The sustainable development strategy of marine tourism in Banda District of Central Maluku Regency based on economic valuation.

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Abstract. Many tourism products are offered to tourist whom travels to Banda in this case study is Marine tourism. The increasing number of demands is potential in bringing pressure upon the coastal and sea sectors. The aims of this research is to study the factors that affects the amount of visits by calculating the economic value of the marine tourism and formulating a strategy in developing a sustainable marine tourism in Banda. The methods used in the study are the multiple linear regression, the travel cost and the exponential comparison. The result shows the equation VISIT = 23.639 – 1.798COST + 0.258INC – 0.889AGE + 1.792EDUC (DT) and VISIT = 4.074 – 0.525COST – 0.075INC – 0.815AGE + 1.658EDUC (FT), towards the total visits from Domestic Tourist (DT) and Foreign Tourist (FT) in the tourism area in Banda. The estimated economic value for the tourism area calculated from Domestic Tourist per individual is IDR 7,201,404,479 per year and from Foreign Tourist is US$ 2,571,316 per year. The first alternative strategic priority for the marine tourism in Banda District is from the ecology sector with a ECM value of 450,094,848. This concludes that the ecological sustainability implies on the contiunity of the social and economic sectors.

Keywords: marine tourism, Banda Districts, travel cost, valuation, development

1. Introduction

Indonesia's marine resources are one of the most important assets to be managed and developed as well as a source of economic growth for the country. Many of Indonesia's productive marine sectors are potential economic resources, one of which is marine tourism activities. Tourism is one of the largest economic sectors in the world and has quite rapid growth acceleration [1], and is one of the industries that is able to provide rapid economic growth in terms of employment opportunities, income, living standards and in activating other production sectors in tourist-receiving countries [2].

Maluku Province, especially Central Maluku Regency, Banda District has great potential in the field of tourism which can contribute to improving the economy. Various tourism products can be offered to tourists who travel in Banda, including natural attractions, historical tourism, cultural tourism, customs and especially marine tourism. Overall in Banda District until 2013 there were 13 marine tourism objects. One of the coral reefs that tourists are interested in comes from the Gunung Api Banda lava rock, besides that there are ± 14 seabed diving spots which are tourist destinations for diving tourism [3].

Today, the willingness of people to pay more in order to achieve satisfaction in conducting tourism activities is increasingly high. Increasing economic growth will be in line with travel demand. However, the increased demand for tourism has the potential to put pressure on coastal and marine areas if the management does not think about the sustainability of the resources being managed. The sustainable development paradigm makes sustainable coastal and marine problems and environmental issues must be taken into consideration in management and development including the importance of knowing the economic value of resources. At this point the need for economic valuation becomes important [4] to translate the value of the benefits of a resource into market price units. This study aims to (a) examine
the factors that influence the number of tourist visits, (b) calculate the economic value of marine tourism areas and (c) formulate sustainable tourism development strategies.

2. Methodology

This research was conducted in the marine tourism area of Banda District, Central Maluku Regency, Maluku Province, covering several islands which are marine tourism destinations and took place in August to October 2017. The data collection locations are presented in Figure 1.

![Map of Study Area](image)

Figure 1. Map of research location

In this study there are two types of data collected, namely primary data obtained from interviews or questions and answers to respondents directly using questionnaires, as well as secondary data obtained from government offices, related agencies and related websites. The sample of respondents was selected using the accidental sampling technique. The total sample of respondents encountered and interviewed was 77 people, consisting of 34 respondents from domestic tourists and 43 respondents from foreign tourists. In this study there are several variables used, including (Table 1):

| No. | Variable Name                  | Symbol | Unit      | Method of Obtaining Data |
|-----|--------------------------------|--------|-----------|--------------------------|
| 1   | Visits (dependent variable)   | VISIT  | Visitor   | Primary / survey         |
| 2   | Travel cost (independent variable) | COST   | IDR/US$   | Primary / survey         |
| 3   | Income                        | INC    | IDR/US$   | Primary / survey         |
| 4   | Age                           | AGE    | Year      | Primary / survey         |
| 5   | Education                     | EDUC   | Year      | Primary / survey         |

