Financial Feasibility Analysis of Kendari-Toronipa Tourism Destination Road Development

Sunaryo[1], Haryono[2], Hadi Wijaya[3], Kasmaruddin[4]

ABSTRACT- The purpose of this study is to analyze or measure the level of investment value or feasibility study of road development, on the tourism destination Toronipa and Bokori Island. This research method refers to the measurement of eligibility by using direct benefits and indirect benefits.The results of this study are expected to be a reference or basis for policy makers, both local and central government, this is because road development is the main accessibility of Toronipa and Bokori Island tourism destinations. This research focuses on measuring feasibility by using the value of direct benefits and indirect benefits.
Keywords: Financial Feasibility, Road Development, Tourism Destination, Annual cost, Annual benefits.

1 INTRODUCTION

Road construction in its development has been very advanced, only use plastic waste can be used as road construction [1], of course, all this requires very deep research, the use of any waste in road construction must be carried out research that requires a very long time. Waste is waste, but if it has become a construction item it turns out to be very valuable, not only that it can even become a renewable resource.

Since the discovery of asphalt as road construction material, it is a challenge for researchers to always find a way to substitute asphalt with other materials [2], as well as the addition of polymer additives to the physical properties of asphalt binders [3]. Indeed, it will never stop to look for ways to make the asphalt can be replaced and even only provide additional so that its characteristics will increase and provide durability from the road that is used daily for traffic that is endless. The road life is largely determined by the construction of the asphalt layer above it, the better the road cover, the lower the construction will last and last longer. Likewise, on the contrary, the worse the layer above, the shorter the construction life below. The durability of asphalt mixture as a road cover material is needed to maintain road durability [4] this condition still requires a study which can be useful for handling road damage.

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The main obstacle to road construction projects is the problem of land disputes, wherever this problem is always present and becomes a serious problem [5]. Land dispute problems and land prices in road construction projects are almost the same as construction costs, and there are even some cases of land prices more expensive than the price of road construction itself, although this is very serious in a project it is normal - ordinary.

In a project, especially in road construction projects, in order to achieve road quality results according to quality demands, the workmanship process must be in accordance with the budget set and the budget provided is sufficient [6]. In order for the project process to run well, quality must be properly controlled. Purchasing cheap materials can shorten the life of the road so that roads are damaged prematurely, many accidents are caused by road damage, and the cost of economic commodities becomes expensive.

Roads are the most complicated and difficult construction industry [7], this is because all those involved in the construction of road construction must have the skills and expertise, as well as the equipment, must be supported by complete equipment and operators who have skills certificates.

Handling and upgrading of roads still get support from Buton Asphalt natural resources [8], Buton Asphalt production is also expected to receive support, so that it can be utilized in the nearest area, then it can become wider. The use of Buton Asphalt, in general, has brought many benefits, especially in the surrounding area, coastal areas, and the smallest islands. But for more remote areas still, need local government policies where roads will be built and improved.

The feasibility study in the construction of roads and bridges is a stage of planning that must be passed [9], without a feasibility study of a plan, cannot describe the benefits produced. Although

in bridge or road planning other than using construction disciplines, financial-economic disciplines are also very important, so the two disciplines must always work together in developing a region's development, especially in disadvantaged areas.

Feasibility studies are inseparable from construction planning [10], two things that are never separate, a building construction, roads, bridges, dams, and other things will be in vain, if not a feasibility study is done then a construction building there is no one who will give funds, and if it is still desperate to build, the users will not be there even though there are only a few people. Thus the feasibility study is the main requirement in a plan and the second requirement for planning is construction planning.

Feasibility studies in transportation are needed for making policy decisions [11], implementation and handling of a road will be important if a feasibility study has been carried out, although it does not directly benefit from road infrastructure, it must be predictable and estimated so that development and investment value can be measured.

