

ANALYSIS OF THE BENEFITS AND COSTS OF PIONEER SEA FREIGHT OPERATIONS (STUDY CASE: ROUTE R-5 ENGGANO ISLAND, BENGKULU PROVINCE)

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Abstract: Pioneering sea transportation is a transportation service that can accommodate remote islands or areas that fall into the category of remote, isolated, frontier and border areas (3TP). The service of pioneer ships was used by the residents of these islands to meet basic daily needs and trade. One of the outer islands served by pioneering sea transportation is Enggano island on the route code R-5, which is administratively located in North Bengkulu regency, Bengkulu province. This study aims to determine the amount of fixed costs and variable costs of the pioneer ship KM Sabuk Nusantara 52 and the amount of benefits obtained due to the operation of pioneer ships as measured by the Benefit Cost Ratio (BCR) analysis approach. The results showed that the total fixed costs of The Nusantara Belt 52 amounted to Rp. 3,538,365, 860 and variable costs amounted to Rp. 3,122,538,257. The benefits obtained in this study are divided into 2 kinds of benefits, namely commercial benefits as measured in terms of passenger income of Rp. 117,768,000 and economic benefits received from the production income of the produce sector and the tourism sector. Total economic benefits Rp. 23,489,566.034. from the results of the BCR approach obtained a value of 3.53 based on the Benefit Cost Ratio approach criteria > 1 means that the pioneering sea transportation operations on Enggano island are considered economically feasible. 000 and economic benefits received from the production income of the produce sector and the tourism sector. Total economic benefits Rp. 23,489,566.034. from the results of the BCR approach obtained a value of 3.53 based on the Benefit Cost Ratio approach criteria > 1 means that the pioneering sea transportation operations on Enggano island are considered economically feasible.

Keywords: BCR, Ship Operating Costs, Economic Benefits

1. Introduction

Pioneer sea transportation is sea transportation that operates especially on routes that have not been served by commercial water transportation because they have not been able to provide commercial benefits. In 2021 the pioneer ships have served 118 routes from 42 base ports and stopped at 519 ports of call. Enggano Island is one of the small islands inhabited by the administrative district of North Bengkulu province which is served by pioneer sea transportation with route code R-5 served by KM Sabuk Nusantara 52 This ship operates by serving the community, especially the island of Renggano which is in North Bengkulu district. The geographical location of the island of Renggano itself is a remote island in Bengkulu province, which is 110 miles from the city of Bengkulu, so transportation facilities are needed to support these community activities. On this route, the Sabuk Nusantara 52 ship serves voyages from the port of Baai – the port of Malakoni Enggano – the port of Linau Bintuhan with a total distance of 1,048 miles and travels in one round voyage for 14 days. Based on a report from the Bengkulu Provincial Transportation Service, it was stated that the reluctant people used the ship to sell their produce to Bengkulu province and distributed it to several provinces on the island of Sumatra and other islands. These commodities are in the form of agricultural and plantation products which are processed by the people of the island themselves. Most of the commodities transported by the KM Sabuk Nusantara 52 ship are reluctant bananas, which are the island's main commodity. In addition, there are also several other plantation and agricultural products such as onions, chilies, and others. The results of these commodities are not only used as materials for the community's needs, they are also the wheels of the economy for the people of the island of Maluku.

Pioneer Sea Freight

In Law Number 17 of 2008, Regarding shipping, it is stated that "pioneer shipping is a transportation service in waters on routes determined by the government to serve areas or areas that have not been or are not served by water transportation because they have not provided commercial benefits". The implementation of pioneering sea transportation

service activities has the objectives set out in Article 2 (two) Government Regulation Number 48 of 2018 regarding the Implementation of Pioneer Ship Public Service Activities are as follows:

1. Connecting areas or islands that are still underdeveloped or remote areas that have not developed with areas that have developed or developed.
2. Connecting areas where other modes of transportation are inadequate.
3. Connecting areas that are not commercially profitable to be served by operators of sea transportation activities, river and lake transportation or crossing transportation.

With the availability of transportation services can provide benefits both directly and indirectly. Regional and national economic development requires adequate transportation services. According to Kadir (2006). Without transportation as a means of support it cannot be expected to achieve satisfactory results in the economic development of a country.

