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ECONOMIC VALUATION OF MARIA TRITIS CAVE TOURISM

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ABSTRACT

The purpose of this research is to estimate the potential value of Maria Tritis Cave using the Individual Travel Cost Method and to identify the factors influencing visitor rates to the cave. Applying statistical methode to acces tool validity and reliability the quantitative method was used, and primary data was collected through we have simple random sampling technic a questionnaire from 100 people who had visited or were visiting the cave. SPSS 26 software was employed for data analysis, which included multiple linear regression. According to the findings, travel cost and visitors' age have an impact on the number of visitors to Maria Tritis Cave, while income and distance do not. The average visitor surplus per visit is Rp84,581, and the economic value of Maria Tritis Cave in 2022 is Rp3,287,558,656.

Keywords: economic valuation; maria tritis cave; yogyakarta; indonesia

INTRODUCTION

The tourism sector is vital to the local economy with multiplier effects on related industries such as hotels, restaurants, crafts, and transportation. Economic growth and improved purchasing power have led to increased domestic travel and tourism spending. Every country develops tourism as a strategy for boosting the economy, preserving the environment, and enhancing social and cultural values in the community (Croitoru, 2011:156; Chiao & Chen, 2011: 274).

Gunungkidul Regency is a part of Yogyakarta Special Region and has numerous interesting places to visit, both natural and man-made. One of these places is Maria Tritis Cave. It is located around 15 kilometers away from Wonosari city and about 7 kilometers from Baron Beach. The city of Wonosari is located 40 km away from Yogyakarta. The cave is in Dusun Bulu, Giring Village, Paliyan Subdistrict. On the way to Maria Tritis Cave passes by the Lesung Museum, which is a museum from the Dutch colonial period located in the Paliyan forest. Maria Tritis Cave holds a special place for Catholics in Gunungkidul Regency and is often referred to as the Lourdes of the area. It is the only cave that holds significance for Catholic pilgrims in the region. The months of May and October are the highest number of tourist visits, coinciding with the celebrations of Mary and the Holy Scriptures in the Catholic faith.

The area encompassing Maria Tritis Cave is endowed with captivating and unspoiled mountainous landscapes. The path from the main road to the cave is one kilometer affording a panoramic spectacle of towering coconut palm trees. Abundant wildlife, comprising species such as squirrels and melodious avifauna, inhabit the locale, enhancing the natural allure. The ambient atmosphere carries a refreshing and invigorating quality. Tourists are afforded the opportunity to indulge in distinctive local gastronomic offerings, including Pecel Abang, Grilled Grasshoppers, and Grilled Coconut Ice, thus immersing in the culinary heritage of the area. The indigenous populace primarily comprises individuals engaged in agrarian activities, carpentry, or commerce. People who live in this area are mostly farmers, carpenters, or sellers. They make and sell things like wooden crafts and metal souvenirs for tourists.

The examined region is notable for its untapped potential as an economic asset, arising from the intrinsic value of its ecosystem. However, this potential has yet to be fully harnessed by the local population. Development in this area has seen limited progress, with crucial infrastructural elements such as roads, electricity supply, lighting, water access, and communication facilities inadequately addressed. Additionally, facilities for worship and site cleanliness at the cave remain at a rudimentary stage. Recognizing the pivotal role played by the Maria Tritis Cave, it becomes imperative to facilitate and foster its advancement, thereby paving the way for amplified economic benefits in the foreseeable future. The inherent natural charm of the environs encompassing the Maria Tritis Cave positions it as a focal point for tourist attraction, with the potential to contribute significant economic value to the neighboring community.

This observation aligns with the foundational economic principle underpinning environmental services, wherein those deriving benefits reciprocate by contributing (Pagiola, 2013:1). It is pertinent to note that the Indonesian Environmental Management and Protection Law No. 32 of 2009 delineates the mechanisms governing compensation for environmental services at the national level. In essence, this compensation framework seeks to restore and safeguard sustainable environmental goods and services, while concurrently optimizing cost-efficiency over an extended temporal framework. The valuation of environmental services assumes paramount importance within the domain of decision-making, particularly concerning resource management strategies that are predicated upon both economic viability and environmental sustainability. The substantial increase in visits to the Maria Tritis Cave spanning the timeframe from 2020 to 2022 is indicative of a positive trajectory, underscoring a promising developmental trajectory for the future.

