OPTIMIZING WILLINGNESS TO PAY FOR THE PRESERVATION OF SIBOLANGIT NATURE PARK IN NORTH SUMATERA

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Abstract

Nature Tourism Park (TWA) is a conservation area that is formed and aims to be used as a location for tourism, education, research and cultural preservation. By looking at the completeness of the facilities and the potential of the flora and fauna in Sibolangit TWA, it should have the potential to be visited by more tourists. Moreover, its location is only 38 km from Medan City or one hour by road using a motorized vehicle, the place is on the edge of the Medan - Berastagi crossing road. The decline in visitors over the past 2 years has had an impact on the low income received by TWA Sibolangit, which is also one of the sources of PNBP (Non-Tax State Revenue). This study was conducted to answer several research questions, including: 1) What are the factors that affect WTP in Sibolangit TWA? Logistic regression analysis was used and 2) How much is the WTP value by visitors to Sibolangit TWA? Using CVM and average WTP. The target of the questionnaire is teenage visitors (12-25 years old). From the results of the study it is known that the significance value of each variable is smaller than 5 percent of only three variables, namely the variable gender, level of knowledge, and visitor perceptions of service. And based on the above calculations, the average WTP value of respondents is idr. 7,875. Rounded up to idr. 8,000,-

Keywords: *Nature Tourism Park, Willingness to Pay and teenage visitors.*

Introduction

According to the Minister of Forestry Regulation Number: P.4/Menhut-II/2012, nature tourism businesses include all activities aimed at providing goods and services required by tourists and visitors during nature tourism activities. This includes businesses related to objects and attractions, provision of services, provision of facilities, and other businesses related to nature tourism.

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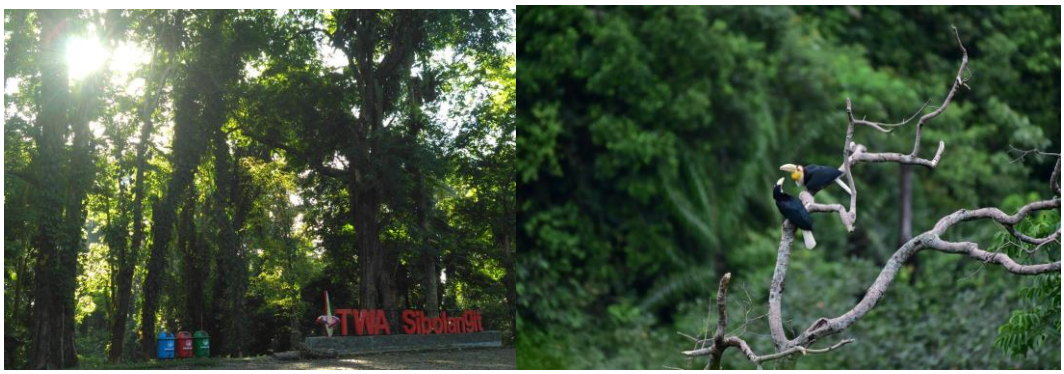
Nature Tourism Park (TWA) has functions and benefits as a place of preservation and ecotourism. This location which has a natural ecosystem can support the tourism sector, protect the living system of the surrounding area, and as a means of education and scientific development. TWA Sibolangit is one of the nature conservation forests under the management of the North Sumatra Natural Resources Conservation Center (KSDA), which is one of 126 TWAs in Indonesia. The designation of the Sibolangit TWA area is through the Minister of Forestry Decree No. SK.197/Menhut-II/2014 dated February 25, 2014 concerning the Designation of the Sibolangit CA/TWA Forest Area Located in Deliserdang Regency, North Sumatra Province with an Area of 120 Ha (RPJP TWA Sibolangit). Within the Sibolangit TWA there are infrastructure facilities that support wildlife conservation, namely the Animal Rescue Center with the main facilities in the form of various types of cages, PPS Office, PPS Clinic, Feed Warehouse which are all equipped with electricity (PLN) and clean water and sewerage facilities. For the interpretation path used by visitors to explore the area in good condition, parking lots and offices and other supporting facilities are still considered good and suitable for use. According to the report on the number of tourist visitors at Sibolangit TWA from 2017 - 2020, it has increased every year. In 2017 the total number of visits was 1903 people, followed by the following year 2018 the number of visits increased to 2,891 people in 2019. Until March 2020 the number of visits for 3 months reached 3,367 people before the covid-19 virus hit Indonesia, but in 2021 visitors only numbered 796 people. And in June 2022 the area was reopened, but visitors only reached 2,073 people. It is known that the average number of visits in the last 6 years is 2451 people

