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The Recreation Value of Giliyang Island, Sumenep Regency: Application of the Travel Cost Method

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Abstract:- Tourism has an essential role in economic development, particularly for archipelagic regions. A good understanding of the use-value of recreation is crucial to tourism development. This study aims to estimate the tourism recreation value of Giliyang Island by adopting the individual travel cost method. The result of this study illustrate that the consumer surplus value is IDR 331,289 per individually per visit and the tourism recreation value of Giliyang Island is IDR 1,625,301,381. These results provide information for formulating sustainable and environmentally-conscious tourism policies, management, and development of Giliyang Island.

Keywords:- *Value of Recreation, Islands Tourism, Travel Cost Method.*

I. INTRODUCTION

The tourism industry is considered as the largest economic sector globally, where tourism increases the economy by absorbing labor and income [1], and providing participation in regional development and even a country [2] [3]. In 2013, Indonesia achieved a foreign exchange gain from tourism sector which amount to $ 10.05 billion [4]. Every year, the tourism sector provides an enormous contribution to the National GDP.

Indonesia is called an archipelago because it has approximately seventeen thousand islands with excellent tourism potential. Giliyang Island is one of the islands to the east of Madura Island. This island has natural potential and high oxygen content (also known as oxygen island) [5]. In 2006, the oxygen concentration on the island was 20.9% (BAPPEDA Sumenep-LAPAN, 2016). In 2013, the oxygen concentration was 20.9% - 21.5% (BBTKLPP, 2013). In 2014, the oxygen concentration was 20% - 23% (Kementrian PUPR), and the highest was 27% (Ciptakarya, 2014). Based on this potential, Giliyang Island is designated as a tourism destination. Recorded in 2016-2017, the number of tourist visits has increased by 25% or 7,754 people, mostly domestic tourists. In 2018-2019, the number of visiting tourists experienced a significant decrease of 17%. Tourism development has a positive or negative impact on the economy, society, and environment [6]. In the economic sector, tourism development can create employment, accelerate local economy development as well as increasing welfare and regional income [7]. However, if it is not well planned, it can put pressure on the environment [8], especially in the island and coastal areas because of their level of vulnerability and limited environmental carrying capacity [9].

The air on Giliyang island is generally clean, but most people still carry out environmentally-polluting activities, such as open burning, illegal dumping, and marine littering. These activities cause environmental degradation in a long term such as water and soil pollution as well as air pollution. Air pollution will decrease the air quality in Giliyang Island. Various policies, regulations, and managements are required to solve environmental damages and pollutions caused by human activities. Economic valuation provides information for policy makers in regard to sustainable archipelagic tourism management [10] [11].

This study aims to measure the recreation value of Giliyang Island by using the travel cost method using visitor data from a questionnaire survey. The regression method to analyze travel costs and socio-economic characteristics of tourists with the number of visits per year. The consumer surplus per person per visit and the number of visits were analyzed to obtain the recreation value of Giliyang Island.

II. METHOD

A. Research Area

Giliyang is an island in the east of Madura Island, Dungkek District, Sumenep Regency, as illustrated in Figure 1. This island consists of two villages, namely Bancamara Village and Banra'as Village. The total population is 7,701 people with an area of 915 ha. Apart from the potential for high oxygen levels, this island has the potential for natural tourism that can be visited, such as Ropet Beach, Batu Cangge, Batu Celeng, Sarepa Cave, Mahakarya Cave, Aeng Cave, and others.