The economic value of natural resources offering scenic beauty is generally non-market and therefore not directly tradable (Jala & Nandagiri, 2015:1316), necessitating specific valuation techniques. According to Jala & Nandagiri (2015:1316), one such technique to assess the economic value of natural beauty used for tourism is the Travel Cost Method (TCM). This method asserts that the time and money spent by individuals to visit a location represent the price to access that place (Jala & Nandagiri, 2015:1316; Becker et al., 2005:429). The Travel Cost Method can adopt two approaches: the Zonal Travel Cost Method and the Individual Travel Cost Method (ITCM). In recent decades, the ITCM has been more commonly used due to advancements in information technology and its ability to capture socio-economic characteristics of visitors, such as gender, income, age, number of visits, travel cost, and distance.

Implementation of the travel cost method is the use of substitute markets to analyze demand for recreational areas. This method examines the amount of money paid and time taken to reach the recreation site, encompassing transportation, accommodation, consumption, documentation, entry tickets, and other relevant costs. The travel cost is represented as the value or price of the environmental asset (Yakin, 1997: 221). The Travel Cost Method can provide a positive correlation in calculating the economic value of established and developing tourist attractions (Igunawati, 2010:36).

Consumer surplus is the difference between the amount paid by a buyer for a product and their willingness to pay (Santoso, 2018:22). Consumer surplus arises because consumers receive more than what they paid for, rooted in the law of diminishing marginal utility. It can be measured as the area between the demand curve and the price line (Djijono, 2002). Consumer surplus is the discrepancy between the amount paid by a buyer for a product and their willingness to pay. Consumers living farthest away and incurring the highest travel costs are assumed to have the lowest consumer surplus, whereas those residing nearby with lower travel costs are expected to have the highest consumer surplus (Santoso, 2018:18). The objective of

this research is to estimate the potential economic value of Maria Tritis Cave as a tourist attraction using the Individual Travel Cost Method and identify factors influencing tourist visitation rates to the cave. The research hypothesis is:
H1. Travel costs influence the number of visits
H2. Income influences the number of visits
H3. Distance influences the number of visits
H4. Age influences the number of visits.

METHOD

Sample

The primary data for this research consists of respondent answers regarding their gender, income, and age profiles, as well as responses to questions related to the variables of the number of visits, travel cost, and distance. The population for this research encompasses visitors who have either visited or previously visited Maria Tritis Cave, with an unknown quantity. In light of the unknown population size, the formula for determining the sample size is employed as follows (Haganta, 2021:27):

$$N = \left[\frac{ZS}{E}\right]^2$$

N = number of samples
Z = standardized value
S = standard deviation
E = standard error

At a confidence level of 95% and a standard deviation of 25%, the standardized Z value is derived from a 5% margin of error, resulting in a minimal sample size. For this research, a sample size of 100 was determined, utilizing purposive sampling methodology and employing a questionnaire as the instrument.

Classic Assumption Tests

Classic assumption tests encompass assessments of multicollinearity, autocorrelation, and normality (Ghozali, 2016:103). The purpose of the multicollinearity test is to evaluate the presence of correlations among the independent variables. A regression model is deemed robust when there is no significant correlation among the independent variables, as evidenced by Tolerance values > 0.10 or Variance Inflation Factor (VIF) values < 10. The autocorrelation test is deployed to examine the potential for correlation between errors in a specific period and errors in the preceding period. A sound regression model avoids autocorrelation, as indicated by the criteria (number of independent variables - critical value) > Durbin Watson statistic > critical value. The normality test gauges whether residuals exhibit a normal distribution, ensuring the validity of statistical tests since both t-tests and F-tests in the regression model assume that residual values adhere to a normal distribution.

Descriptive Analysis

Descriptive analysis is used to determine the respondent's profile, the method used is to percentage respondents' answers to questions regarding the respondent's personal data.

Regression Analysis

This analysis was conducted to determine the extent of influence exerted by the independent variables specifically, travel cost, income, distance from the visitor's residence to Amal Beach, and visitor age—on the dependent variable, which is the number of visits (Faizal, 2015:48).

