

ECONOMIC VALUATION OF PULAU PISANG TOURISM, IN PESISIR BARAT REGENCY: UNCOVERING THE POTENTIAL OF LOCAL RESOURCES FOR SUSTAINABLE ECOTOURISM

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Abstract

Pulau Pisang, located in Pesisir Barat, Lampung Province, offers a remarkable diversity of tourist attractions, including stunning marine beauty, abundant fisheries and agricultural resources, as well as preserved cultural and historical heritage. However, the allure of its marine beauty still primarily drives tourism activities, despite the underutilization of this potential. This study aims to analyze visitor travel costs, identify factors influencing visit frequency, and estimate the economic value of Pulau Pisang's tourism based on its local resources. It focuses on the development of sustainable ecotourism to enhance local community welfare, using the *Travel Cost Method* (TCM). The results indicate that the average travel cost per visitor is Rp1,335,200. Key factors influencing visit frequency include age, income, and travel costs. The estimated economic valuation of Pulau Pisang's tourism is Rp2,183,813,162 per year. These findings underscore the need to maximize economic benefits through the development of local resource-based ecotourism, offering valuable insights for more targeted tourism strategies. Pulau Pisang possesses far greater tourism potential than its marine beauty alone. With its rich marine and agricultural resources, as well as its preserved cultural and historical heritage, a well-executed approach can position Pulau Pisang as a model of how ecotourism can not only preserve the environment and nature but also sustainably enhance the well-being of local communities.

Keywords: Ecotourism, Economic Valuation, *Travel Cost Method* (TCM), and Local Resources.

A. INTRODUCTION

Tourism in Indonesia plays a significant role as a major contributor to the national economy, particularly in regions with unique and underexplored natural potentials (Santi Singagerda et al., 2013). According to the Ministry of Tourism and Creative Economy (2021), the development of nature and cultural tourism has accelerated over the past decade, driven by the rise of ecotourism and sustainability trends. These trends align with global efforts to mitigate the impacts of mass tourism while offering authentic, eco-friendly travel experiences. Lampung, with its abundant natural resources, cultural heritage, and historical significance, holds considerable potential to emerge as a prime tourist destination, particularly along the West Coast, renowned for its pristine

beaches. Tanjung Setia Beach, an international surfing destination, attracts visitors from across the globe. According to the Regional Strategic Plan of the Lampung Provincial Tourism and Creative Economy Office 2019-2024, the West Coast region has been designated as a Regional Tourism Destination (DPD), encompassing 11 subdistricts with unique potential, including Pisang Island, which is poised for development as an ecotourism destination.

Pulau Pisang, located in the western part of Lampung Province and directly bordering the Indian Ocean, serves as a premier tourism destination for both domestic and international visitors. (Supriadi et al., 2021). According to the Regional Regulation of Pesisir Barat Regency on the Regional Spatial Planning (RTRW) for 2017-2037, specifically Article 33, Pisang Island is designated as a natural tourism area within the West Coast region. This designation is further reinforced by the Regional Regulation of Pesisir Barat Regency No. 03 of 2017 concerning the Master Plan for Regional Tourism Development, which includes Pisang Island in Article 12, paragraph 2, as a tourism development zone. Pisang Island has become a primary focus for regional tourism development due to its diverse local potential, including natural beauty, historical heritage, cultural significance, as well as opportunities in fisheries and agriculture (Sitompul et al., 2013) . This diversity supports Pulau Pisang as a sustainable ecotourism destination. The RTRW 2017-2037, Article 39, designates Pulau Pisang as a strategic area from an economic perspective, with a focus on the development of ecotourism in the subdistrict of Pulau Pisang. As an ecotourism area, any tourism development plans must be oriented towards positive environmental impacts. Ecotourism on Pulau Pisang aims not only at environmental conservation and local community economic empowerment but also emphasizes education, which is crucial for conservation efforts and fostering visitors' understanding of the island's rich ecosystems and local culture. (Koroy et al., 2017).

The development of a tourist destination into an ecotourism area requires effective collaboration between the government and the private sector to increase visitor numbers and foster social interaction with the local community. This collaboration must be tailored to the community's capacity to adapt in terms of their economic, social, and cultural conditions. (Arum et al., 2018). The uniqueness of the landscape, culture, and local economy creates a mutually supportive relationship in the development of ecotourism (Paramita et al., 2018). Therefore, this presents an opportunity for the community to enhance their capacity in managing ecotourism potential based on local resources. Local resource potential encompasses all natural wealth, culture, and human resources influenced by the region's geographic conditions, climate, and landscape. In general, village potential can be categorized into two types: physical potential, which includes land, water, climate, geographical environment, livestock, and human resources; and non-physical potential, which involves the community's social interactions, social institutions, educational institutions, village social organizations, and local government apparatus (Soleh, 2017).