Improving the quality of a material can also increase and affect the durability of the asphalt mixture [12], use of the PCI method in case of handling roads [13], the life of the road is largely determined by the physical condition of the road, due to the damage caused by nature, due to traffic, due to the strength of the material, and because wear out, all due to road damage do not come individually, sometimes coming together and sporadically, the material comes in for a long time. Sometimes there is something strange, which is where a vehicle with a load exceeds capacity but if it is run at a speed that is not slow then the road will not be damaged. And vice versa, if the road is very slow then along the road, will be damaged.

The value of benefits based on the feasibility study is very important in a construction project activity [14], directly the road user does not pay for what he has passed on the road, but indirectly whatever passes on the road is the value of the payment done indirectly.

Something infrastructure that will be built, it is necessary to conduct a feasibility study that will assess economically [15], even if it is a connecting road between cities or regions, even though users can cover the value of investment, there is a value that cannot be paid with money, namely road it can be used as a facility and infrastructure for a state land, thus it is commonly referred to as non-technical benefits.

Road conditions can also affect accident rates, so public or Bus use is highly recommended [16], a phenomenon that occurs in developing countries with many users of private vehicles including motorbikes, is very much influenced by the level of skill or driving skills of inexperienced vehicles, other than that, the condition of the vehicle is very unsupportive, and there is no periodic inspection of the feasibility of the vehicle. In addition, the road conditions also need to be improved so that it can reduce the level of accidents, while also increasing road capacity based on its function.

In general, the feasibility study is a measuring instrument in an investment [17][18], without measuring feasibility, investors or stakeholders, willing or will make decisions because then decision making is accompanied by positive implications. Any investment is very attractive to investors and is a very valuable asset for the future.

2 LITERATURE REVIEW

Net present value (NPV) is a method of calculating the net value at present and is calculated at a certain interest rate [19][20]. if NPV> 0, it means that the number of present value benefits is greater than the number of present value costs, calculated at the same interest rate with the discount rate so that it is declared feasible. If NPV<0, it means that the costs incurred are greater than the benefits (benefits) so that they are declared not feasible. If NPV=0, it means that it is in a state of break event which will return exactly the opportunity cost of. capital. The mathematical equation used:

$$NPV = \sum_{t=0}^{n} \frac{(C)t}{(1+i)^t} - \sum_{t=0}^{n} \frac{Co)t}{(1+i)^t} \quad \text{..... (1)}$$

where,

NPV = Net present value
(C)t = Annual cash inflows
(Co)t = Annual cash outflows
n = Total number of periods
i = Required return or discount rate
t = Number of time periods

The decision guideline is :

If NPV = positive, the project proposal can beaccepted, the higher the NPV number the better.
If NPV = negative, the project proposal was rejected.
If NPV = 0 means neutral.

The Internal Rate of Return (IRR) is a return flow that produces an NPV of cash inflows = NPV of cash outflows. In the NPV method, the analysis is carried out by determining in advance the amount of the return (discount) (i), then calculating the present net value (PV) of the cash flow in and out. For the IRR, NPV=0 is determined first, then find out how much the return (discount) is (i) so that the thing happens. The formula is as follows:

$$\sum_{t=0}^{n} \frac{(C)t}{(1+i)^t} - \sum_{t=0}^{n} \frac{Co)t}{(1+i)^t} \quad \text{..... (2)}$$

where,

(C)t = Annual cash inflows
(Co)t = Annual cash outflows
i = Required return or discount rate
n = Total number of periods

The decision guideline is :

If IRR > i (Discount Rate), the project is economically acceptable at the discount rate.
If IRR < i (Discount Rate), the project is not economically acceptable at the discount rate.

Another variation of Profitability index (PI) of the NPV criterion is Profitability Indes (PI), which shows the ability to bring profit per unit value of the investment. Defined as follows:

$$IP = \frac{\sum_{t=0}^{n} \frac{(C)t}{(1+i)^2}}{\sum_{t=0}^{n} \frac{(C0)t}{(1+i)t}} \quad \text{..... (3)}$$

where,

(C)t = Annual cash inflows
(Co)t = Annual cash outflows
i = Required return or discount rate
n = Total number of periods

The evaluation guideline for a single project using the PI is the same as for the BCR.