Benefit Cost Ratio

This cost-benefit analysis according to the statement "(Bovie Kawulusan., 2016)" is one of the techniques used to evaluate the use of economic resources so that they can be used efficiently". Where in a project, cost-benefit analysis is used to compare the extent to which the allocation of resources (costs) to be used can provide the desired positive contribution (benefits) optimally. According to (Pujawa, 2009) The application of cost-benefit analysis is generally often used in evaluating government projects which in government projects will affect all activities of the wider community, either directly or indirectly.

In general, the formulation for performing calculations to obtain a value in this analysis can be described as follows:

$$BCR \frac{Benefit}{Cost} \dots\dots\dots (1)$$

Information :

B : Benefits (Benefit)

C :Cost(Cost)

R :Ratio(Comparison)

Benefit cost ratio(B/C ratio) shows that the ratio of the value of benefits (benefits) to the value of costs (cost) is added to the value of the investment and it is necessary that the B/C ratio is greater than 1 (one):

1. If the B/C ratio is >1 , then the benefits that will be obtained during the economic technical life of the project are greater than the cost (cost) + investment, which means that the project is feasible to run.
2. If the B/C ratio = 1, then the benefits obtained during the technical economic life of the project can only cover costs + investment, which means that from a financial and economic point of view the project is considered not to be implemented, but if viewed from the from the point of view of social and community development aspects, the project can be considered for implementation.
3. If the B/C ratio <1 , then the benefits obtained during the technical economic life of the project are not sufficient to cover the costs (costs) + investment, which means that the project cannot be implemented.

Project Evaluation

Project evaluation is an assessment of a proposal on a project or business whether it can be implemented or not, with various aspects of the study. In general, projects or businesses that prioritize the assessment of social benefits are often referred to as project evaluation analysis(Ekowati et al., 2018). One of the developments of the Benefit Cost Ratio (BCR) method in Indonesia is to assess the feasibility or evaluate a project. This analysis is generally used in assessing the feasibility of a project. There are 2 kinds of feasibility assessed from a project, namely economic feasibility and financial feasibility. Economic feasibility relates to reviewing whether the project to be carried out will contribute to overall economic development. While financial feasibility is related to the profit (revenue) of a project so it is necessary to know that the project concerned will be able to repay the

funds used and whether the project can develop so that it can financially stand alone.(Tamin Z, 2008).

Table 1. Comparison of the Flow of Revenue and Expenditure of Financial Aspects and Economic Aspects

Financial Analysis		Economic Analysis	
Receipt Flow	Flow Flow	Receipt Flow	Flow Flow
Production result	Investation	Production result	Investation
Rent	Operating costs - Raw materials - Semi-finished ingredients - Wages and benefits - Leader - Miscellaneous expense	Rent	Operating costs - Raw materials - Semi-finished ingredients - Opp. labor cost - Leader - Miscellaneous expense
Benefits outside the project	Routine fee - Interest on loans - Shrinkage	Benefits outside the project	Routine Fee - Interest on long-term loans
Residual value (salvage) Project results	Routine Expenses - Tax - Installment loan - Dividend	Residual value (salvage)	Project cost - Wages and benefits - Tax - Installment loan - Flower - Shrinkage - dividend
Benefits - Shrinkage - Long term loan - Short-term loan	Retained profit Project cost Subsidy	Benefits - Subsidies - Long term loan -Loan period short	

Source :(Introduction to Project Evaluation, Clive gray et al., 1988)

2. Method

This research is descriptive quantitative. The data source used is secondary data. The data used to obtain the cost concept is obtained from the calculation of the operational costs of the pioneer ship which refers to the guidelines for calculating the operational costs and income of pioneering sea transportation in the Regulation of the Minister of Transportation Number 55 of 2019. Meanwhile, the concept of benefits is obtained in the form of direct benefits for residents of the island of Enggano, namely: sell their produce

with the help of the pioneering ship Sabuk Nusantara 52, namely by converting commodity production results in 2021. Data on commodity production on Enggano island is obtained from the relevant agency, namely the Central Bengkulu Utara Statistics Agency in 2021. After obtaining commodity production results,

After obtaining the total operational costs of the Sabuk Nusantara 52 ship, then it is compared with the economic benefits obtained due to the operation of the Sabuk Nusantara 52 ship on the island of Enggano with the Benefit Cost Ratio formulation as follows:

$$"BCR" = \frac{"Total Benefit (Manfaat)"}{"Total Cost (Biaya)} = \%.....(2)$$

where :

