

Ecotourism Development at Candi Gedong Songo: A Contingent Valuation Method Approach

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Abstract. Tourism has a direct impact on society. In addition to providing economic benefits, tourism also has a multiplier effect on other sectors. As a tourist attraction, Gedong Songo Temple should be managed sustainably. The focus of managing the Gedong Songo Temple tourist attraction has been on the number of tourists, thus overlooking the externalities of tourists on cultural heritage buildings and environmental preservation. This study aims to determine the willingness to pay of tourists in the sustainable development of the Gedong Songo Temple tourist attraction. Primary data was used to support the results of this study. Primary data was obtained based on interviews and questionnaires with 109 tourist respondents who visited Gedong Songo Temple. Respondents were selected using purposive sampling, and the analysis was conducted statistically using the Contingent Valuation Method (CVM). The results of this study show that according to the contingent valuation method, 98 of the 109 tourist respondents were willing to pay more for the development of the Gedong Songo Temple tourist attraction, with an average WTP value of IDR 28,000 per tourist and a total willingness to pay per year for the Gedong Songo Temple tourist attraction of IDR 7.9 billion. These results confirm that tourists appreciate conservation efforts, facility improvements, and increased comfort when visiting the Gedong Songo Temple tourist attraction.

Keywords: Candi Gedong Songo, Willingness to Pay, CVM, Ecotourism, Sustainable Tourism

1. Introduction

Tourism is one of the fastest growing sectors and a driver of the global economy (Dadang & Aribal, 2020). According to a report by the United Nations World Tourism Organization (UNWTO, 2022), this industry contributed more than US\$1.073 trillion in 2022 and accounted for approximately 4.1% of global GDP. In developing countries, the contribution of tourism is increasingly significant, especially through tourist spending, which is a source of foreign exchange earnings and increased income for local communities (Azam et al., 2018). In Indonesia, tourism plays a role in economic, social, and cultural development (Spillane, 1987; Yoeti, 2005). However, conventional tourism development that only emphasizes economic aspects has been shown to cause various negative externalities on the environment and society (Buckley, 2012). This has led to a shift towards sustainable tourism.

The global trend after the Covid-19 pandemic shows a change in tourist preferences, with tourists becoming more concerned about sustainability, nature conservation, and cultural preservation (*Global and Regional Tourism Performance*, n.d.; Scott et al., 2012). Ecotourism has emerged as one of the most relevant forms of tourism, as it not only provides economic benefits but also emphasizes biodiversity conservation, cultural protection, and local community empowerment (Bauer et al., 2003). In Indonesia, the increase in tourist interest in nature tourism can also be seen from the distribution of domestic tourist visits, which are dominant in provinces with strong natural potential such as Central Java, East Java, South Sulawesi, North Sumatra, and Bali (Badan Pusat Statistik, 2023). Central Java, in particular, has more than 450 natural attractions and hundreds of cultural destinations such as temples, palaces, and archaeological sites (Dinas Pariwisata Jawa Tengah, 2022; Suryahani et al., 2020). One of the prominent cultural and natural attractions is Gedong Songo Temple, located on the slopes of Mount Ungaran, Semarang Regency.

As a cultural heritage site and leading tourist destination, Gedong Songo Temple has important historical, aesthetic, and ecological value (Undang-Undang Republik Indonesia, 2010). However, in recent years, this tourist attraction has experienced a decline in visitor numbers due to the emergence of artificial tourist destinations such as Dusun Semilir and Saloka Theme Park (BPS Kab. Semarang, 2023). This decline has had significant economic, social, and ecological impacts on the surrounding community. The results of field observations conducted by researchers in October 2023 show various problems at Gedong Songo Temple, including: first, negative externalities in the form of litter, vandalism, and degradation of conservation areas; second, minimal involvement of local communities in tourism management; third, damage to tourist facilities; and weak institutions and coordination among stakeholders.