Pulau Pisang is rich in diverse resources, including natural beauty, marine products, plantation wealth, well-preserved local culture, and historical sites from the Dutch colonial era. This diversity serves as a crucial asset for tourism development, particularly ecotourism, which appeals to visitors seeking authentic travel experiences. In 2018, the island attracted a total of 6,944

visitors, with the peak of tourist arrivals occurring during the Eid holiday in September (Sofiyan et al., 2019). Given the high level of visitor interest, enhancing the capacity of the local community in managing and utilizing the available potential is crucial to ensure that the tourism experiences offered meet the expectations of visitors optimally.

Efforts to improve community welfare can be achieved by maximizing local resource potential, including both human and natural resources available in a region (Endah, 2020). Pulau Pisang has a significant opportunity to develop various ecotourism-based destinations, which hold potential to boost the local economy by creating new job opportunities in the tourism sector. Unfortunately, this potential has not been fully utilized by the local community due to a lack of awareness of the economic value and opportunities available in the tourism sector. As a result, tourism has yet to become a primary source of livelihood for the residents of Pulau Pisang. Therefore, an economic valuation assessment of Pulau Pisang is needed to determine the economic benefits, particularly recreational benefits derived from the use of local natural and environmental resources. This research aims to: (1) analyze the average travel costs incurred by visitors to Pulau Pisang, (2) identify the factors related to local resource attractions that influence visit frequency, and (3) estimate the economic value of Pulau Pisang tourism using the Travel Cost Method (TCM).

B. RESEARCH METHOD

This study employs a case study research method focused on the tourist area of Pulau Pisang, located in Pulau Pisang District, West Pesisir Regency, Lampung Province. Sampling was conducted using accidental sampling, a technique in which samples are selected randomly based on available sampling units encountered in the field. Once the required sample size was reached, data collection ceased (Nawawi, 1991). The sample size was calculated according to (Lemeshow et al., 1990).

$$n = \frac{p(1-p)(Z_{\alpha/2})^2}{D^2}$$

- n : required sample size,
 $Z_{\alpha/2}$: normal distribution value at a 95% confidence level (1.96),
 p : statistical significance threshold (0.05),
 D : margin of error or absolute precision (0.01).

Based on this formula, the required sample size for this study is 96 respondents. For convenience, the sample size was rounded up to 100 respondents. Research data were collected through both direct and indirect interviews with respondents, using prepared questionnaires, available in both printed and digital formats.

The data analysis method used in this study is the travel cost method. The calculation of travel costs in this study follows the approach of Djijono (2002), which estimates the economic value of tourist visits to the Pulau Pisang area by assessing the expenditures tourists incur during their trips (Al Khoiriyah et al., 2017). The total travel cost (BPT) is calculated as follows:

$$BPT = BT + BP + BK + BL$$

- BPT : Total travel cost (Rp/visit),

BT : Transportation costs (Rp),
 BP : Accommodation costs (Rp),
 BK : Consumption costs (Rp),
 BL : Other expenses (Rp).

A multiple linear regression analysis is employed to determine the influence of local resources as factors affecting tourist visit frequency to Pulau Pisang. Visit frequency is measured as the number of visits per year. The model is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e_i$$

Y : Visit frequency (visits/year),
 X_1 : Natural beauty attractions,
 X_2 : Cultural attractions,
 X_3 : Historical attractions,
 X_4 : Natural resource attractions.

Before analysis, the model must pass classical assumption tests, including multicollinearity and heteroscedasticity tests. Multicollinearity issues are detected by examining the Variance Inflation Factor (VIF); if $VIF > 10$, multicollinearity is present, while $VIF < 10$ indicates no multicollinearity. Heteroscedasticity is detected using scatterplots in SPSS, where data are considered free of heteroscedasticity if there is no clustering of data points (Ghozali, 2011).

The F-test is applied to assess the significance of the collective effect of independent variables on the dependent variable. Decision-making is based on the significance probability (Ghozali, 2011) :

- 1) If the significance probability is < 0.05 , then α_0 is rejected, and α_1 is accepted, indicating a significant collective effect of the variables on visit frequency.
- 2) If the significance probability is > 0.05 , α_0 is accepted, and α_1 is rejected, indicating no significant collective effect of the variables on visit frequency.