1. B/C Ratio > 1, if the benefits to be obtained during the technical-economic life of the project in question are greater than the cost, it can be said that the project in question can be implemented.
2. B/C Ratio = 1, if the benefits to be obtained during the technical-economic life of the project in question are only sufficient to cover the costs (costs), then the project concerned from a financial and economic point of view does not need to be implemented, but if viewed from the from a social and community development perspective can be considered for implementation.
3. B/C Ratio < 1, if the benefits to be obtained during the technical-economic life of the project in question are smaller and cannot cover costs, then the project in question is not feasible to implement

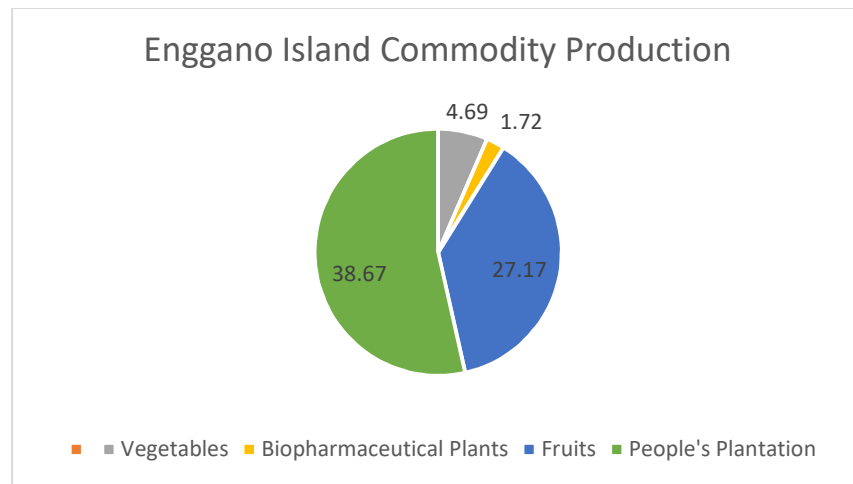
3. Discussion and Result

A. Benefit Analysis

Enggano Island is one of the outermost islands in the Indian Ocean. Enggano Island is administratively located in the local government of Bengkulu Utara district and is a sub-

district with the center of government in Apoho village. Based on data from the Central Statistics Agency of North Bengkulu, the population of the island of Maluku in 2021 is 4,179 people with an area of 400.6 Km². (BPS Bengkulu Utara, 2021). There are six villages in the Enggano sub-district, namely the villages of Banjarsari, Meok, Apoho, Malakoni, Kaana, and Kahyapu. In terms of social and economic factors, most of the inhabitants of the island of Enggano are farmers and fishermen, when the weather conditions are good the people will go to sea, on the contrary when the weather is bad, the people cultivate agriculture and plantations. Relucano sub-district has 25 hectares of rice fields in Kaana village, while the plantation area dominates a quarter of the Enggano island area. To meet the necessities of life, the people of Enggano sell their plantation and fishery products to Bengkulu City and other big cities such as Lampung Province. One of the biggest plantation commodities on the island of Renggano is the reluctant banana.

To facilitate the flow of commodity distribution, the only transportation that is most effective according to the Enggano people for transporting their products is sea transportation. There are 2 sea transportations serving the Enggano – Bengkulu route, namely the Pullo Telo ferry and the Pioneer Sabuk Nusantara 52 ship. Bengkulu Provincial Transportation Service Report stated that in general the people of the island of Enggano use pioneer ships to sell their produce (raw materials) to markets in Bengkulu city and several other cities, while from Bengkulu to Enggano the majority of people will return after selling their produce and buying materials. basic needs to support daily life as well as materials and materials used to reprocess crops such as fertilizers and others.

**Figure 1: Diagram of Enggano Island Commodity Production Results in 2021**

The agricultural products of the island of Enggano are dominated by the production of commodities in the sub-sector of fruits, marine fisheries and smallholder plantations. One type of fruit which is the leading sector in the production of the inhabitants of the island of Enggano is banana. the bananas are sold to several big cities in Bengkulu province and several other provinces including Jakarta. One of the processed banana products originating from Enggano Island is the Kepok Banana Chips typical of Lampung province. These producers stated that bananas processed by the island of Enggano are of the best quality compared to those in other areas in Bengkulu province