Hypothesis Testing

Hypothesis testing involves assessing the significance of individual parameters (t-statistic test) and the overall significance (F-statistic test) (Ghozali, 2016:99). The t-statistic test with

a probability of 0.05 indicates that an independent variable has no significant effect on the dependent variable if the computed coefficient significance is > 0.05. Conversely, if the computed coefficient significance is < 0.05, the independent variable has a significant effect on the dependent variable. The F-statistic test is used to determine the collective significance level of the independent variables on the dependent variable. If the computed coefficient significance is < 0.05, it signifies that the independent variables jointly influence the dependent variable.

Economic Valuation Calculations

Economic valuation is calculated using the Individual Travel Cost Method, wherein the economic value of each individual is assessed. To compute the economic value, the initial formula is employed (Handayani, 2021:117):

$$Dx = Qx = a - bP$$

a = constant in regression analysis
b = regression coefficient
P = travel costs

This equation is used to calculate consumer surplus, which ultimately yields the economic value. Calculating the consumer surplus per individual necessitates the use of definite integrals, with the lowest and highest travel costs as the lower and upper bounds, respectively (Handayani, 2021: 118):

$$\mathbf{SK} = \int_{P0}^{P1} f(P\chi)dP$$

SK = consumer surplus
P_1 = highest travel costs
P_0 = lowest travel costs

To calculate the economic value, a formula is used (Handayani, 2021:118):

NE = SK x Number of visits
NE = economic value
SK = consumer surplus

RESULT AND DISCUSSION

The research was conducted in April 2023, encompassing a respondent pool of 100 individuals who have visited Maria Tritis Cave.

Classic Assumption Tests

Classic assumption tests in this research include:

a. Multicollinearity test

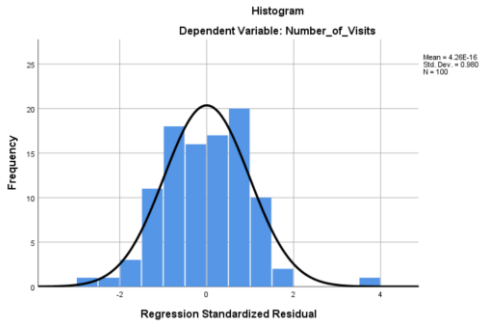
   The regression results using SPSS 26 indicate that all Tolerance values are greater than 0.1, and all VIF values are below 10, indicating the absence of multicollinearity.

b. Autocorrelation test

   With a significance value of 0.05, a sample size of 100, and 4 independent variables, the critical value from the table is 1.76. The Durbin Watson value is 2.062. The regression model is sound if (number of independent variables - critical value) > Durbin Watson > critical value, resulting in 2.24 > 2.062 > 1.76, indicating the absence of autocorrelation.

c. Normality test

   Normality Test



The histogram graph portrays a normal distribution pattern, affirming that the regression model meets the assumption of normality.

Descriptive Analysis

The characteristics of the respondents were classified into gender, income, and age.

Table 1.
Distribution of Respondents Based on Gender

Gender	%
Male	59
Female	41

The majority of respondents were male, considering that the location of Maria Tritis Cave is situated in hilly terrain.

Table 2.
Distribution of Respondents Based Income

Income (Rp)	%
< 1.000.000	15
1.000.000 – 4.400.000	70
> 4.400.000	15

The majority of respondents' incomes fall within the range of Rp1,000,000 – Rp4,400,000, indicating that Maria Tritis Cave is visited by individuals from various economic strata.

Table 3.
Distribution of Respondents Based Age

Age	%
< 22 year	29
22-50 year	68
> 50 year	3

The majority of respondents are aged between 22 and 50 years, as age is related to the physical ability of respondents to undertake visits.

Regression Analysis

This analysis was conducted to ascertain the influence of independent variables, namely travel cost, income, distance, and age of visitors, on the dependent variable, which is the number of visits.