If PI ≥ 1.0, the project is economically acceptable at the discount rate.
If PI < 1.0, the project is not economically acceptable at the discount rate.

Remember, the computations for PI and BCR are essentially the same, except the PI is usually applied without disbenefits estimated. The PI has another name: the present worth index (PWI). It is often used to rank and assist in the selection of independent projects when the capital budget is limited.

Benefit-Cost Ratio (BCR) is a practical way to estimate benefits where analysis and evaluation are needed and various perspectives relevant to the costs or benefits contributed. It is said that it is feasible if the ratio between the benefits to the costs required is greater than one [14]. With the mathematical equation the cost-benefit ratio is normally stated as follows:

$$BCR = \frac{B-D}{C} \quad \text{..... (4)}$$

where,

B = Benefit
D = Disbenefit
C = Cost

The decision guideline is :

If BCR ≥ 1.0, accept the project as economically justifi ed for the estimates and discount rate applied.
If BCR < 1.0, the project is not economically acceptable.

3 RESEARCH METHODS

This study focuses on the feasibility study of primary arterial roads, which use the variable operational costs of vehicles as the second variable and the cost of handling or increasing roads as the third variable. While the first variable is the base unit price contained in Table 1.

Then the results of this study will be feasible or not feasible depending on the final results of this feasibility study, this feasibility study is useful for making decisions for stakeholders, both local and central government, to reduce or budget the costs for road development..

As a reference for research, this feasibility study uses an investment time interval of 20 years, and during these 20 years, road conditions will be maintained periodically and periodically by relevant agencies.

This research method in its completion uses an analysis tool directly in Microsoft Excel.

In this study only using technical factors to determine the final value of the feasibility study, and not include non-technical factors, the reason is if using non-technical factors to determine the final value of this feasibility study, it is expected to have a less favorable effect in determining the final value.