There are several work steps in conducting this research, including:
1. Analyzing the factors that influence the number of tourist visits, which is done by using multiple linear regression analysis through the OLS (Ordinary Least Square) approach (5). Based on the research operational variables in Table 1, a research model (a model for tourists and a model for tourists) can be constructed which is analyzed through the OLS approach, as follows:

Models for domestic and foreign tourists:

\[ VISIT = \beta_0 + \beta_1 \text{COST} + \beta_2 \text{INC} + \beta_3 \text{AGE} + \beta_4 \text{EDUC} + \varepsilon \]  

(1)

In the inverse log form, this model forms:

\[ VISIT = \beta_0 + \beta_1 \ln \text{COST} + \beta_2 \ln \text{INC} + \beta_3 \ln \text{AGE} + \beta_4 \ln \text{EDUC} + \varepsilon \]  

(2)

where: \( \beta_0 \) (a constant), \( \beta_1, \beta_2, \beta_3, \beta_4 \) (regression coefficient), \( \varepsilon \) (error terms).

2. Estimating the economic value of the tourist area by using the individual travel cost method (ITCM).

In this case, for the inverse log function, the consumer surplus is calculated using the equation (6):

\[ CS = \beta_1 \left( e^{\beta_0/\beta_1} - T\bar{C} \right) - \beta_0 T\bar{C} + \beta_1 T\bar{C} \ln T\bar{C} \]  

(3)

or the average consumer surplus is calculated using the equation:

\[ \frac{CS}{V} = \frac{\beta_1 \left( e^{\beta_0/\beta_1} - T\bar{C} \right)}{(\beta_0 - \beta_1 \ln T\bar{C})} - T\bar{C} \]  

(4)

where: \( T\bar{C} \) is the maximum cost that will reduce the visit to zero \( (V=0) \). The maximum cost is often referred to as a choke price. From coefficients \( \beta_0, \beta_1 \) and information related to choke prices, then the amount of consumer surplus can also be known.

3. Formulate a strategy for developing sustainable tourism areas.

One method that can be used in making decisions related to formulating strategies or alternative decisions is the Exponential Comparison Method (ECM). The Exponential Comparison Method is one method for determining alternative priority decisions with multiple criteria (7). Alternative assessment of each criterion uses a rating scale 1-9 (where the rating scale is 9 means very important, 1 means not important) (8). The formulation of the score calculation for each alternative in the exponential comparison method is:

\[ Total \ Nilai \ (TN_i) = \sum_{j=1}^{m} (RK_{ij})^{TKK_j} \]  

(5)

where: \( TN_i \) (Total alternative value to i), \( RK_{ij} \) (Degree of the relative importance of the criteria to j on the decision choices to i), \( TKK_j \) (Degree of the decision criteria importance to j; \( TKK_j > 0 \); round), \( n \) (Number of decision choices), \( m \) (Number of decision criteria).
3. Result and Discussion

3.1 Identification of Tourist Characteristics

Some of the characteristics identified are variables that influence a tourist to make a tourist request. The results showed that, tourists visiting Banda were divided into two, namely domestic tourists which were dominated by tourists from Jakarta (44%) and foreign tourists who were dominated by tourists from the Netherlands (10.23%). This is understood because in addition to conducting marine tourism in Banda, one of the other tourist destinations is historical tourism. There are traces of historical relics during colonialism that were directly related to the Netherlands and the abundance of spices in Maluku, especially Banda, which played a direct role as the forerunner of world exploration by European nations. So it is not wrong if most of the foreign tourists visiting Banda come from European countries.