Figure 1. Number of Visitor in TWA Sibolangit Year 2017 to 2022

The type of visit is also dominated by group visits where this is a type of visit by students or students who usually come from schools or universities around Medan City who come to TWA to learn about flora and fauna and nature. Meanwhile, individual visits have not been maximized. The indication is the low number of visits on holidays or weekdays where visitors are not groups. The cause of this low number of

visits is not yet known. Even though the entrance ticket price is quite affordable. For domestic tourists, the ticket price is only IDR 5,000, and IDR 100,000 for foreign tourists on weekdays. While on weekends / holidays, the ticket price for domestic tourists is only IDR 7,500, while for foreign tourists is IDR 150,000.

With all the potential and facilities owned by TWA Sibolangit, not to mention considering its ecological role for animal preservation, regulating the water cycle, preventing landslides, regulating the microclimate, it is not yet known how much "price" tourists are willing to pay when visiting this tourist spot until now. Therefore, it is necessary to study the optimization of WTP (willingness to pay) for the preservation of Sibolangit TWA. The concept of Willingness to pay (WTP) is generally interpreted as the user's willingness to pay (in the form of money) for the services he gets. The concept of willingness to pay is actually the price at the consumer level which reflects the value of goods or services and the sacrifice to get them (Sanjaya and Saptutyningsih, 2019). Research through the study of willingness to pay is needed to examine the perceptions and characteristics of visitors so that it can be known what the maximum cost value that visitors are willing to pay with the condition of the available infrastructure and the beauty of Sibolangit Nature Tourism Park.



Picture 1. Biodiversity potential of Sibolangit Wildlife Park

The Sibolangit Nature Park area has the potential for the development of educational nature tourism, a high diversity of plant and animal species in this conservation area which can be used as an object of research and scientific development. The research objective of the WTP optimization study on the preservation of Sibolangit TWA is to measure the amount of WTP value given by visitors. Th e results of this study can provide benefits or input for the government in determining the area's entrance ticket price policy.

The Contingent Valuation Method (CVM) to determine willingness to pay (WTP) is a method to estimate the economic value of the environment in the form of non-market benefits of an ecosystem as an environmental commodity that is not marketed, in the form of indirect use value or passive use of natural resources, including its beauty and existence. Research on measuring the value of a public good

based on an assessment through the CVM method has been conducted for quite some time by implementing survey method (Bowen and Wantrup, 1947).

Research Method

Research Approach and Sample Selection

Purposive sampling, also known as judgmental, selective or subjective sampling, reflects a group of sampling techniques that rely on the researcher's judgment when it comes to selecting the units (e.g. people, cases/organizations, events, pieces of data) to be studied. These purposive sampling techniques include maximum variation sampling, homogeneous sampling and typical case sampling; extreme case sampling (deviant), total population sampling and expert sampling (Firmansyah et al.2022) the sample used by researchers has the conditions of teenage students aged 12-25 years and has visited TWA Sibolangit. The number of samples in this study totaled 110 respondents. Multiple regression analysis research, the number of samples required is 10 times the number of research variables (Sugiyono in Karisyawati et al., 2019). This study uses 11 variables where 1 variable is dependent and 10 variables are independent. The dependent variable (Y) is willingness to pay (dichotomous, 0 = not willing; 1 = willing).

Tools and Materials

This study used the following hardware and software: Printer; Digital camera; Questionnaire; Stationery, Microsoft Office Word 2019; Microsoft Office Excel; SPSS Statistics.

Data Collection Methods

Interview and Questionnaire. This study uses primary data obtained from visitors as respondents who are collected and processed directly from the subject or object of research.

Literature Study. Secondary data in the form of supporting information used in the study will be obtained from journals, books, reports and publications from several agencies related to the management of Sibolangit TWA, especially the North Sumatra Natural Resources Conservation Center.