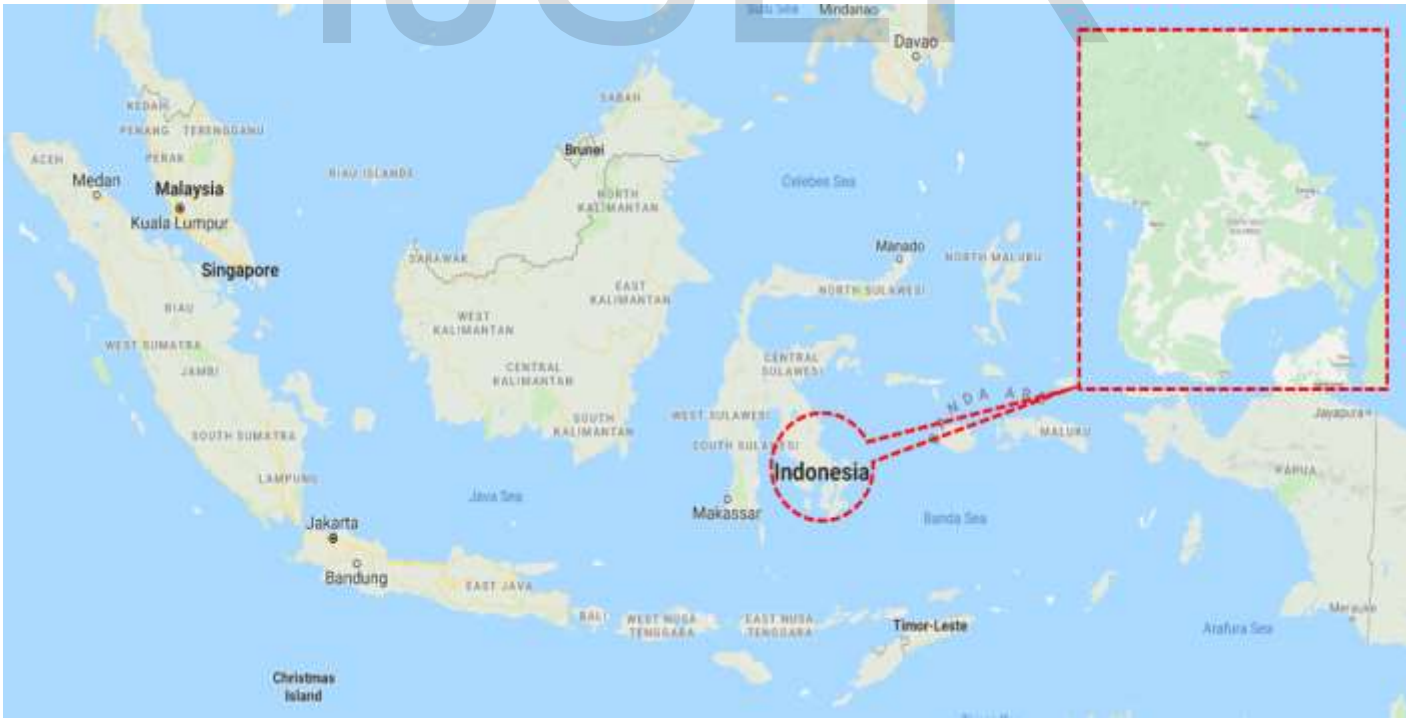


Fig.1. Research Map

Fig.2 Map Detail

4 RESULTS

This research is about the feasibility study of road development., the results of the study will present description to get the feasibility value, with the following description

4.1. Basic Price

In the description of the base unit price, it explains the prices in the market related to integrity in this study, while the details are explained in Table 1, the following:

TABLE 1
Basic Price

No.	Discription	Unit	Code	Price (IDR)	Information
1	Gasoline	liters	b	8,500.00	
2	Diesel	liters	c	8,500.00	
3	Lubricant	liters	d	50,000.00	
4	Truck tires	unit	e	2,500,000	
5	Bus Tires	unit	f	1,500,000	
6	Car Tires	unit	g	1,000,000	
7	Driver	hours	h	80,000	
8	Mechanic	hours	i	100,000	
9	Truck	unit	j	450,000,000	
10	Bus	unit	k	700,000,000	
11	Car	unit	l	400,000,000	

Based on Table 1, the base unit price is the initial data in this feasibility study, the unit price is the first variable in this study.

4.2. Vehicle operating costs Analysis

Vehicle operating costs are the simplest and easiest way, to determine the value of road benefits, specifically for primary arterial roads, secondary arteries and so on, so-called indirect benefits. For Toll Roads or paid roads, it will be easier to calculate the value of road benefits, so it is called direct benefits.

What needs to be considered in calculating vehicle operating costs is the speed of the existing vehicle and the speed of the vehicle plan, where the existing speed must be smaller than the speed of the plan and do not occur otherwise, meaning that there is no increase. Another thing is the basic unit price found in Table 1, and as the first variable in this study, it must be consistent.

In the analysis of the operational costs of vehicles all calculated in the amount of 1000 km, this means it is easier and simpler, so to find costs per 1 km stay divided by 1000 numbers. Of course, this is very rational compared to using direct analysis 1 km.

And it turns out the value to be sought is the difference in the speed of the plan minus the value of the existing speed, of course, sometimes we are confused for those who are still laying. The difference value, called the indirect benefit value, is why it is called

indirect because road users do not directly pay for the value, it is only an estimate that the road used by the road user is like that. Average daily traffic is a value taken from a survey that has been carried out, on the number of vehicles passing through the road being examined, vehicles passing the road being surveyed are divided into, private vehicles or two-wheeled vehicles, bus vehicles and truck vehicle. The difference aims to distinguish the value of each vehicle, of course, private vehicles are cheaper compared to buses and so on.