Table 2 : Quantification Results in the form of money

No	Commodity Sector	Production Total (Ton)		Revenue (Rp)	
		2020	2021	2020	2021
1	Agriculture	221,24	296,25	Rp 275,685,154	Rp 476,924,369
2	People's Plantation	2192,2	2541,04	Rp 4,497,777,438	Rp 4,986,392,954
3	Capture Fisheries	1778,25	1789,25	Rp 11,420,531,529	Rp 11,811,749,759
Total		4191,69	4626,54	Rp 16,193,994,121	Rp 17,275,067,082
Selisih					Rp 1,081,072,961

Table 2 is obtained from the total production of each commodity produced by the residents of the island of Enggano in 2020 and 2021. The production results are quantified in terms of money with reference to the average market price of the producer level in 2021, and then consider the logistics costs which are assumed to be 20% , then the value of

economic benefits from the operation of pioneering sea transportation on the inhabitants of the island of Enggano in the commodity sector is Rp. 17,275,067,083.

Table 3 : Components of Travel Costs per Month

Cost Component	Description	Cost
Average Meal Cost	people/day	Rp 5,600,000
Boat Rental	day	Rp 7,000,000
Hotel Rental	night	Rp 16,000,000
Guide Fee	day	Rp 2,000,000
Total Cost		Rp 30,600,000

Based on information from the Bengkulu Province Transportation Service employee who is on duty at the Malakoni Port on Enggano Island and local information, in a month there are at least 10-20 tourists who come to Enggano Island and they stay for an average of 1-4 days. Table 3 shows the costs incurred by tourists who become revenues (economic benefits) for residents of the island of Enggano which are then quantified in one year so that a value of Rp.367.200.000 is obtained.

B. Cost Analysis

In the concept of cost in this study, measured on the operational costs of the ship in one year, operational costs are the costs incurred for operating the ship during service time. Operational costs in pioneer vessels are divided into 2 (two) components, namely fixed costs and variable costs. These costs are regulated in the Regulation of the Minister of Transportation Number 55 of 2019. These costs are divided into two, namely fixed costs and shipping costs or ship variable costs.

1. Fixed cost

Fixed costs are costs incurred to support the daily operations of the ship for a year so that the condition of the ship is always ready to sail. This fee is not affected by the number of frequencies or demand obtained. In operational costs, the fixed cost components include crew salaries, crew food costs, crew clean water costs, maintenance and repair

costs, ship insurance costs, and docking costs. The results of the calculation of each component of fixed costs are as follows:

Table 4: Total Fixed Cost of Ship

Fixed Cost		
Crew Salary	Rp	1,600,105,500
Crew Food Cost	Rp	131,250,000
Crew Ballast Water	Rp	21,000,000
Ship's Insurance	Rp	331,200,000
Repair and Maintenance Costs	Rp	750,000,000
Annual Docking Cost	Rp	704,800,360
Total Fixed Cost	Rp	3,538,355,860

2. Variable Cost

Variable costs or shipping costs (voyage costs) are costs incurred to meet needs during the voyage. In shipping costs, the value of the cost component is influenced by demand and the resulting frequency. Shipping costs or variable costs on the R-5 Bengkulu route are obtained in the calculation of variable costs which are calculated based on the cost requirements of each route segment. In the decision letter on the route network in 2021. The KM Sabuk Nusantara 52 ship serves 3 ports with one Round Voyage which takes 14 days and in one year has a target of 25 voyages. The results of the calculation of each component are as follows

Table 5: Total Vessel Variable Costs

Variable Cost		
Fuel Oil		
a. Main Engine	Rp	2,302,040,730
b. Auxiliary Engine	Rp	408,128,977
Lubricant		
a. Main Engine	Rp	40,348,000
b. Auxiliary Engine	Rp	7,153,300
Passanger Fresh Water Fee	Rp	263,173,750
Goods Safety Cost	Rp	24,128,000
Marketing Cost	Rp	24,128,000
Port Service Fee	Rp	53,437,500
Total Variable Cost	Rp	3,122,538,257

3. Total Vessel Operating Cost

After all components of fixed costs and variable costs are obtained, the amount of fixed costs is Rp. 3,538,355,860/year. And the variable cost of the ship KM Sabuk Nusantara 52 type DWT 750 tons serving the route R-5 Bengkulu with a total voyage of 25 in 2021 amounting to Rp. 3,122,538,257/year, then the total operating costs are as follows

Ship operational costs = Rp. 3.538.355.860/year + Rp. 3.122.538.257/year =
Rp. 6,660,894,117/year

C. Benefit Cost Ratio Analysis

After collecting and processing data in the previous stage, the next step is to determine the value of the Benefit Cost Ratio for the operation of the pioneer ship. In calculating the Benefit Cost Ratio analysis in this study, 2 (two) assessments were carried out, namely an assessment of the financial benefits and economic benefits of operating the ship and economic benefits for the residents of the island of Enggano.