In this context, the application of the concept of ecotourism is relevant. A number of experts emphasize that ecotourism must include environmental, social, economic, and institutional dimensions (Asadpourian et al., 2020; Barzekar et al., 2011; Hetzer, 1965; Ross & Wall, 1999). This approach enables the creation of a tourism development model that maintains long-term sustainability. One important instrument in supporting ecotourism development is Willingness to Pay (WTP). WTP describes the extent to which visitors are willing to pay additional contributions to preserve the environment and culture of a destination (Fauzi, 2014). WTP analysis has been widely used in the economic valuation of natural resources and conservation, including in nature-based tourist destinations (Musa et al., 2020; Roslan et al., 2021; Suana et al., 2020). Therefore, knowing visitors' WTP for the preservation of Gedong Songo Temple is crucial for designing conservation funding strategies and improving management based on tourist preferences.

Previous studies on Gedong Songo Temple have mostly discussed the role of stakeholders (Salsabia & Santoso, 2018), infrastructure improvements (Rahmat et al., 2020), and ecotourism development needs (Sulistiyadi, 2014). However, there has been no comprehensive study that integrates the analysis of externalities, visitors' WTP, and ecotourism-based development strategy priorities. In fact, these three aspects are very important in formulating effective and sustainable tourism management policies. Based on this, this study aims to analyze tourism externalities at Gedong Songo Temple and measure visitors' willingness to pay as a form of contribution to the preservation of the area. This study is expected to provide comprehensive and applicable policy recommendations for the sustainable development of Gedong Songo Temple as a tourist attraction.

2 . Research Method

This study was conducted in the Gedong Songo Temple Tourist Attraction area in Semarang Regency, Central Java Province. The focus of this study was to measure the Willingness to Pay value of the Gedong Songo Temple tourist attraction if it were developed into sustainable tourism. The quantitative analysis used in this research scheme was the Contingent Valuation Method (CVM) and Choice Modeling (CE). Both are research methods used to assess preferences related to costs (Fauzi, 2014). The population used in this study was tourists visiting the Gedong Songo Temple tourist attraction, with a sample of 109 tourist respondents. The sampling technique used in this study was purposive sampling using the Lemeshow formula (Lemeshow et al., 1990).

The Contingent Valuation Method (CVM) was used in this study to measure the willingness of tourists to pay for the preservation of Gedong Songo Temple in Semarang Regency. In using CVM, there are several techniques or stages in its implementation, including the following (Chang et al., 2021; Francis, 2022; Haris Yuswinarto et al., 2019; Lin et al., 2022):

1. Building a Hypothetical Market, in building a hypothetical market, a literature study, field observations, and interviews were conducted to determine the conditions in the field. This was done during the preliminary survey conducted by the researchers in October 2024, where respondents were asked to provide statements regarding the conditions and development efforts of the Gedong Songo Temple tourist attraction.
2. Development Scenario, Respondents were given information about the development scenario of the tourist attraction as an effort to create a sustainable tourist attraction and preserve the Gedong Songo Temple itself. The development scenarios include :

Table 1. Candi Gedong Songo Development Scenarios

No	Gedong Songo Temple Development Scenarios
1.	Restoration of temple buildings and repair of fences surrounding temple buildings
2.	Addition of CCTV cameras at every central point to monitor tourist activities
3.	Planting and maintenance of vegetation around Gedong Songo Temple to prevent erosion
4.	Addition of sanitation facilities and waste treatment facilities
5.	Repair and addition of toilets at several points along tourist walking trails
6.	Creation of special horse trails that are separate from the walking trails for tourists
7.	Repair and addition of information related to history in each temple area

Source: Observation and Interviews, 2024

3. Obtaining Bids, Obtaining WTP Bids (Obtaining Bids), the large WTP bid value was obtained through interviews with respondents using a questionnaire. The CVM method used in this study was the Bidding Game method. In the study, the researcher started the open bid with a value of IDR 25,000.
4. Calculating the Average Willingness to Pay of Tourists

The average value issued by respondents who were willing to pay was calculated using the following calculation formula (Chang et al., 2021; Francis, 2022; Haris Yuswinarto et al., 2019; Lin et al., 2022):

$$EWTP = \frac{\sum_{i=1}^n Wi}{n} \quad (\text{Equation 1})$$

Explanation:

EWTP = Average WTP value (IDR/Month)

Wi = Amount of WTP willing to pay (IDR/Month)

i = Respondents who pay

n = Number of Respondents

5. Aggregating Tourist Willingness to Pay Data

After estimating the average WTP value, the total WTP value of respondents is then estimated using the following calculation formula (Chang et al., 2021; Francis, 2022; Haris Yuswinarto et al., 2019; Lin et al., 2022):

$$TWTP = \sum_{i=1}^n WTP_i \left(\frac{n_i}{N} \right) P \quad (\text{Equation 2})$$

Explanation:

TWTP = Total WTP

WTP i = WTP Value i

ni = Number of sample i Willing to pay

N = Number of Sampel

P = Population size

I = Respondent i willing to pay

3 . Result & Discussion

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3.1 Profile of Tourist Respondents Visiting Gedong Songo Temple

There were 109 tourist respondents in this study, obtained from direct interviews at the Gedong Songo Temple tourist attraction over a period of three weeks. Because Gedong Songo Temple is a tourist attraction whose temples are spread across five areas, the respondents used in this study were tourists who had completed a tour of all five areas of the tourist attraction in order to obtain a comprehensive picture of the attraction. The characteristics of the respondents in this study were very diverse and were classified based on several variables such as region of origin, gender, age, religion, highest level of education, marital status, occupation, income, and purpose of travel, as shown in Table 2 below.

Table 2 Characteristics of Gedong Songo Temple Tourist Respondents

Demographic Variables	Category	Number	Percent (%)
Address	Semarang	27	25
	Outside Semarang	82	75
Gender	Male	43	40
	Female	66	60
Age	< 17 Years	1	1
	17-25 Years	76	70
	26-35 Years	18	16
	36-45 Years	10	9
	46-55 Years	3	3
	> 55 Years	1	1
Religion	Islam	105	96
	Cristian	3	3
	Catholic	1	1
Education	Elementary School	1	1
	Junior High School	6	6
	Senior High School	52	48
	Diploma	8	7
	Bachelor's Degree	34	31
	Magister's Degree	8	7
Marriage Status	Marriage	29	27
	Not Marriage	80	73
Occupation	PNS/Military/Police	5	5
	Provate Employee/Enterpreneur	45	41
	Farmer/Laborer/Fisherman	8	7
	Student/University Student	38	35

	Other	13	12
Income	< IDR 1.000.000	29	27
	IDR 1.000.000 - IDR 2.500.000	31	28
	IDR 2.600.000 - IDR 5.000.000	31	28
	> IDR 5.000.000	18	17
Purpose	Tourism	104	95
	Business/Work	1	1
	Education/Research	1	1
	Sport	1	1
	Organization Activities	1	1
	Other	1	1

Source: Observation and Interviews, 2024

Table 4.2 shows the characteristics of respondents visiting Gedong Songo Temple in Semarang Regency. It is known that of the total 109 tourist respondents, 25 percent (27 people) were tourists from Semarang Regency itself, while 75 percent (82 people) were from outside Semarang Regency. The majority of tourists came from outside Semarang Regency. Furthermore, in this study, female tourists to Gedong Songo Temple dominated the respondents, accounting for 60 percent (66 respondents), while male tourists accounted for 40 percent (43 respondents).

In terms of age, the respondents in this study were dominated by teenagers aged 17-25 years old, with 76 respondents, followed by those aged 26-35 years old, with 16 respondents. The youngest age in this study was 16 years old, who came for a vacation, while the oldest age was 59 years old, who also came for a vacation. To see the entire Gedong Songo Temple complex, tourists must walk 1.5 km around the tourist attraction, so few tourists are able to complete the journey to Temple V. This is why the respondents were predominantly teenagers, many of whom were able to walk around the Gedong Songo Temple complex from Temple I to Temple V.