Time and Location of Research

This research was conducted in Sibolangit Nature Park, administratively located in Sibolangit Village, Sibolangit District, Deli Serdang Regency, North Sumatra Province, geographically Sibolangit TWA is located between 98°36'36"- 98°36'56" East Longitude and 3°17'50"-3°18'39" North Latitude. And the research was conducted from Jun e to August 2023.

Data Analysis

Table 1. Summary of Research Structure

Problem formulation	Analysis method

1. What are the factors that influence WTP in Sibolangit Natural Park?	Logistic regression analysis $ln\ Y = \alpha + \beta 1lnX1 + \beta 2lnX2 + \beta 3lnX3 + \beta 4lnX4 + \beta 5lnX5 + \beta 6lnX6 + \beta 7lnX7 + \beta 8lnX8 + \beta 9lnX9 + e$ - Statistical test: - Likelihood test - Classification Table -Nagelkerke R Square test (coefficient of determination)

2. How much is the WTP value by visitors to Sibolangit Park?	CVM analysis Total WTP $\boldsymbol{TWTP = WTPi\left(\frac{ni}{N}\right)P}$ TWP average: $EWTP = \frac{\sum_{i=1}^{n} Wi}{n}$

Results and Discussion

Results

Characteristics of Respondents: Respondents were dominated by the female gender as many as 73 people or 66.36%. While the remaining 33.64% or 37 people are men. Table of Willingness to Pay Based on Respondents' Education Level. Characteristics of Respondents: Respondents were dominated by the female gender as many as 73 people or 66.36%. While the remaining 33.64% or 37 people are men.

Table 2. Willingness to Pay Based on Respondents' Education Level

Willingness to Pay	Education Level			Total
	Undergraduate	Junior High School	High School	
No	3	3	8	14
Yes	34	33	29	96
Grand Total	37	36	37	110

Likelihood Test

The model likelihood is the probability that the hypothesized model describes the input data. This test is used to determine if an independent variable added to the model significantly improves the model. in this model obtained at the initial stage (Block 0; Block beginning) the -2 Log Likelihood value is 83.857. After entering the variables in the model (block 1; method = enter) as shown in table 4.5, the -2 Log Likelihood value drops to 47.067. Thus, there was a decrease in the value-2 Log Likelihood of 36.790. This decrease indicates that the modeling is getting better or the resulting model is feasible (fit) with the data.

Classification Tabel

The classification table shows the predictive power of the regression model to predict the likelihood of respondents' willingness to pay.

Table 3. Test Value of Classification table

Classification Table[a]					
Observed			Predicted		
			WTP		Percentage Correct
			Not Willing	Willing	
Step 1	WTP	Not Willing	9	5	64.3
		Willing	0	96	100.0
	Overall Percentage				95.5
a. The cut value is .500					

Based on this table, it can be seen that the predictive power of the model to predict the probability of willingness to pay (WTP) for the preservation of Sibolangit TWA in this study is 95.5% percent. The predictive power if the WTP value is increased then the total willing to pay from respondents who are willing to pay 100%. And for the predictive power of those who are not willing to pay 64.3%.

Nagelkerke R Square Test (Koefisien Determinasi)

This test is conducted to see the ability of the independent variable to explain the dependent variable.

Table 4. Nagelkerke Test Value dan R^2

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	42.222[a]	.315	.591
a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.			

Based on data analysis, the Nagelkerke R Square value of 0.591 was obtained. This means that the ability of the independent variables to explain the dependent variable - the willingness to pay visitors to the preservation of Sibolangit TWA - is 59.1%. There are 40.1% (100% - 59.1%) other factors or variables outside the model that explain the dependent variable.

Logistic Regression Equation

The logistic regression equation generated in this study is shown in the table below.

