] - I_o$$

Explanation:
CF_1 CF_2 and so on are cash inflows from the first, second, third, and so on..
k represents discount rate
I_0 is initial cost of the investment required for the project
n is the project year period (concession period)

Luehrman (1997) explains that adjusted present value (APV) is designed to assess operations, or installed assets/ operational assets (assets-in-place), where the asset will generate cash flows in the future. All discounted cash flow methodologies (discounted cash flow) involves forecasting future cash flows and then discounting them to their present value at a rate that reflects the risk in question. However, these methodologies differ in the details of their application, especially in calculating the value created or reduced by financial maneuvers as opposed to operations. The APV approach is used to analyze financial maneuvers separately and then add the intended value to the business value.

	Basic value of project		**Overall value of financing side effects**
APV =	The value of the project if it is financed in its entirety using equity	+	Tax shield from interest, financial distress costs, subsidies, hedging, issuance costs, and other related costs.

Cost and benefit analysis, according to Schniederjans et al. (2004), is a method for analyzing costs and benefits that entails calculating and assessing the advantages of potential course of action. This method aids in decision making, especially long-term investment decisions, by comparing the value of current benefits with investments of the same investment costs.

Determine the economic costs and advantages from the government assignment to State Owned Enterprise (SOE), which directly affects the performance of the company, using the tools of cost and benefit analysis. The benefits can come in the form of additional post-regional development traffic assumptions, profits from regional development construction services, cash flow from other sources, and cash flow from toll revenues. In the meanwhile, there may be expenses related to maintenance and operation, asset securitization, loan interest, opportunity costs from other project tender chances, or late fees for the payment of bailout money for land acquisition.

Referring to the Decree of the Director General of State Assets Management Number 438/KN/2020, economic benefits are benefits obtained directly for the state and society from objects of analysis that can be measured in the form of money. In carrying out the economic benefit analysis, identification and calculation of all economic benefits for the object of analysis during the period of collaboration are carried out using data sourced from market research data, tax regulations, regional or national wage standards, and other reliable data sources.

Several economic benefits are closely tied to toll road management and the growth of related industrial sectors, according to the analysis of the Trans Sumatera Toll Road project's economic benefits for each part. The value added tax from sales of industrial areas, corporate income tax from toll road operations, regional economic turnover from toll road repairs and maintenance, and creation of community income from job creation in the Industrial Complex developed are among the economic benefits calculated. These are based on the assumption that there is one company per 1 hectare of effective development area, the land is sold within 10 years

from the 11th to the 20th year of the concession period, and the company's operations are phased in over 20 years.

Based on calculations carried out using instruments in toll road financing modeling, namely net present value (NPV) on discounted cash flows, adjusted present value (APV), cost and benefit analysis (CBA), and economic benefits analysis (EBA) during the concession period for the five toll road sections which were the object of research obtained the following results.

Table 8. Calculation Results of Toll Road Financing Modeling

Sections	NPV	APV	CBA	EBA
Bakauheni-Terbanggi Besar	7.950.162.983.130	-18.056.012.874.630	11.440.811.119.584	167.026.838.306.508
T Besar – P. Panggang-Kayu Agung	-21.761.710.195.567	-30.546.639.558.035	-20.628.872.039.206	82.425.243.977.645
Palembang-Indralaya	-3.525.622.347.990	-3.117.725.188.633	135.458.122.661	20.214.940.381.494
Pekanbaru-Dumai	-15.029.732.433.322	-22.018.526.590.901	-11.717.800.867.505	62.151.482.479.852
Medan-Binjai	-523.890.055.308	-2.745.002.320.464	495.931.782.712	28.350.136.274.626

Source: secondary data analysis

When the JTTS project's section generates a positive net present value (NPV), it indicates that the project generates more cash flow than it costs over the concession period, taking into account current time value of money.APV calculation that produces a positive APV means that the project or section is able to generate cash flows that can exceed the opportunity (opportunity) if the equity owned by State Owned Enterprise (SOE) is used for other projects that are more productive and economically viable. Meanwhile, if the resulting APV is negative then the JTTS project being implemented is worse than other more economical opportunities.