Gedong Songo Temple itself is not only a tourist attraction but also a place of worship for Hindus. Although it is a Hindu temple, the majority of respondents who visited Gedong Songo Temple were Muslim tourists, numbering 105 respondents (96 percent), followed by 3 Christian respondents and 1 Catholic respondent. The highest level of education among respondents was high school graduates, accounting for 48 percent of respondents, followed by bachelor's degree graduates at 31 percent, and the rest were divided between elementary school graduates at 1 percent, junior high school graduates at 6 percent, diploma holders at 7 percent, and master's degree graduates at 7 percent.

Then, when looking at the marital status of the respondents, those who were not yet married dominated at 73 percent, while the remaining 27 percent were married. Meanwhile, in terms of profession/occupation, the most dominant were those who worked as private employees/entrepreneurs, namely 41 percent (45 people), followed by students in second place at 35 percent (38 people). The rest are civil servants/military/police officers at 5 percent, farmers/laborers/fishermen at 7 percent, and other occupations at 12 percent.

Furthermore, regarding the respondents' income, of the 109 respondents who had an income of <IDR 1,000,000, 27 percent had an income of IDR 1,000,000 – IDR 2,500,000 and IDR 2,600,000 – IDR 5,000,000, each accounting for 28 percent, and 17 percent had an income of >IDR 5,000,000. On the other hand, the majority of respondents' purpose for visiting Gedong Songo Temple was for tourism, which was 95 percent, while the remaining 5 percent were for business/work, education/research, sports, organizational activities, and other activities

3.2 Willingness to Pay of Gedong Songo Temple Visitors in Preserving Sustainability

The existence of Gedong Songo Temple in Semarang Regency directly causes positive and negative externalities. Positive externalities can directly improve the community's economy, but negative externalities can have detrimental effects, especially on the preservation of Gedong Songo Temple. Therefore, in order to maintain the preservation of Gedong Songo Temple as a heritage site, it is necessary to develop sustainable tourist attractions so that they can be enjoyed by tourists. In addition, recommendations for the development of tourist attractions are needed to maintain positive externalities so that they can continue to be enjoyed by the community from generation to generation and to anticipate negative externalities resulting from excessive tourism activities, such as mass tourism, which can occur at any time.

Willingness to Pay (WTP) analysis for tourists was conducted to estimate tourists' willingness to pay if development was carried out at the Gedong Songo Temple tourist attraction. This development is necessary to improve the infrastructure and facilities at the Gedong Songo Temple tourist attraction. In addition, development is also necessary to protect the Gedong Songo Temple complex as a cultural heritage site from the negative effects of externalities. Tourists' willingness to pay was assessed using the Contingent Valuation Method with a single development scenario consisting of several development recommendations taken from interviews with relevant stakeholders and tailored to the needs of the Gedong Songo Temple tourist attraction itself.

The development scenario for this tourist attraction aims to improve infrastructure, facilities, tourist safety, and the sustainable preservation of the Gedong Songo Temple tourist attraction. Several recommendations for the development of the Gedong Songo Temple tourist attraction include the restoration of temple buildings and the repair of the fence surrounding the temple buildings, the addition of CCTV cameras at every central point to monitor tourist activities, the planting and maintenance of vegetation around Gedong Songo Temple to prevent erosion, the addition of sanitation facilities and waste treatment facilities, and the repair and addition of toilets at several points along the tourist tracking route. The creation of special horse trails is somewhat different from trails for tourists who walk, and finally, the improvement and addition of information related to the history of each temple area.

The price tourists are willing to pay in the Gedong Songo Temple development scenario is adjusted to tourists' ability to pay using a CVM questionnaire. This price becomes the value of sustainable tourism development for Gedong Songo Temple and serves to maintain positive externalities as a tourist attraction.

3.2.1 Calculating the Average Value of WTP (Willingness to Pay)

The average WTP value is the estimated average willingness of tourists to pay a certain amount for the development and preservation of the Gedong Songo Temple tourist attraction. To determine the average WTP value, it is necessary to first find out how many respondents are willing to pay and how many are unwilling to pay through interviews and questionnaires. At the time of this study, the entrance fee to the Gedong Songo Temple tourist attraction was still IDR 15,000. Based on the results of field research, it was found that 109 respondents were interviewed, 90 percent (98 people) of whom were willing to pay the development costs of Gedong Songo Temple, while the remaining 10 percent (11 people) were not willing to pay the development costs. The estimated average WTP value of respondents for the Gedong Songo Temple tourist attraction was obtained from the ratio of the total WTP value given by respondents to the total number of respondents who were willing to pay. The distribution of the average WTP value for the Gedong Songo Temple tourist attraction is shown in Table 3 below.