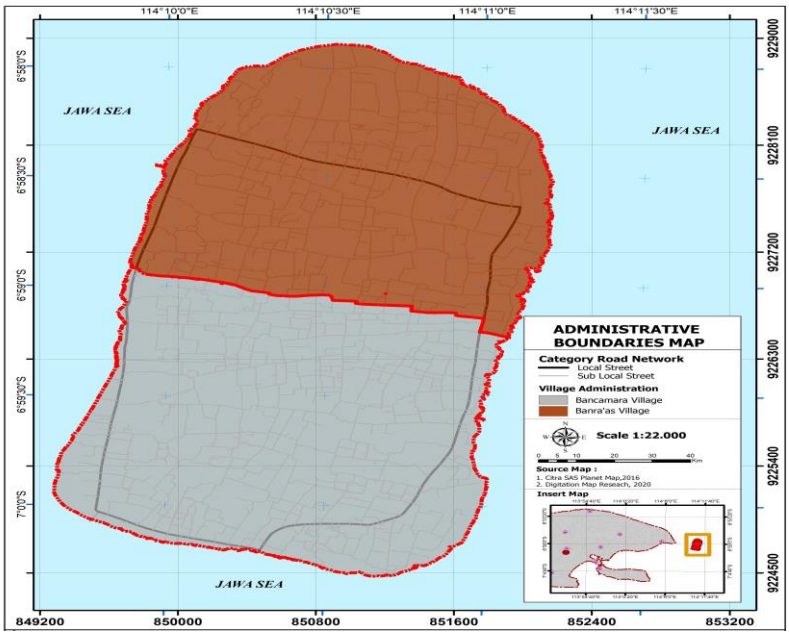

Fig. 1. Research Sites for Giliyang Island

B. Data Collection

Collected data during the primary survey through interviews, questionnaires, and secondary surveys by seeking information from planning documents related to tourism development and the number of tourist visits in 2019. The questionnaire is structured to obtain the individual visitor travel data needed to be applied to the travel cost method. Data collection was carried out by distributing questionnaires directly to visitors at the site. The questionnaire survey was conducted in November - December 2019.

C. Population and Sampling Techniques

This research population is Giliyang Island tourist visitors with a total number of 4,906 people. Sampling with purposive sampling, where the selected respondents have specific criteria to represent the population. The determination of the number of visitor samples using the Slovin formula can be written [12]:

$$n = \frac{N}{1+N\,\alpha^2} \quad (1)$$

Where n is the number of samples, N is the population, and α is the marginal error (10%).

Overall, 98 questionnaires were distributed to visitors using the purposive sampling technique with the respondent's criteria that they have an individual income and a minimum age limit of 20 years.

D. Travel Cost Method

The method serves to provide estimation on the recreational activity value of tourism areas, for instance beaches, historical buildings, those without a market value [13]. Moreover, this approach translates physical and social benefits monetary value resulting from recreational activities [14]. This method estimates that the trip's cost represents the visitor's implicit price for the journey to the destination site [15].

Two approaches are often applied to the travel cost method, namely the zonal travel cost approach first used by Marion Clawson and Jack L. Knetsch [16], and the individual travel cost approach used by Brown and Mendelsohn [17].

This study adopted an individual travel cost approach. This approach is based on personal visitor data [18], considers the cost of travel and the socio-economic characteristics of unique visitors, and has the advantage of estimating tourist locations with high visitor numbers [19] [20]. This study used the regression method to analyze travel costs and socio-economic characteristics of tourists (age, education, income, distance, and length of stay) with the number of visits per year.

Regression analysis analyzes the relationship of more than one independent variable with the dependent variable [21], and the result is the coefficient of each independent variable [22]. The main assumptions underlying the regression model using OLS as an analysis tool can be written [23]:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_n X_n \quad (2)$$

Y is dependent. X_1, X_2, X_3, X_4, X_5, X_n are independent variables, while β_1, β_2, β_3, β_4, β_5, β_n are the estimation coefficients from the regression results. At the same time, β0 is a constant value.

The dependent variable of this analysis is the number of visits to Giliyang Island. The indicator of this dependent variable is the number of tourist visits in the past year. Meanwhile, the independent variables are travel costs, age, education, income, distance, and length of stay. For more details, the indicators of the dependent variables and the independent variable are described in (Table I).