Table 5. Coefficient Result Table

		B	Wald	Sig.	Exp(B)
Step 1[a]	Age	-.084	.016	.899	.920
	Gender*	2.412	6.063	.014	11.160
	Education	-.518	.075	.785	.596
	Pocket Money	-.313	.850	.357	.731
	Distance	-.640	1.737	.188	.527
	Travel Time	.911	2.728	.099	2.487
	Knowledge *	1.015	4.330	.037	2.760
	Service *	1.427	5.099	.024	4.164
	Infrastructure Condition	-.437	.585	.444	.646
	Object Attraction	.427	.403	.525	1.533
	Constant	-6.291	.581	.446	.002

ln Y = -6,291 - 0,084X1+ 2,412X2 – 0,518X3 – 0,313X4- 0,640X5 +0,911X6 +1,015X7 + 1,427X8 – 0,437X9 + 0,427X10

Dimana:
Ln Y: Willingness to pay (WTP)
A : Constant
β : Regression coefficient value
X1 : Age of respondent
X2 : Gender of the respondent
X3 : Education of the respondent
X4 : Respondent's pocket money
X5 : Distance from home to Sibolangit Wildlife Park
X6 : Travel time from home to TWA Sibolangit
X7 : Respondents' knowledge
X8 : Perception of TWA staff services
X9 : Perception of Sibolangit TWA facilities

From the equation above, it is known that gender, knowledge, and service are factors that influence visitors' willingness to pay and support the preservation of Natural Tourism Parks in Sibolangit. While other factors have no influence on visitors' willingness to pay and support the preservation of Nature Tourism Parks in Sibolangit.

Picture 2. Questionnaire data collection to visitors

Discussion

Age

The age factor has a significance value of 0.968. Where the age factor is not significant to willingness to pay at Sibolangit Nature Tourism Park. And has a coefficient value of - 0.084 stating that every increase in age will cause a decrease in Willingness to Pay (WTP) of 0.084. However, research on the willingness to pay conducted at Situ Ciledug found that age has an influence on WTP (Lestari, 2019).

Gender

The gender variable has a significance value of 0.014 which significantly affects the willingness to pay. Female gender has a greater quantity of willingness to pay than male gender. Gender has a coefficient value of 2.412 stating that every increase in female respondents will cause an increase in Willingness to Pay (WTP) of 2.412. The gender variable has a statistically insignificant correlation coefficient in influencing the Willingness to Pay of the community for adaptation to the impacts of climate change, research (Oktaviany, 2017) In this study, the quantity of female respondents was more than male respondents so that the possibility of respondents to answer willingness to pay was also greater. Women are known for their meek, emotional, and feminist nature so that they are more easily influenced, in contrast to men who are rational and masculine who are always firm in making decisions.

Education

The education variable has a significance value of 0.785, meaning that education is not significant to the willingness to pay at Sibolangit Nature Tourism Park

and has a coefficient value of -0.518 stating that if there is an increase in the level of education of 1 unit, the respondent's willingness to pay Willingness to Pay (WTP) decreases. The high and low level of the last education of tourists cannot guarantee an understanding of environmental sustainability and the willingness of tourists to WTP. The understanding that the forest area management area is fully the responsibility of the government and they think for scientific needs should not be charged to visitors. The independent variable of education level does not have a significant effect on the value of WTP to support sustainable ecotourism in the pindul cave tourist area, Gunung Kidul District (Annisa, 2017)

Pocket money

The pocket money variable has a significance value of 0.413, meaning that pocket money is not significant to the willingness to pay at Sibolangit Nature Tourism Park. Pocket money has a coefficient value of -0.313 stating that every increase in pocket money of Rp.1, - will result in a decrease in Willingness to Pay (WTP) of 0.313. Income or pocket money has no influence on the willingness to pay at Situ Ciledug tourist attractions (Lestari, 2019). The insignificance of pocket money on respondents' willingness to pay for ecological services at Sibolangit Nature Tourism Park can be explained that respondents are students who get pocket money from parents and the costs incurred to visit Sibolangit Nature Tourism Park come from parents and do not interfere with their pocket money. Therefore, they do not really consider the amount of pocket money in making decisions regarding prices.

Distance Traveled

The mileage variable has a significance value of 0.188. This means that the mileage variable is not significant and the coefficient value is -0.640 The direction of the relationship between mileage and Willingness to Pay (WTP) is inversely proportional. This is because they come to the area using bus vehicles rented by the school so that the distance traveled may not be an obstacle. If they went to TWA using private transportation, the results of the study might be different.