In the event that the CBA calculation produces a positive value, the value of the benefits resulting from the construction of the JTTS section (main activity cash flow and development activity cash flow) is greater than the costs incurred. Meanwhile, the total amount of economic benefits generated by the JTTS project shows the feasibility of being implemented with macroeconomic benefits or contributions if the value produced exceeds the value of the investment issued (initial outlay).

CONCLUSION

The Bakauheni-Terbanggi Besar section has positive NPV calculation results, negative APV, positive CBA, and Total Economic Benefits (from EBA) > Investment Value. In terms of cash flow without development (NPV), this section is feasible to implement, the equity owned by the Company will be better suited to implementing other, more profitable projects (APV), and if implemented with the potential for revenue from development (benefit) then this project can still be implemented. Positive CBA provides additional value to the Company and from TEB calculations produces large economic benefits.

The Terbanggi Besar-Pematang Panggang-Kayu Agung section has negative NPV, negative APV and negative CBA calculation results. In terms of cash flow without development (NPV), this section is not feasible to implement, the equity owned by the Company will be better used to carry out other, more profitable projects (APV), and if implemented with potential revenue from development (benefit) then the project still cannot be implemented. With the results of three negative parameters, this section project does not provide additional value to the Company. However, according to the TEB calculation which is > Investment Value, this project can be implemented with Government support so that the company does not suffer losses.

The Palembang-Indralaya section has negative NPV, negative APV and positive CBA calculation results. In terms of cash flow without development (NPV), this section is not feasible to implement, the equity owned by the Company will be better used to carry out other, more profitable projects (APV), and if implemented with potential revenue from development (benefit) then the project can be implemented. Positive CBA provides additional value to the Company and TEB calculations produce large economic benefits.

The Pekanbaru-Dumai section has negative NPV, negative APV and negative CBA calculation results. In terms of cash flow without development (NPV), this section is not feasible to implement, the equity owned by the Company will be better used to carry out other, more profitable projects (APV), and if implemented with potential revenue from development (benefit) then the project still cannot be implemented. With the results of three negative parameters, the project is no provide additional value to the Company. However, the results of the TEB > Investment Value calculation mean that the project can be implemented with Government support so that the company does not suffer losses.

The Medan-Binjai section has negative NPV, negative APV and positive CBA calculation results. In terms of cash flow without development (NPV), this section is not feasible to implement, the equity owned by the Company will be better used to carry out other, more profitable projects (APV), and if implemented with potential revenue from development (benefit) then the project can be implemented. Positive CBA provides additional value to the Company from TEB calculations resulting in large economic benefits.

According to the outcomes of the financing modeling studies for toll road projects, a number of criteria affect whether a toll road project is feasible to construct, including:

a. Long-term income uncertainty
   Since there are long-distance toll roads connecting locations with low populations, it is impossible to ensure future revenue growth. This is consistent with research findings by Sihombing et al. (2018), which show that long-term sustainability is a significant issue for toll road development in greenfield, or newly developed, areas, where one of the factors is long-term income uncertainty. Thruong et al. (2019) also provided similar research findings.
b. Budget constraints provided by the Government
   Toll road projects are generally long-term projects that require a very large investment value with a long payback period. This can burden the project's cash flow during the concession period if budget support is low.
c. High interest rates on loan
   Based on research findings, the largest portion of costs in managing JTTS is interest payments for loans and asset securitization. This is in line with research by Alfian (2010), Primadian & Purnawan (2023), Nguyen et al. (2018), and Pratama et al. (2023).
d. Estimated traffic volume and growth rate of toll road users are not match the plans
   The quantity of toll income received is insufficient to cover the initial investment and operations and maintenance expenses when traffic volume predictions in planning do not match the realization in the field. This discrepancy can be attributed to planning bias and optimism. This is consistent with the findings of studies conducted by Bain (2009), Alfian (2010), Alfian (2013), Alfian et al. (2017), and Sihombing (2017).
e. Operational and maintenance costs that exceed planning
   The rapidly bumpy and damaged road conditions on JTTS mean that the estimated operational and maintenance costs will increase than planned. This is in line with the research results of Primadia & Purnawan (2023), Nguyen et al. (2018), and Pratama et al. (2023).
f. Willingness to pay (WTP) and ability to pay (ATP) of toll road users is lower when compared to the expected increase in toll revenue
   We frequently deal with willingness to pay (WTP) and ability to pay (ATP) toll service consumers who are unable to follow in our attempt to raise toll rates on JTTS in order to

improve toll road revenues. Users of toll roads respond to the increase in toll charges by taking alternative routes, which prevents the anticipated rise in revenue from the rate increase from happening. This result is consistent with studies conducted by Glenn (1996), Wraharjo et al. (2021), Pratama et al. (2023), and Jeerangsuwan et al. (2014).