Table 3 Distribution of average WTP values for Gedong Songo Temple tourists

WTP	Respondents	%	WTP x Respondents
IDR 15,000.00	13	13	IDR 195,000.00
IDR 20,000.00	12	12	IDR 240,000.00
IDR 25,000.00	29	30	IDR 725,000.00
IDR 30,000.00	16	16	IDR 480,000.00
IDR 35,000.00	5	5	IDR 175,000.00
IDR 40,000.00	22	22	IDR 880,000.00
IDR 50,000.00	1	1	IDR 50,000.00
Total	98	100	IDR 2,745,000.00

Source: processed primary data, 2024

Based on Table 3, out of 98 respondents who were willing to pay, it was found that the majority of Gedong Songo Temple tourists were willing to pay IDR 25,000 for the development scenario, with 29 respondents considering this amount to be in line with their financial capabilities for the development of Gedong Songo Temple. Next are tourists who are willing to pay IDR 30,000 (16 respondents), IDR 35,000 (5 respondents), IDR 40,000 (22 respondents), and IDR 50,000 (1 respondent). They considered that the development of tourist attractions was carried out for the improvement and preservation of the temple as well as to improve facilities and infrastructure, which they would also experience when visiting Gedong Songo Temple again. The remaining respondents were only willing to pay IDR 20,000 and IDR 15,000 because they considered that such prices were more affordable for the lower-middle class.

After determining the average WTP distribution value, the next step is to estimate the average WTP value to find out the average willingness and ability of respondents to pay a certain price for the development of the Gedong Songo Temple tourist attraction in Semarang Regency. The average WTP value is calculated using equation 1, which yields the following results:

$$\frac{2.745.000}{98} = 28.010$$

Based on the results of the WTP value distribution calculation above, it is known that the average WTP value of tourist respondents is IDR 28,010, which is then rounded to IDR 28,000. This average value is used as a reference in determining the price of admission tickets to tourist attractions charged to visitors.

3.2.2 Aggregating Data

After determining the average WTP value of respondents, the next step is to estimate the total aggregate WTP value of respondents for the Gedong Songo Temple tourist attraction, which is calculated as shown in equation 2 by multiplying the mean WTP value by the total population of Gedong Songo Temple tourists based on the number of visitors in the last year. The results of these calculations are shown in Table 4 as follows:

Table 4 Total WTP of Respondents Visiting Gedong Songo Temple

Mean WTP	Population	Total WTP/years
IDR 28,000	283.244	IDR 7,930,832,000

Source: processed data, 2024

Based on the total WTP calculation in Table 4, the total WTP value of visitors for the development and preservation of the Gedong Songo Temple tourist attraction is IDR 7,930,832,000 per year. The total WTP value is used for the development and preservation of the Gedong Songo Temple tourist attraction as recommended in the Gedong Songo Temple development scenario. Based on the results of the analysis using the contingent valuation method (CVM), the value of protection that tourists are willing to pay is determined to be IDR 28,000. This additional value shows that visitors are very enthusiastic and supportive of the development of the Gedong Songo Temple tourist attraction. This development is very important to realize the Gedong Songo Temple area as a sustainable tourist attraction that pays attention to the preservation of cultural heritage and the environment.

The analysis also shows that tourists are willing to pay an additional fee, from the original IDR 15,000 to IDR 28,000. With this increase in ticket fees, the economic value of ticket revenue for one year is estimated to generate an income of IDR 7,930,832,000. However, the increase in ticket fees must be accompanied by the management's responsibility to implement the proposed development scenarios, including the restoration of temple buildings and the repair of fences surrounding the temple buildings. addition of CCTV cameras at every central point to monitor tourist activities, planting and maintaining vegetation around Gedong Songo Temple to prevent erosion, adding sanitation facilities and waste treatment facilities, repairing and adding toilets at several points along tourist trails, creating special horse trails that are separate from the walking trails, and improving and adding historical information at each temple site.