Domestic tourists visiting Banda are dominated by age groups 31 to 40 years (29%), while foreign tourists are dominated by age groups 51 to 60 years (26%). This age group is still a productive age for tourism activities. The middle or productive tourists ranged from 35 to 54 years (9). Most of the tourists who visit are men. Domestic tourists with a percentage of 65% and foreign tourists with a percentage of 56%. One of the reasons tourists are more dominated by men is because marine tourism activities such as diving, snorkeling, fishing and others are activities that are generally preferred by men.

Most of the domestic tourists that visiting Banda came from graduate background (71%) with an income level of more than IDR 10,000,000 (32%). Whereas foreign tourists were dominated by master degree (37%) with income levels of US$ 1,000 to US$ 2,000 (47%). The higher the level of education, it is expected that the higher the level of understanding of tourists about the importance of maintaining the sustainability of natural resources which are used as tourist attraction objects. That a more equitable income and increased income will encourage more and more travel demand (9).

3.2 Travel Cost to the tourism area in Banda District

Travel costs incurred for each individual or tourist is an accumulation of transportation costs, lodging costs, consumption costs, entrance fees, rental fees for entertainment facilities, fees for using public facilities (such as toilets, WiFi, etc.), as well as other costs (such as souvenirs etc.) while traveling in Banda.

The travel costs incurred by 50% of domestic tourists, with a minimum cost of IDR 1,935,000 and a maximum cost of IDR 18,565,000, and an average trip cost of IDR 6,243,471. As for foreign tourists, travel costs incurred by 37% of foreign tourists with a minimum cost of US$ 295 and a maximum of US$ 4,820 and an average trip cost of US$ 1,108.

3.3 Tourist perceptions analysis towards tourist attraction

The potential of natural resources, especially maritime, became the main motivation for most domestic tourists when deciding to travel to Banda with a percentage of 68%. While 58% of foreign tourists travel to Banda because of its unspoiled environment. On the other hand, the majority of tourists, both domestic tourists (65%) and foreign tourists (72%) have an interest in nature, the sea and coral reefs when traveling in Banda. This is understood because most of the activities carried out while traveling are diving and snorkeling. This is also related to tourists perceptions towards the condition of coral reefs at tourist sites. The domestic
tourists (65%) and foreign tourists (51%) stated that the coral reefs at the tourist sites are in good condition.

3.4 Tourist perceptions analysis towards Infrastructure

Based on the results of the study, almost the majority of domestic and foreign tourists perceptions of each infrastructure in the tourism area are in the good category, followed by the quite good category. However, the infrastructure that is the main concern for tourists, especially foreign tourists, is transportation to Banda. According to respondents, they need quite a long time to go to Banda by using fast boats or PELNI ships with a travel time of approximately 6 to 8 hours. Other than that, there are only one air transportation modes with limited passenger quota and non-static schedules. Therefore 37% of foreign tourists answered that it is good enough for transportation, but there needs to be an increase.

3.5 Tourist perceptions analysis towards manager of tourist attraction

Most of the domestic (41%) and foreign tourists (30%) get information about tourist areas in Banda through friends. The information about tourism areas in Banda are still lacking because there is no official tourist information center yet.

The things that are more concern to tourists when conducting tourist activities are public awareness of the environment around the tourist area and waste management. Most tourists chose the category of not good for public awareness of the environment around the tourist area, domestic tourists (56%) and foreign tourists (59%). For waste management, domestic tourists answered less well (47%), as well as foreign tourists (70%). This answer is based on the tourist attraction area that is still littered with plastic waste, and even plastic waste is found by tourists at sea while doing marine tourism activities.

Although found the problem of environmental cleanliness, the majority of tourists feel very comfortable while in Banda. This is supported by a very good public response to tourists that visiting Banda. This is one of the reasons that 94% of domestic tourists and 86% of foreign tourists said they had plans to return to tour in Banda.