TABLE 2
Vehicle operating costs Analysis

No.	Discription	Vehicle operating costs (VOC)						Unit	Code	Information
		Car		Bus		Truck				
1	Speed	40	100	40	80	40	60	km/hours	V	
2	Fuel	548,624.00	1,013,540.00	548,624.00	685,448.00	548,624.00	510,476.00	IDR	-	(0.0284 x V2 - 3.0644 x V +141.68) x b
3	Olie	240.00	240.00	240.00	240.00	240.00	240.00	IDR	-	0.0048 x d
4	Tires	123,434.80	335,786.80	277,728.30	596,256.30	462,880.50	728,320.50	IDR	-	((0.0008848 x V) - 0.0045333) x 4 x g
5	Spare parts	325,080.00	33,320.00	568,890.00	(31,290.00)	365,715.00	(77,715.00)	IDR	-	((0.0000064 x V)-0.0005567) x f
6	Mechanic	50,747.00	72,467.00	50,747.00	65,227.00	50,747.00	57,987.00	IDR	-	((0.00362 x V)+0.36267) x i
7	Depresation	2,105,263.16	1,600,000.00	3,684,210.53	3,043,478.26	2,368,421.05	2,142,857.14	IDR	-	(1/(V +150)) x l
8	Annual cost	880,000.00	880,000.00	1,540,000.00	1,540,000.00	990,000.00	990,000.00	IDR	-	0.22/100 x l
	for 1000 km	4,033,388.96	3,935,353.80	6,670,439.83	5,879,359.56	4,786,627.55	4,352,165.64	IDR	r	
	per km	4,033.39	3,935.35	6,670.44	5,879.36	4,786.63	4,352.17	IDR	s	r/1000
	Cost difference		98.04		791.08		434.46	IDR	t	
	Average daily traffic/year		3,102,500.00		1,861,500.00		1,551,250.00	IDR	u	
	Sub total		304,154,077.37		1,472,595,914.13		673,959,037.54	IDR	v	t x u
	Total						2,450,709,029.03	IDR		

Based on Table 2, the value of indirect benefits obtained from the analysis of vehicle operating costs is IDR2,450,709,029.03, the amount calculated per year including private vehicles, buses, and trucks. And then this value will be used to calculate the NPV, which is referred to as the value of indirect road benefits.

4.3. Feasibility Study Analysis

This feasibility study directly uses Microsoft Excel as a fast analysis tool, all already provided by the goodness of Microsoft Excel, with the description in Table 3, as follows:

TABLE 3
NPV IRR PI and BCR Analysis

Years	Cash Flow (IDR)	Present Value (IDR)	NPV Chart Profile		Information
			Discount Rate	NPV (IDR)	
0	(1,000,000,000,000.00)	(1,000,000,000,000.00)	0%	5,662,307,491,890.34	=NPV(E5,$C$6:$C$25)+$C$5
1	2,450,709,029.03	2,448,260,768.27	1%	4,591,382,018,910.79	
2	3,485,888,522.90	3,478,927,189.59	2%	3,704,390,331,583.00	
3	4,958,327,834.97	4,943,482,551.92	3%	2,967,985,782,932.48	
4	7,052,725,512.46	7,024,584,996.86	4%	2,355,159,651,567.85	
5	10,031,796,768.93	9,981,787,911.62	5%	1,843,984,287,812.65	
6	14,269,227,724.12	14,183,911,214.28	6%	1,416,615,379,934.57	
7	20,296,549,514.79	20,155,040,270.91	7%	1,058,497,961,924.41	
8	28,869,812,029.83	28,639,889,391.96	8%	757,733,023,732.55	
9	41,064,420,631.24	40,696,681,989.13	9%	504,571,032,613.52	
10	58,410,031,905.87	57,829,131,330.01	10%	291,005,986,237.83	
11	83,082,429,382.91	82,173,982,421.38	11%	110,449,291,949.43	IRR
12	118,176,447,554.25	116,767,505,091.08	12%	(42,532,819,769.44)	
13	168,094,179,001.17	165,924,175,066.49	13%	(172,431,197,507.95)	
14	239,097,160,211.27	235,774,771,842.73	14%	(282,965,145,784.93)	
15	340,091,800,684.51	335,031,004,464.64	15%	(377,221,326,774.15)	
16	483,746,577,293.64	476,072,028,721.78	16%	(457,766,580,652.00)	
17	688,081,131,542.47	676,488,365,288.56	17%	(526,739,754,108.99)	
18	978,726,601,506.01	961,275,775,011.44	18%	(585,926,597,341.12)	
19	1,392,140,717,982.15	1,365,952,709,666.61	19%	(636,820,975,789.29)	
20	1,980,180,957,257.81	1,940,990,144,085.70	20%	(680,674,997,608.25)	
NPV (+)		6,545,832,159,274.95			=SUM(D6:D25)
Total NPV		5,545,832,159,274.95			=SUM(D5:D25)
DR	10%				
IRR		11.593%			=IRR(D5:D25)
PI	1.291	=NPV(C28,C6,C7,C8,C9,C10,C11,C12,C13,C14,C15,C16,C17,C18,C19,C20,C21,C22,C23,C24,C25)/-C5			
BCR		6.546			=D26/-D5

Based on the feasibility study analysis in Table 3, NPV (+) IDR6, 545,832,159,274.95, Total or ∑NPV IDR5,545,832,159,274.95, IRR is 11.593% ≃11.5%, PI is 1.291, and BCR is 6.546 were obtained, in addition to obtaining the feasibility study value also displayed the text formula as the completeness of the research course, completely clearly appearing in the information column. Based on Table 3, it can be graphically illustrated using the Profile Chart NPV value, then the graph is illustrated in Figure 3, as follows:

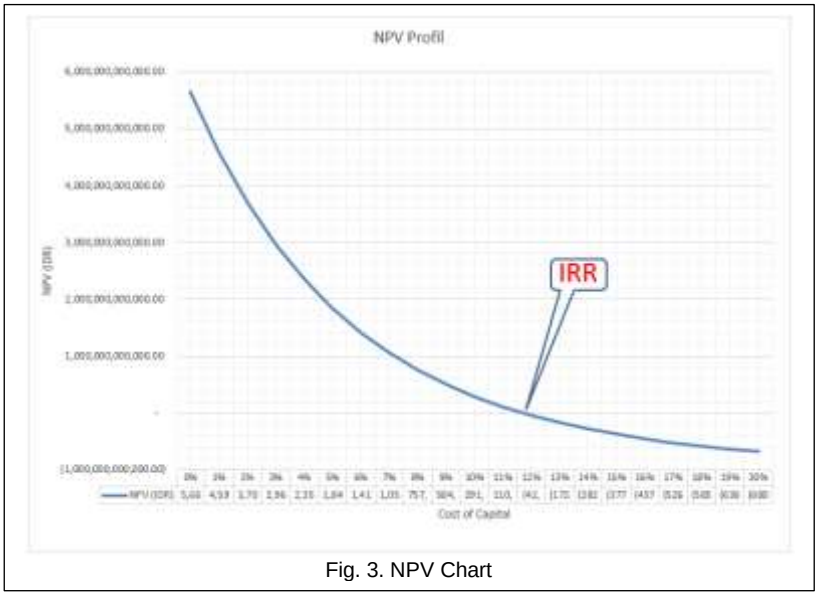
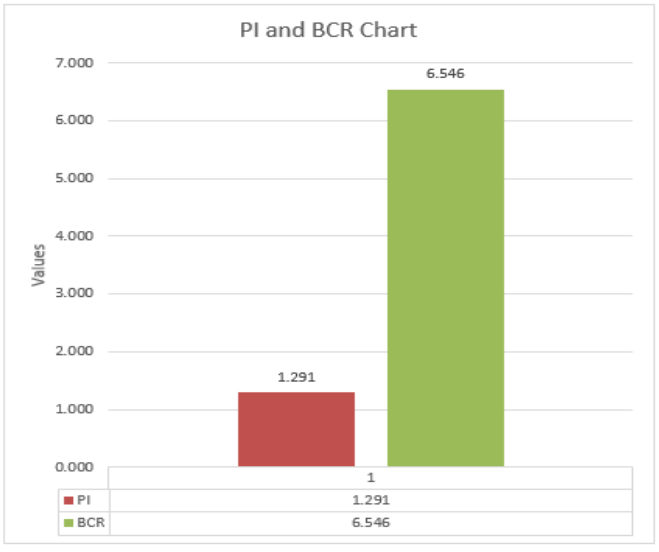