Travel Time

The travel time variable has a significance value of 0.862, meaning that travel time has no significant effect on the willingness to pay at Sibolangit Nature Tourism Park. Travel time has a coefficient value of 0.911, which states that every increase in travel time will cause an increase in Willingness to Pay (WTP) of 0.911. With a long travel time, respondents still enjoy traveling with groups so that the time spent does not have a significant effect, it may be different when respondents travel alone. There is no influence between the length of visit (X3) on the willingness to pay retribution (Y) at the Mandeh island area tourist attraction (Rosya ,2019).

Knowledge

The knowledge variable has a significance value of 0.037, which means that the knowledge variable has a significant effect and has a coefficient value of 1.015, which states that every increase in the level of knowledge by 1 unit will increase the increase in Willingness to Pay (WTP) by 1.015. With the increase in respondents' understanding of the important role of Sibolangit TWA in maintaining the ecosystem. Knowledge of nature impact to ecosystem has significant relation to willingness to pay, such as knowledge of river pollution is a variable which affects the willingness to pay of Bidaracina Village residents (Ladya, 2014).

Perception of Service

The service variable has a significant value of 0.043, meaning that the service has a significant effect and has a coefficient value of 1.427 where every 1 percent increase in service will cause an increase in Willingness to Pay (WTP) of 1.427. To be able to provide satisfaction to tourists, the manager must pay attention to the quality of the services offered. Satisfaction comes from the level of a person's feelings by comparing his impression of the performance of a product and his expectations of the product and if consumers or tourists are satisfied, they will be loyal in the long term (Kotler, Bowen & Makens, 2002).

Perception of Facilities and Infrastructure

The variable condition of facilities and infrastructure has a significance value of 0.283, which means that the condition of facilities and infrastructure does not have a significant influence on willingness to pay at Sibolangit Nature Tourism Park. This is due to the purpose of the visit from respondents to increase knowledge about nature and not to stay overnight so that infrastructure is not too important to them.

Perception of Attractiveness of Tourism Objects

The tourist attraction variable has a significance value of 0.301, meaning that the attractiveness of the tourist attraction is not significant. This variable has a coefficient value of 0.427 The direction of the relationship between the condition of tourist attractions in TWA Sibolangit and Willingness to Pay (WTP) is unidirectional (+), where the better the attractiveness of natural attractions will result in an increase in the willingness to pay. The insignificance of the perception of tourist objects on the willingness to pay of respondents at TWA Sibolangit may be explained by the activities of respondents. Based on the results of the questionnaire, it was found that 64.66% or as many as 86 respondents conducted research / field practice activities and as many as 17, 29% or as many as 23 people had activities to enjoy natural phenomena. As it is known that field practice or research activities are one of the mandatory activities by

students, so in doing this they do not have freedom of choice. Moreover, their visit to TWA is facilitated or "required" by the school so that any object in TWA, may not be a priority.

WTP Score

The questionnaire results show that 87.27% (96 people) of respondents stated that they were willing to participate in efforts to preserve this area by paying a certain entrance ticket price. Meanwhile, 12.73% (14 people) of respondents were not willing to pay. Of 96 respondents who state willing to pay, they answered various value as shown in the table below.

Table 6.Average of WTP

WTP Class	Respondent frequency	Relative frequency	Average of WTP	Total
5000	28	0.291666667	1458.3333	140000
7000	16	0.166666667	1166.6667	112000
8000	7	0.072916667	583.33333	56000
9000	4	0.041666667	375	36000
10000	42	0.4375	4375	420000
	96	1	7875	756000

The total WTP value of 96 respondents is IDR 756,000. Then, based on the above calculations, the average WTP value of respondents is idr. 7,875. Rounded up to idr 8,000.

Conclusions and Suggestions

Based on the results of the Wald Test (Significance Test) there are three factors that have an influence on WTP in Sibolangit TWA, namely gender, level of knowledge and service. In an effort to increase visits, it is necessary to conduct socialization related to the functions and ecological benefits of the area so that it can increase understanding and a sense of interest in the community, especially students, to visit TWA Sibolangit. Improve services by providing easy access for teachers and students who want to visit to conduct research activities and school visits. Further research needs to be carried out on other variables outside the variables in this study that might contribute to respondents' willingness to pay for the ecological services of Sibolangit TWA.

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