TABLE I. VARIABLES FOR ANALYSIS

Variable	Sub-variables	Indicator
Number of visits	-	The number of tourist visits in the past year
Travel cost	Transportation costs to tourist sites	Total transportation costs incurred on tour from going to return (IDR)
	Transportation costs at tourist sites	Total transportation costs incurred while in the tourist area (IDR)
	Consumption costs	Total costs incurred for food and drinking needs (IDR)
	Ticket costs	Total fees for entry to tourist destinations (rupiah)
	Accommodation costs	Total fees for lodging (IDR)
	Souvenir costs	Total costs for souvenirs (IDR)
	Miscellaneous expense	Total costs incurred other than the prices listed above (IDR)
Age	-	Visitor age (years)
Education	-	Giving Scoring 1 = Primary school; 2 = Junior school; 3 = High school; 4 = Diploma or Bachelor's Degree; 5 = ≥ Magister
Income	-	Average monthly visitor revenue (IDR)
Distance		Distance from residence to the tourist area of Giliyang Island (km)
Length of stay	-	Duration of visitors during their visit (days)

The consumer surplus value can measure the benefits that visitors get from tourism activities on Giliyang Island. Consumer surplus is the difference in value between the number of costs they are willing to pay and the amount they pay [24]. The total consumer surplus value per individual per visit results in the Giliyang Island tourist sites' value. If the value of benefits is high on tourism demand, then tourist sites' consumer surplus value is also increased [25]. A consumer surplus analysis based on individual travel trips can be written [26]:

$$CS = \int_{p_0}^{P_1} f(P_x)\ dP \quad (3)$$

P_1 is the highest visitor travel cost, P_0 is the lowest visitor travel cost, P_x is the constant value, and the travel cost coefficient value.

The recreation value of the Giliyang Islands, which is calculated by the total weight of consumer surplus per individual per visit and the number of tourist visitors for one year, can be written:

The Recreation Value: CS per trip x number of visitors (4)

III. RESULTS AND DISCUSSION

A. Respondent Characteristics

Based on the survey, all tourist visitors to Giliyang Island are domestic tourists. Survey results from respondents are presented in (Table II).

TABLE II. CHARACTERISTICS OF THE SAMPLE POPULATION

Variable	Sample Size	Percentage of Sample Size (%)
Number of visits (Trip / Year)		
1	51	52.0
2	22	22.5
3	8	8.2
4	8	8.2
5	5	5.1
6	1	1
10	1	1
12	1	1
15	1	1
Travel cost (IDR)		
≤ 100,000	3	3.1
100,001 - 200,000	34	34.7
200,001 - 300,000	39	39.8
300,001 - 400,000	15	15.3
400,001 - 500,000	6	6.1
> 500,000	1	1
Age (Years)		
20 - 25	20	20.4
26 - 35	37	37.8
36 - 45	23	23.5
46 - 55	12	12.2
56 - 65	6	6.1
Education		
High school	14	14.3
Diploma and Bachelor degree	69	70.4
≥ Magister	15	15.3
Income (IDR)		
≤ 1,000,000	36	36.7
1,000,001 - 2,000,000	14	14.3
2,000,001 - 3,000,000	11	11.2
3,000,001 - 4,000,000	7	7.1
4,000,001 - 5,000,000	16	16.3
> 5,000,000	14	14.3
Distance (Km)		
≤ 50	70	71.4
51 - 100	10	10.2
101 - 150	2	2.0
151 - 200	3	3.1
> 200	13	13.3
Length of stay (days)		
1	29	29.6
2	45	45.9
3	18	18.4
4	4	4.1
5	1	1
6	1	1

Most visitors are still visiting Giliyang Island for the first time and a maximum of fifteen times in the past year. For the most part, visitor travel costs range from IDR 200,001 - IDR 300,000 with an average travel cost of IDR 238,647 per visit. The highest travel cost for visitors to Gili Island tours is IDR 510,000, and the lowest travel cost IDR 95,000. The difference in the price of this tour is due to the distance traveled and the visitor's length of stay.

The majority of visitors are aged 26 – 35 years and have an education level of diploma and/or bachelor's degree. Most of them are also within their productive age with considerably high level of knowledge regarding their ability to decide the location and the benefits of tourism activities.