3.6 Analysis of Factors Affecting Number of Visits

Based on the results of the regression test, the equation or demand function of the domestic and foreign tourists produced is:

Domestic tourists model

\[ VISIT = 23,639 - 1,798COST + 0.258INC - 0.889AGE + 1,792EDUC \]

Foreign tourists model

\[ VISIT = 4,074 - 0.525COST - 0.075INC - 0.815AGE + 1,658EDUC \]

Based on the coefficient of the independent variable and the resulting P-value, the variable that significantly influences the significance level of 0.05 on the number of domestic and foreign tourist arrivals to the tourist area in Banda, namely the COST variable (travel costs). The coefficient of the domestic tourist COST variable is (-1.798), this provides an understanding that each increase in travel costs by IDR 1.00 will have a negative effect (the opposite direction) in the form of a decrease in the number of visits by 1.798 assuming other variables do not change or are constant. While the coefficient of the foreign tourist COST variable is negative (-0.525), this gives an understanding that each increase in travel costs by IDR 1.00 will have a negative effect (the opposite direction) in the form of a decrease in the number of visits by 0.525 assuming other variables do not change or are constant.
3.7 Economic Value of the Maritime Tourism Area of Banda District

The economic value of a tourist area can be estimated by doubling the value of the average individual consumer surplus by the total number of visits in a given year (4). Therefore, before calculating the economic value, it is necessary to know the average individual consumer surplus. The results of the calculation of the consumer surplus for domestic and foreign tourists is presented in Table 2.

Table 2. The calculation results of consumer surplus

| Indicator     | Indicator value | Numerator       | Denominator                    | Quotient | CS (IDR/person / visit) | Number of visits /year (person)* |
|---------------|-----------------|-----------------|--------------------------------|----------|-------------------------|----------------------------------|
| Domestic      |                 |                 |                                |          |                         |                                  |
| β0            | 23.63961832     | 32,461,138.39   | (6.46) (5,028,525.4)           | 13,536,475 | 532                     |                                  |
| β1            | -1.798135714    |                 |                                |          |                         |                                  |
| TC            | 18,565,000      |                 |                                |          |                         |                                  |
| E             | 2.718281828     |                 |                                |          |                         |                                  |
| ln(TC)        | 16.73678865     |                 |                                |          |                         |                                  |
| e^β0/β1      | 512,336.8261    |                 |                                |          |                         |                                  |
| Foreign       |                 |                 |                                |          |                         |                                  |
| β0            | 4.074145021     | 1,316.02        | (0.39) (3,417.21)              | 1,403    | 1,833                   |                                  |
| β1            | -0.525823232    |                 |                                |          |                         |                                  |
| TC            | 4,820           |                 |                                |          |                         |                                  |
| E             | 2.718281828     |                 |                                |          |                         |                                  |
| ln(TC)        | 8.480529207     |                 |                                |          |                         |                                  |
| e^β0/β1      | 2,317,227477    |                 |                                |          |                         |                                  |

Source: Primary data, (*) Secondary data, CS= Consumer Surplus

The estimated economic value of the marine tourism area of Banda District, calculated from domestic tourists, is IDR 7,201,404,479 per year, with a consumer surplus value of IDR 13,536,475 per individual. The number of domestic tourist arrivals in 2016 was 532 people. As for foreign tourists, the estimated economic value of the marine tourism area of Banda District is US$ 2,571,316 per year, if converted to IDR, an economic value of IDR 34,712,762,192.81 per year is obtained. Consumer surplus value of US$ 1,403 per individual, if converted to IDR, a consumer surplus value of IDR 18,940,500 per individual (exchange rate of IDR 13,500/US$ 1). The number of foreign tourists visiting in 2016 was 1,833 people.

3.8 Strategy for Sustainable Development in the Maritime Tourism Area of Banda District

The method used to arrange and select alternative strategic priorities in this study is the Exponential Comparison Method (ECM). This method is done by quantifying a person's opinion or more on a certain scale by scoring the available choices (10). The determination towards the level of importance of the criteria was carried out by interviewing three relevant experts, namely The Maluku Provincial Tourism and Creative Economy Office, the Village Head of Kampung Baru, Banda Neira, and business operators in the Banda tourism area. The scoring process (between numbers 1 to 9) of the criteria that affect the development of marine tourism in Banda then produces a weighting of numbers that will be used to calculate the total...
score or value of each alternative that has been chosen, among others in terms of ecology, economics and social. The importance level of criteria as well as the alternative value of developing a marine tourism area are presented in Table 3.