The decision criterion for statistical significance is set at < 0.05 with a 95% confidence level (Ghozali, 2011). The t-test, on the other hand, assesses the individual impact of each independent variable on the dependent variable. Decisions are made as follows:

- 1) If the significance value is < 0.05 , then α_1 is accepted, indicating a partial effect of the independent variable on visit frequency.
- 2) If the significance value is > 0.05 , α_1 is rejected, indicating no significant partial effect of the independent variable on visit frequency.

The economic value calculation using the travel cost method (TCM) involves estimating the consumer surplus per individual per year:

$$SK = \frac{x^2}{2\beta}$$

SK : Consumer surplus (Rp/person),
 X : Number of respondent visits (visits/year),

B : Travel cost coefficient.

For individual per-visit consumer, we use:

$$SK' = SK/\Sigma X$$

SK' : represents the consumer surplus per individual per visit (Rp/person),
 n : number of respondents.

The total economic value (TEV) of the tourism area is then calculated as follows: (Marsinko et al., 2001):

$$EV = SK' \times TP$$

EV : Economic value of the tourism area per year (Rp/year),
 SK' : Consumer surplus per individual per visit (Rp/person),
 TP : Total annual visitor count.

C. FINDINGS AND DISCUSSION

Characteristics of Respondents

Based on questionnaire analysis, the majority of tourists visiting Pulau Pisang are male (79%), while female tourists make up 21%. Visitor ages range from 18 to 43 years, dominated by the productive age group. Among respondents, 54% work as civil servants or in the private sector, 26% are students, and 20% are entrepreneurs. The average monthly income of tourists is Rp4,386,000, with some respondents earning up to Rp15,000,000, indicating diverse purchasing power among visitors. Most tourists are from Lampung Province (44%), with others from neighboring provinces such as South Sumatra, Bengkulu, North Sumatra, and Java (e.g., Banten, Jakarta, and West Java). The majority (84%) are first-time visitors, while 16% have visited Pulau Pisang two to three times (Table 1). This data provides an insightful profile of the socio-economic and demographic characteristics of visitors, important for understanding tourism demand and sustainable economic development potential for Pulau Pisang

Travel Cost per Visit

The average travel cost per individual per visit is Rp1,024,411, with the largest share spent on accommodation (Rp345,231). Accommodation represents the primary expense, while the lowest expenditure is on-site consumption (Rp172,400 per visit) (Table 2). These estimates offer a comprehensive overview of travel costs for tourists, particularly those who choose to stay on Pulau Pisang.

Pulau Pisang is located in a relatively remote area with challenging access, situated on the border between Lampung and Bengkulu Provinces. The distance from the city center of Bandar Lampung to Pulau Pisang is approximately 258 kilometers, with a travel time by land of around six hours. Visitors can utilize various modes of land transportation, including private cars, motorcycles, or buses. For a quicker journey, air travel is also available from Raden Inten II Airport in Bandar Lampung to Muhammad Taufiq Kiemas Airport in West Pesisir, with a flight duration of

approximately 45 minutes. After arriving in West Pesisir, visitors continue their journey by sea using a traditional boat known locally as a “jukung” from either Kuala Stabas Pier or Tembakak Pier, with a sea crossing that takes about 30-45 minutes to reach Pulau Pisang’s port. This analysis provides a detailed overview of the travel cost structure and accessibility challenges to Pulau Pisang, serving as a vital basis for planning and improving tourism infrastructure to enhance Pulau Pisang's appeal as a sustainable ecotourism destination (Putri et al., 2018).

Table 1. Distribution of Tourist Visit Frequency to Pulau Pisang

Visit Frequency	Number of People	Percentage
1	84	84%
2	8	8%
3	8	8%

Tabel 2. Travel Costs Incurred by Visitors to Pulau Pisang

Classification	Maximum (Rp)	Minimum (Rp)	Average (Rp)
Transportation	Rp4.500.000	Rp50.000	Rp172.831
Accommodation	Rp600.000	Rp100.000	Rp345.231
Consumption	Rp500.000	Rp45.000	Rp172.400
Unexpected Costs	Rp2.000.000	Rp20.000	Rp333.950
Total Cost	Rp7.600.000	Rp215.000	Rp1.024.411

Factors of Local Resource Attraction Potential Influencing Visit Frequency

The visit frequency analysis aims to measure the number of visits made by visitors, expressed as the number of visits per year, serving as an essential indicator of visitor interest in the Pulau Pisang destination. To identify the factors affecting visit frequency to this destination, a multiple linear regression method was employed. The regression model was required to pass classical assumption tests, specifically multicollinearity and heteroscedasticity tests, to ensure the validity and reliability of the analysis results.