g. Benefit value from regional development in the JTTS planning is not fully detailed
Several toll road development plans lack clarity and depth regarding the additional benefits of regional development, which increases the possibility that the plans won't be realized exactly as intended. This is consistent with the findings on research conducted by Primadia & Purnawan's (2023).

Additionally, the TEB calculation's results indicate that the five sections generate economic benefits, indicating the necessity of their continued implementation. The research's findings also yield the following recommendations:

a. Restructuring can be done or requested from creditors/syndicators for loan interest obligations that are too much for the business to handle.
b. Special Mission Vehicle (SMV) is able to take over the loan and offer a cheaper interest rate in place of onerous loan interest costs.
c. Revitalization of weigh bridges and obligation for certain heavy-laden vehicles to use toll roads so that daily traffic volume can increase.
d. Offers toll rate reductions during months when vehicle daily traffic volume (LHR) is low.
e. Giving decision-makers a different way to evaluate the viability of constructing a toll road by looking at the overall economic benefits of doing so. This way, they can consider not just how the toll road will affect business performance but also how regional and macroeconomic factors will affect how much government support SOEs that get assigned.
f. The completion of additional sections is necessary to enable linkage between regions and enhance the Trans Sumatera toll road's usage value. Future regional investment and growth may be enhanced by linking the proposed JTTS sections in the Sumatera region.

REFERENCE

Alfian. (2010). Analisis Sensitivitas Variabel Berisiko Pada Pembangunan Infrastruktur Rencana Ruas Jalan Tol Kandis-Dumai. *Jurnal APTEK* Vol.3 No.1 Januari 2010, hal. 11-22.

Alfian. (2013). Analisa Sensitivitas Pertumbuhan Lalu Lintas dan Probabilitas Risiko pada Pembangunan Jalan Tol Kategori Priority Project. *Jurnal Teknik Sipil Universitas Atmajaya Yogyakarta*, Vol.12 No.3, Oktober 2013:181-191.

Alfian, Imam Suprayogi, dan Ari Sandhyavitri. (2017). Analisis Karakteristik Lalu Lintas Jalan Tol Trans Sumatera (Studi Kasus Ruas Jalan Tol Medan-Binjai). *Jurnal Fakultas Teknik Universitas Pasir Pengaraian*. Vol. 9 No.1, hal 10-17.

Arikunto, S. (2010). Prosedur Penelitian Suatu Pendekatan Praktik. Jakarta: Rineka Cipta.

Bain, Robert. (2009). Error and Optimism Bias in Toll Road Traffic Forecasts. Transportation 36, 469–482. https://doi.org/10.1007/s11116-009-9199-7.

Direktorat Jenderal Kekayaan Negara. (2020). Keputusan Direktur Jenderal Kekayaan Negara Nomor 438/KN/2020 tentang Pedoman Pelaksanaan Analisis Manfaat dan Dampak Ekonomi Sosial. Jakarta: Direktorat Jenderal Kekayaan Negara, Kementerian Keuangan.

Fissabil, Erlangga Jihadul, dan Ratu Nurmalika. (2014). Analisis Studi Kelayakan Investasi Dengan Metode Capital Budgeting, Studi Kasus: Proyek Jalan Tol Cijago. Jurnal Fakultas Teknik Sipil dan Perencanaan Universitas Gunadharma Jakarta hal 1-15.

Glenn, Thomas L. (1998). Procedures and Criteria Used to Evaluate The Financial Viability of Private Toll Road Projects by States and Private Entities Involved in The Approval, Financing, and/or Evaluation of Private Toll Road Projects. The Texas A&M University System.