Table 4.
Results of Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.472	.213		16.307	.000
	Travel_Cost_X1	-1.152E-5	.000	-.669	-9.145	.000
	Income_X2	-5.451E-8	.000	-.143	-1.777	.079
	Distance_X3	.013	.015	.063	.868	.387
	Age_X4	.016	.006	.213	2.674	.009

a. Dependent Variable: Number_of_Visits

The results of the multiple linear regression analysis yield the following equation:

$$Y = 3{,}472 - 0{,}00001152\ X_1 - 0{,}00000005451X_2 + 0{,}013X_3 + 0{,}016X_4$$

Y = number of visits to Maria Tritis Cave
X_1 = individual travel costs to Maria Tritis Cave
X_2 = respondent's income per month
X_3 = distance to Maria Tritis Cave
X_4 = respondent's age

Maria Tritis Cave

Source: Meyrisca, 2016

The constant value of 3.472 can be interpreted if all the independent variables are zero held at zero, the number of visits to Maria Tritis Cave amounts to 3.472 times per year. The regression coefficient of the travel cost variable, -0.00001152, indicates that a one percent increase in travel cost will lead to a decrease in the number of visits by 0.00001152 percent, assuming all other variables remain constant. An increase in travel cost has a negative effect on the number of visits. The regression coefficient of the income variable, -0.00000005451, signifies that a one percent increase in income will result in a decrease in the number of visits by 0.00000005451 percent, assuming all other variables remain constant. An increase in income negatively impacts the number of visits. The regression coefficient of the distance variable, 0.013, implies that a one percent increase in distance will lead to an increase in the number of visits by 0.013 percent, assuming all other variables remain constant. The regression coefficient of the age variable, 0.016, indicates that a one percent increase in age will result in an increase in the number of visits by 0.016 percent, assuming all other variables remain constant.

Hyphotesis Testing

The results of the multiple linear regression analysis indicate that the significance value of the travel cost variable is 0.00 < 0.05. As a result, hypothesis H1 is accepted. On the other hand, the significance value of the income variable is 0.79 > 0.05, leading to the rejection of hypothesis H2. The significance value of the distance variable is 0.387 > 0.05, resulting in the rejection of hypothesis H3. The significance value of the age variable is 0.009 <0.05, leading to the acceptance of hypothesis H4.

Table 5.
Results of F Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.933	4	7.733	23.770	.000[b]
	Residual	30.907	95	.325		
	Total	61.840	99			

a. Dependent Variable: Number_of_Visits

b. Predictors: (Constant), Age_X4, Distance_X3, Travel_Cost_X1, Income_X2

The results of the F test show a significance value of 0.000 <0.05. This indicates that collectively, the independent variables significantly influence the dependent variable of the number of visits.

Economic Valution Calculations

The economic value of Maria Tritis Cave is calculated using the individual travel cost method.

$$Dx = Qx = a - bP$$
$$= 3{,}472 - 0{,}00001152\ P$$

$$\mathbf{SK} = \int_{P0}^{P1} f(P\chi)dP$$
$$= \int_{10.000}^{170.000} (3{,}472 - 0{,}00001152\ P)dP$$
$$= \int_{10.000}^{170.000} (3{,}472\ P - 0{,}00001152\ P^2)$$
$$= \{(3{,}472 \times 170.000) - (0{,}00001152 \times 170.000^2) - (3{,}472 \times 10.000) - (0{,}00001152 \times 10.000^2)\}$$
$$= \{(590.240 - 332.928) - (34.720 - 1.152)\}$$
$$= 257.312 - 33.568$$
$$= 223.744.$$

The consumer surplus per individual is Rp223,744. Given an average of 3 visits per year, the consumer surplus per individual per single visit is determined as Rp223,744 / 3 = Rp74,581. To obtain the updated economic value, this consumer surplus per individual is multiplied by the number of visitors to Maria Tritis Cave in the year 2022.

NE = SK x number of visits year 2022
= Rp223.744 x 10.224
= Rp2.287.558.656.

Economic value of Maria Tritis Cave Rp2.287.558.656 in the year 2022.

CONCLUSION

The research findings indicate that while collectively the independent variables of travel cost, income, distance, and age influence the dependent variable of the number of visits, only the travel cost and age variables partially impact the number of visits. The consumer surplus per individual per single visit is calculated to be Rp74,581, whereas the economic value of Maria Tritis Cave in the year 2022 amounts to Rp2,287,558,656. The results of the descriptive analysis show that the majority of visitors are men with an income of between IDR 1,000,000 – IDR 4,400,000 and ages between 22 years – 50 years. This explains that Maria Tritis Cave is visited by all levels of society even though its location is in a mountainous area so physical strength is required to reach it. In the context of tourism development, Maria Tritis Cave has great potential to be developed into a tourist attraction with the advantage of being a religious place. This development will have a positive impact on the economic growth of the surrounding community, which will ultimately increase the original regional income of Gunungkidul district.

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