36.7% of visitors have a monthly income of ≤ IDR 1,000,000. For the most part, the distance traveled by visitors to Giliyang Island tourism area is ≤ 50 km and the visitors came from Sumenep regency. The amount of income and the distance to the tourist sites affect tourist visit activities. 45.9% of tourism visitors with an average length of stay of two days.

B. The Giliyang Island Tourism Demand Function

The tourism demand function for Giliyang Island uses regression analysis. This analysis provides information about travel costs and other variables on the number of tourist visits. This analysis shows all independent variables, namely travel fees, gender, age, education, income, distance, motivation for self-development, motivation for relaxation, the inspiration for health and prevention, and length of a visit with a 95% confidence level. The results of the regression analysis are shown in (Table III).

TABLE III. REGRESSION ANALYSIS RESULTS

Model	Variabel	Coef.	Std. Error	t	Sig.
1	Constant	2.558	.743	3.445	.001
	Travel Cost	3.293E-006	.000	2.291	.024[a]
	Age	-.005	.009	-.501	.617
	Education	.045	.182	.248	.805
	Income	.200	.073	2.740	.007[a]
	Distance	-.012	.002	-5.906	.000[a]
	Length of Stay	.364	.138	2.637	.010[a]
	R^2	.532			
	Sig. F	.000[a]			
2	Constant	2.717	.378	7.182	.000
	Travel Cost	3.354E-006	.000	2.381	.019[a]
	Age	-.005	.009	-.493	.624
	Income	.204	.071	2.874	.005[a]
	Distance	-.012	.002	-5.934	.000[a]
	Length of Stay	.361	.137	2.639	.010[a]
	R^2	.532			
	Sig. F	.000[a]			
3	Constant	2.580	.255	10.097	.000[a]
	Travel Cost	3.251E-006	.000	2.343	.021[a]
	Income	.192	.067	2.882	.005[a]
	Distance	-.012	.002	-5.958	.000[a]
	Length of Stay	,370	,135	2,739	,007[a]
	R^2	,531			
	Sig. F	,000[a]			

[a]. Significant with a confidence level of 95%

The coefficient of determination (R^2) for the model 1, model 2, and model 3 is 53.2%, 53.2%, and 53.1%, respectively. The selection of the most appropriate model for this study was based on the significance value with the level of confidence (95%) on each independent variable. According to the regression analysis result with the backward elimination method from the tested six independent variables, four of them proved to be significant to the dependent variable, which are the travel cost variable, income, distance, and length of stay. The followings are the regression models:

Model 1:
NV = 2.558 + 0.000003293 TC – 0.005 AGE + 0.045 EDU + 0.200 INC – 0.012 DIS + 0.364 LEN
Model 2:
NV = 2.717 + 0.000003354 TC – 0.005AGE + 0.204 INC – 0.012 DIS + 0.361 LEN
Model 3:
NV = 2.580 + 0.000003251 TC + 0.192 INC – 0.012 DIS + 0.370 LEN

The model 3 is a function model for tourism demand used in this study for calculation the estimated consumer surplus value and the recreation value of Giliyang Island.

C. The Recreation Value of Giliyang Island Tourism

The recreational value can be calculated by the consumer surplus of each individual for every visit, multiplied by the number of visitors in a certain year, in this case 2019. The number of visitors to Giliyang Island in 2019 was 4,906 people. The upper and lower limits on integral consumer surplus requests are calculated using the visitor travel costs of IDR 510,000 and IDR 95,000.

Based on the calculation, the value consumer surplus is IDR 331,289. Meanwhile, the average value of tourist travel cost per visit is IDR 238,648. The recreation value of Giliyang Island is IDR 1,625,301,381.

IV. CONCLUSION

The recreation value of Giliyang Island is IDR 1,625,301,381 in 2019. The number of tourism visits is influenced by travel cost, income, distance, and length of stay. This study's finding contributes information for the tourism development and management of Giliyang Island that are environmentally friendly and sustainable. This is especially considering the potential of the high oxygen levels as one of the destinations for visiting tourists.

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