Table 3. The results of the experts' assessment towards the importance of criteria and alternatives for developing tourist areas

| No | Criteria                                      | Score | Alternative Value of Maritime Tourism Development |
|----|-----------------------------------------------|-------|--------------------------------------------------|
|    |                                               |       | Ecology  | Economy  | Social |
| 1  | Physical quality and visualization of tourist areas | 9     | 9        | 8        | 7      |
| 2  | A tourist experience that satisfies tourists | 8     | 8        | 8        | 7      |
| 3  | Citizen's awareness                           | 8     | 9        | 7        | 8      |
| 4  | Employment and community income               | 6     | 7        | 9        | 8      |
| 5  | Ease of access to the area                    | 7     | 7        | 8        | 6      |
| 6  | Promotion                                     | 7     | 7        | 7        | 6      |
| 7  | Strengthening tourist attractions             | 7     | 7        | 8        | 8      |
| 8  | Community and other stakeholder collaboration | 6     | 8        | 6        | 8      |

After determining the level of importance of the criteria and evaluating all alternatives on each criterion, then the total value of each alternative is calculated and determining the priority order of the decision. The calculation results are presented in Table 4.

Table 4. The results of the calculation towards the total value of alternative tourism development strategies

| Priority | Selected Alternative | Value of ECM |
|----------|----------------------|--------------|
| 1st Priority | Ecology              | 450,094,848  |
| 2nd Priority | Economy              | 162,355,689  |
| 3rd Priority | Social               | 66,076,936   |

Based on Table 4, the first priority for alternative strategies for developing marine tourism areas is in ecological terms with a significant value of 450,094,848 compared to the second and third priority values. The sustainability of a marine tourism area is determined by the ecological sustainability of the tourism area. The sustainability of ecological quality will support economic and social sustainability. Maintaining the physical quality and visualization of the tourist area can provide comfort and satisfaction to tourists who travel in Banda. This certainly can be created if there is collaboration between the community and other stakeholders as well as full awareness and understanding from the community about the importance of the environment and sustainable tourism. The creation of a sustainable tourist area, it will still provide employment opportunities for local communities and improve the socio-economic quality of the local community.

Besides that, to increase the number of tourist visits, it is necessary to have a special and official promotion about tourism in Banda through the internet media. Because based on the results of research most tourists get information about the tourist areas in Banda through the internet media. Ease of access to the tourist area, in this case the ease of transportation infrastructure to Banda, is also important to develop. This is also related to the satisfaction that will be obtained by tourists when traveling to Banda, because the amount of travel costs incurred by tourists must be paid with the comfort and satisfaction felt by tourists during the tour. However, with the promotion and ease of access to the area, tourist visits must be
controlled. So that mass tourism is not created and will have an impact on the degradation ecological quality of the marine tourism area in Banda.

4. Conclusion

Based on the research, it can be concluded that:

Factors that have a significant influence on the number of tourist visits to Banda, both domestic and foreign tourists are the travel costs incurred by tourists while traveling in Banda. Increased travel costs will have the opposite or negative effect of decreasing the number of tourist visits to Banda.

The estimated economic value of the Banda District marine tourism area is calculated from domestic tourists in the amount of IDR 7,201,404,479 per year with a consumer surplus of IDR 13,536,475 per individual per visit. Whereas foreign tourists are US$ 2,571,316 (IDR 34,712,762,192,81) per year with a consumer surplus value of US$ 1,403 (IDR 18,940,500) per individual per visit.

The first priority of alternative strategies for developing marine tourism areas in Banda District is in terms of ecology with an ECM value of 450,094,848. Ecological sustainability will have implications for economic and social sustainability.

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