Jeerangsuwan, Tanaphat, Said, Hisham, Kandil, Amr dan Ukkusuri, Satish. (2014). Financial Evaluation for Toll Road Projects Considering Traffic Volume and Serviceability Interactions. Journal of Infrastructure System.

KJPP Tri, Santi, dan Rekan. (2011). Penilaian Aset. Diakses 13 Oktober 2019, dari situs world wide web:http://www.kjpptrisanti.com/index.php?option=com_content&view=article &id =50%3Apenilaian-aset&catid= 31%3Aumum-jasa-danpelayanan>

Luehrman, Timothy A. (1997). Using APV: A Better Tool for Valuing Operations. Harvard Business Review May-June 1997. Reprint 97306 page 1-10. Diunduh dari situs world wide web: https://hbr.org/1997/05/using-apv-a-better-tool-for-valuing-operations, diakses 16 Januari 2020.

Marin, Martinus. (2017). Evaluasi Kelayakan Pembiayaan Pembangunan Jalan Tol Palembang Indralaya. Institut Teknologi Sepuluh November Surabaya. Makalah.

Nguyen, Anh, Mollik, Abu dan Chih, Ying-Yi. (2018). Managing Critical Risk Affecting the Financial Viability of Public-Private Partnership Projects: Case Study of Toll Road Projects in Vietnam. Journal of Construction Engineering and Management. 144(12).

Pratama, G. Ardi, Latief, Y. Trigunarsyah, Bambang, Riantini, L. Sagita dan Sihombing, Lukas Beladi. (2023). Enhancing Risk Assesment in Toll Road Operations: A Hybrid Rough Delphi-Rough DEMATEL Approach. Civil Engineering Journal, vol. 9, no. 09, 2130-2144.

Primadia, Rahadatul dan Purnawan. (2023). Economic and Financial Feasibilty Analysis of Pekanbaru-Padang Trans Sumatera Toll Road, Padang-Sicincin Section. E3S Web of Converences, 464, 15005.

Purwanti, Sri. (2017). Dokumen Rencana Usaha Terbanggi Besar-Pematang Panggang. Diakses 17 November 2019 dari situs world wide web: https://caridokumen.com/download/0127-bp-terbanggi-besar-pematang-panggang-_5a46b01db7d7bc7b7a18270e_pdf.

Rangkuti, Freddy. (2012). Studi Kelayakan Bisnis dan Investasi: Studi Kasus. Gramedia Pustaka Utama: Jakarta.

Schniederjans, Marc J., Jamie L. Hamaker, dan Ashlyn M. Schniederjans. (2004). Information Technology Investment: Decision Making Methodology. World Scientific Publishing Company: Singapore.

Sihombing, Lukas B., Yusuf Latief, Ayomi D. Rarasati, dan Andreas Wibowo. (2018). Project Financing Models for Toll Road Investments: A State-of-the-art Literature Review. Horizon Research Publishing. Diakses 13 Oktober 2019, dari situs world wide web: http://www.hrpub.org/download/ 20180430/CEA1-14810823.pdf.

Sugiyono. (2019). Metodelogi Penelitian Kuantitatif dan Kualitatif Dan R&D. Bandung: ALFABETA.

Truong, Thi My Thanh, Hanno Friedrich, dan Chotchai Charunngam. (2020). Success Factors for Financial Sustainability of Toll Road Projects: Empirical Evidence From China. Transportation Research Procedia , 48, 1848-1860.

Wibowo, Andreas. (2011). Metodologi Perhitungan Required Rate of Return berdasarkan Cumulative Prospect Theory: Studi Kasus Proyek Investasi Jalan Tol. Jurnal Teknik Sipil ITB Vol.18 No.1 April 2011 hal 1-12.

Wraharjo, Mulyono, Susanti, Betty dan Kadarsa, Edi. (2022). Financial Feasibility Analysis of Cost and Traffic Volume: Case Study on Toll Road Investment Project. Engineering and Applied Science Research, 49(3), 308-315.

Yukeiko, Rivina dkk. (2014). Evaluasi Kelayakan Pembiayaan Pembangunan Jalan Tol Palembang Indralaya. Institut Teknologi Sepuluh November: Surabaya. Makalah.