The multicollinearity test was conducted to evaluate whether there is a strong linear relationship between the independent variables in the model. The test results show that the Variance Inflation Factor (VIF) values of all independent variables are below the critical threshold (<10) (Table 5), indicating that the model does not suffer from multicollinearity issues. Subsequently, heteroscedasticity testing was performed using a scatterplot analysis. The results of this test reveal that the data does not cluster or form a specific pattern, suggesting no heteroscedasticity problem in the model. With these two classical assumptions met, the multiple linear regression model is deemed suitable for further testing and reliable for identifying the potential factors of local resource attraction that influence tourist visit frequency to Pulau Pisang.

The adjusted coefficient of determination (Adjusted R^2) analysis was used to measure the percentage contribution of the independent variables to the dependent variable in the model overall. Based on the SPSS model summary output, the obtained Adjusted R^2 value is 0.642, indicating that 64.2% of the variation in tourist visit frequency to Pulau Pisang can be explained by the independent variables in the model, specifically the local attraction potential factors consisting of Natural Beauty (X1), Culture (X2), History (X3), and Natural Products (X4) (Table 3). Therefore, it can be concluded that these variables together have a substantial influence on the frequency of

tourist visits. The remaining 35.8% of the variation (100% - 64.2%) is due to other factors not included in this research model, potentially involving external or contextual factors that may influence visit levels but were not analyzed in this study.

The F-test statistic was conducted using Analysis of Variance (ANOVA) to determine whether the independent variables in the model, namely local resource attraction potentials such as Natural Beauty (X1), Culture (X2), History (X3), and Natural Products (X4), have a significant influence, both individually and collectively, on the dependent variable, which is the frequency of tourist visits to Pulau Pisang. Based on the ANOVA test results, the calculated F-value is 6.722 with a significance level of 0.003 (Table 4). Since the probability value (Sig.) is much lower than the 0.05 significance level, this result rejects the null hypothesis (Ho) and accepts the alternative hypothesis (H1). This finding indicates that the regression coefficients for the variables Natural Beauty, Culture, History, and Natural Products collectively have a significant impact on the frequency of tourist visits to Pulau Pisang. In other words, the four independent variables representing the potential local resources as main attractions are statistically proven to influence the visit frequency of tourists to this destination.

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.801 ^a	.642	.546	.99373

Table 4. Analysis of Variance (Anova)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.552	4	6.638	6.722	.003 _b
	Residual	14.813	15	.988		
	Total	41.364	19			

a. Dependent Variable: Visit Frequency

b. Predictors: (Constant), Keindahan Alam, Budaya, Sejarah, Hasil Alam.

The t-test analysis results indicate that the variable of Natural Beauty has a significance value below 0.05, suggesting a significant influence of this variable on the frequency of tourist visits to the Pulau Pisang tourism area (Table 5). Thus, Natural Beauty as a factor of local attraction potential proves to contribute substantially to attracting visitor interest. Conversely, other variables such as Culture, History, and Natural Products have significance values above 0.05, indicating no significant influence on tourist visit frequency. These findings suggest that among the various analyzed local resource potentials, only natural beauty serves as the primary attraction for tourists visiting Pulau Pisang. The low significance of the Culture, History, and Natural Products variables may be due to a lack of information or promotion of these potentials, rendering these aspects insufficient to impact tourists' decisions in choosing a destination. This finding underscores the importance of enhanced management and development of natural beauty, along with increased promotion and management of other variables to augment Pulau Pisang's tourism appeal.

Based on the t-test analysis, which shows that the variable of natural beauty has a significant influence on the frequency of tourist visits, this aligns with Pulau Pisang's strong visual appeal. Pulau Pisang is renowned for its beautiful landscape, including white sandy beaches, clear seawater, and wave formations that attract tourists, complemented by cliffs offering views of the Indian Ocean. This natural landscape is a primary attraction that is likely more easily appreciated by visitors, especially those drawn to the natural beauty and distinct island atmosphere. On the other hand, the variables of Culture, History, and Natural Products did not show a significant influence on tourist visit frequency. This may be due to low exposure or promotion of these aspects, resulting in limited tourist awareness of Pulau Pisang's cultural, historical, and local resource values. The rich Lampung culture on Pulau Pisang is still preserved, including the daily use of the Lampung language, traditional ceremonies, and distinctive Lampung-style stilt house architecture. However, this cultural wealth has yet to be maximized as a unique attraction for visitors to Pulau Pisang.