1. Benefit Cost Ratio Against Financial Assessment

The financial assessment which is measured according to the Benefit Cost Ratio approach in pioneering sea transportation operations in Bengkulu province is measured in the calculation of income in 1 (one) year. Whereas in the cost concept, the costs included in this approach are ship operational costs which consist of fixed costs and variable costs, while subsidies obtained from the APBN are included in the cost group as a cost reduction. (Clive gray, et al, 1988). From these calculations, the value of the Benefit Cost Ratio component on financial feasibility is obtained as follows:

Income : Rp. 117,768,000,
Subsidy : Rp. 5,729.535,696,
Operating costs: Rp. 6,660,894,117

Based on these three components, the calculation of financial feasibility based on the Benefit Cost Ratio approach can be obtained as follows:

$$\text{BCR} = \frac{\text{Rp.117.768.000}}{\text{Rp.6.660.894.117} - \text{Rp.5.729.535.696}} = 0,13$$

From the results of the BCR calculation on the financial assessment, it shows that the BCR value is 0.13, which means that if viewed from a financial assessment point of view, it is not feasible.

2. Benefit Cost Ratio Against Economic Assessment

Meanwhile, to get the value of economic benefits, the benefits obtained are in the form of direct benefits received by the residents of the island of Enggano. economic value generated from the income of commodity production carried out by residents of the island of Enggano and also based on the contribution to tourist visits who come by using pioneer ships. Based on the processed results of the two components, it can be described as follows:

Commodity economic benefits:	Rp. 17,275,067,083,
The economic benefits of tourism:	Rp. 367.200.000,
Ship operator income:	Rp. 117,768,000,
Ship operating costs:	Rp. 6,660,894,117,
Subsidy:	Rp. 5,729.535,696,

There is a difference where in the subsidy component in the financial assessment it is included in the cost component as a cost reduction, but in the economic assessment the subsidy is included in the benefits received by the population. After obtaining the results of processing the components above, it can be entered into the Benefit Cost Ratio (BCR) formulation calculated by the following formula:

$$\text{BCR} = \frac{\text{Rp. 17.275.067.083,} + \text{Rp. 367.200.000,} + \text{Rp. 117.768.000} + \text{Rp. 5.729.535.696,}}{\text{Rp.6.660.894.117}} = 3,54$$

If it is reviewed based on economic feasibility, the BCR value is 3.54. Based on the characteristics of the Benefit-Cost Ratio approach, the value is > 1 , which means that the operation of pioneering sea transportation on Enggano Island is said to be economically feasible.

4. Conclusion

1. Based on calculations with reference to the Regulation of the Minister of Transportation No. 55 of 2019 (PM 55 of 2019) regarding the components of costs and revenues that are taken into account in pioneer ship public service activities. Then obtained Fixed Costs of Rp. 3,538,355,860 per year, while the variable costs (shipping costs) in 2021 amounted to. Rp. 3,122,538,257, so that the total fixed costs and variable costs of the KM Sabuk Nusantara 52 ship in 2021 are Rp. 6,660,894,117.
2. The benefits received by the Pioneer sea transportation service on the island of Enggano are divided into 2 (two), the first is the direct benefit for the operator, namely the commercial benefit obtained from ticket sales revenue of Rp. 117,768,000. While the second benefit is the economic benefit received by the residents of Enggano island from the income from the commodity of Enggano island and the income from the tourism sector with a total value of Rp. 17,642,267,083, then the total value of benefits from the operation of pioneer ships subsidized by the government is Rp. 23,489,996,390.
3. Based on the calculation of the Benefit Cost Ratio (BCR) of the 2 assessments, a financial assessment of 0.13 was obtained, meaning that the value was < 1 which means that it is not financially attractive so a larger budget is needed. While the BCR assessment of the economic benefits obtained is 3.53, meaning that the value is > 1 , which means the operation of pioneering sea transportation is economically attractive with the aim of improving the economy of the 3TP area/island.

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