Fig. 3. NPV Chart

Based on Figure 3 and Table 3, a value of 11.5% is obtained in 11.5th and the Present Value is IDR110,449,291,949.43 and the NPV Chart Profile is IDR82,173,982,421.38, this means that bank interest will be set at 11.5%. The reason is that if the value is reduced by one level, the NPV value will be negative, thus the value above negative will be used. If we look at the parabolic graph in figure 3, see the parabola curve > 11.5% is at a negative value and the curve that is <11.5% is at a positive value, this value will be used as a reference for all types of investments.

5 DISCUSSION

Based on the results obtained from this feasibility study, the NPV value is IDR6,545,832,159,274.95,>1, this means that road improvement and handling can be received from being given funds, for the IRR value is 11.5%≥i (Discount Rate), then the project is deemed eligible, for PI is 1.291>1 then the project is also worthy to be accepted, and the BCR is 6.546>1, so also the project is worthy of being accepted. More can be seen in Figures 4 and field conditions can be seen in the Figures 5 and 6.



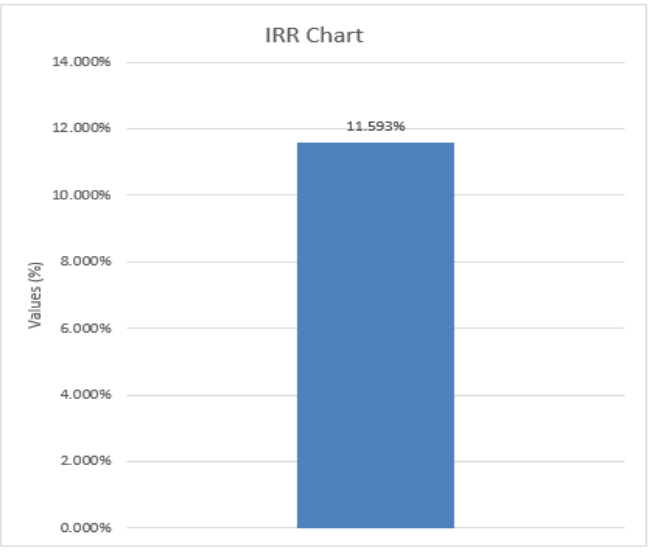


Fig. 4. PI BCR and IRR Chart

Fig. 5. Map of the tourism destinations of Toronipa Beach and Bokori Island

Fig. 6. Road Typical

6 CONCLUSIONS

Based on the results of a feasibility study analysis of Kendari-Toronipa tourism destination road development.

It is strongly recommended to conduct a feasibility study for infrastructure, both direct and benefits indirectly because the feasibility study has become the main requirement in a process of infrastructure development and investment in general.

This feasibility study can be used for any investment that, both small and large scale and all fields can be done, all can be done very feasibility studies. Likewise the banking sector without a feasibility study, the bank will not provide loans.

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