From a historical perspective, although Pulau Pisang has historical sites such as a Dutch lighthouse, colonial-era schools, and the graves of local figures, this information may not be widely known to tourists, potentially leading to low interest in visiting these places. The richness in natural products, such as catch fisheries, cloves, young coconuts, and woven crafts, also requires more targeted promotion to highlight their added value to incoming visitors. These findings demonstrate the need for a promotional strategy that not only highlights natural beauty but also strategically introduces and packages Pulau Pisang's cultural, historical, and local product attractions. With this approach, local resource potential can be holistically developed to create diverse and sustainable tourism attractions while enhancing the economic value of tourism on Pulau Pisang.

Tabel 5. Factors of Local Resource Attraction Potential Influencing Visit Frequency

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
1 (Constant)	-8.580	2.061		-4.164	<0,001	
Keindahan Alam	1.401	.645	.422	2.170	.046	1.581
Budaya	.094	.473	.059	.198	.845	3.752
Sejarah	.568	.477	.359	1.190	.252	3.817
Hasil Alam	.201	.422	.112	.477	.640	2.304

a. Dependent Variable : Visit Frequency

Economic Value of Pulau Pisang

The economic valuation analysis of the Pulau Pisang tourism area using the Travel Cost Method reveals a substantial economic value as a recreational destination, with a consumer surplus per individual per visit of Rp30,204.88 and an estimated total economic value of Rp2,183,813,162.01 (Table 6). This finding highlights significant economic potential, derived from the recreational benefits enjoyed by visitors. This value not only underscores Pulau Pisang's attraction as a tourist destination but also reflects the potential of this area to be developed as a sustainable ecotourism destination. Pulau Pisang, with its natural beauty that includes white sandy beaches, clear seawater, cliffs facing the Indian Ocean, along with its cultural richness and historical sites, has attractions suitable for ecotourism development. Ecotourism can help maximize the area's economic potential while preserving its natural and cultural resources. Through directed

management grounded in ecotourism principles, Pulau Pisang can offer visitors a profound travel experience while conserving the environment and preserving local cultural values.

In addition to increasing income for the local community, the development of Pulau Pisang as an ecotourism destination will support environmental and economic sustainability in the region. Ecotourism allows for active conservation of biodiversity and culture, where tourists can interact directly with nature and local culture without imposing excessive pressure on the environment. Thus, the measured economic potential of Pulau Pisang not only illustrates its current tourism appeal but also opens opportunities for sustainable ecotourism development that can enhance local economic welfare while preserving the area's natural beauty and cultural wealth.

Tabel 6. Economic Value of Pulau Pisang

Description	Value
Number of Visitors (Respondents)	100
Number of Visits per Year	6025
Travel Cost Coefficient	0,000000251
Consumer Surplus (Rp) (SK)	Rp374.540.569,97
Consumer Surplus per Individual per Visit (Rp) (SK')	Rp30.204,88
Total Economic Value per Year (Rp) (EV)	Rp 2.183.813.162,01

D. CONCLUSION

The travel cost incurred by visitors amounts to Rp1,024,411 per individual per visit. Regression analysis indicates that among the factors of local resource attraction potential, only the variable of Natural Beauty has a significant influence on the frequency of tourist visits. The estimated total economic value of the Pulau Pisang tourism area, calculated using the Travel Cost Method, reaches Rp2,183,813,162.01. Given the substantial potential of Pulau Pisang's local resource attractions that remain unmanaged, there is a clear necessity for enhanced management and further development efforts to increase the economic value of the Pulau Pisang tourism area. This economic value reflects the considerable indirect benefits enjoyed by visitors from the natural beauty, culture, history, and richness of local resources in Pulau Pisang. Therefore, developing ecotourism that focuses on optimizing the potential of local resource attractions, such as the natural beauty of beaches and seas, distinctive cultural wealth, and unique historical sites, will be a strategic step to enhance Pulau Pisang's competitiveness as a sustainable tourism destination.

Through an ecotourism approach, these potentials can be optimally utilized without compromising the preservation of the environment and local culture, which in turn will become a primary attraction for tourists seeking authentic experiences. The development of Pulau Pisang as an ecotourism destination is expected to make a tangible contribution to the local economy, create employment opportunities, and encourage community involvement in environmental conservation and cultural heritage preservation. With appropriate management, Pulau Pisang has the potential to become a premier ecotourism destination that not only enriches tourists' experiences but also supports the economic, social, and environmental sustainability of the West Pesisir region.

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