The results of this analysis are in line with research conducted by Cheung (2014) in a study of the Hong Kong ecotourism market, which also revealed that all tourists are willing to pay more for ecotourism activities and protected areas. Shen (2023) also revealed something similar, namely that tourists in Liugong Island National Forest Park, China, are willing to pay more as long as the development is directed at the environmental sector. Several similar studies also reveal that tourists will contribute more to tourism development towards conservation, environmental improvement, and cultural heritage protection through increased costs (Lin et al., 2022; Mehni et al., 2022; Teeroovengadum, 2019; Xu et al., 2021).

The WTP value of visitors to a tourist attraction not only helps to preserve nature and various types of fauna, but also provides economic benefits for the environment and surrounding communities (Francis et al., 2020). As in the case of Gedong Songo Temple, adding value to protection through development scenarios is not solely for the purpose of increasing retribution prices. Rather, it provides benefits specifically for tourists, the community involved in tourism, the government, and Gedong Songo Temple itself. Several benefits of economic valuation are outlined in Table 5 below.

Table 5 Benefits of Developing Gedong Songo Temple as a Tourist Attraction

Beneficiaries	Benefits
Tourists	1. More attractive tourist attractions 2. Separate paths for visitors and horses so that they can enjoy Gedong Songo Temple without disturbance 3. Protection of Gedong Songo Temple as a Cultural Heritage Site 4. Availability of information as an educational tool for tourists 5. Environmental sustainability and cleanliness in the Gedong Songo Temple area
Community	1. Providing employment opportunities for the community around Gedong Songo Temple 2. Improving the community's economy 3. Preserving the environment of Gedong Songo Temple as a source of livelihood 4. Improving facilities and infrastructure in the tourist attraction area
Government	1. Increasing regional income through the tourism sector 2. Becoming a role model for sustainable tourism development in Semarang Regency 3. Preserving cultural heritage and the environment at Gedong Songo Temple

Candi Gedong Songo	1. Providing protection for the Gedong Songo Temple buildings to prevent damage
	2. Restoring several temple buildings damaged by vandalism
	3. Improving facilities and infrastructure in the tourist attraction area
	4. Implementing integrated waste management to address environmental issues
	5. Preserving cultural heritage and the environment at Gedong Songo Temple

Source: Researcher Observation, 2024

4 . Conclusion

This study shows that Gedong Songo Temple tourists are predominantly young visitors from outside Semarang Regency, whose main motivation is tourism. The majority of respondents have a secondary to higher education level and are willing to contribute financially to improving the quality of tourist attractions. Through the Contingent Valuation Method approach, the average Willingness to Pay (WTP) value obtained was IDR 28,000, far above the previous retribution rate. In aggregate, the economic value that can be collected reaches IDR 7.93 billion per year, which shows great potential for the development of facilities and preservation of this cultural heritage area. These results confirm that tourists appreciate conservation efforts, facility improvements, and increased travel comfort. In principle, they support the development of Gedong Songo Temple as long as the benefits can be felt directly and management is carried out transparently. Therefore, an increase in entrance fees is considered appropriate if accompanied by the implementation of clear and measurable development programs.

To support the sustainability of the area, there are several policy recommendations that can be considered. First, local governments and managers need to prioritize the physical conservation of temples through restoration, repair of protective fences, and strengthening of vegetation to prevent erosion. Second, improvements to supporting facilities such as tracking trails, toilets, integrated trash bins, and the provision of special horse trails need to be realized immediately to increase the comfort and safety of tourists. Third, the implementation of technological systems such as CCTV, historical information boards, and visitor management systems is necessary to reduce the risk of vandalism and support public education. Fourth, waste and sewage management must be a major focus, given the high environmental pressure caused by tourism activities. In addition, tourism development must actively involve the local community through the provision of employment, empowerment of MSMEs, and training in culture and environment-based tourism services. By strengthening the role of the community, tourism can have an economic impact while maintaining environmental and cultural sustainability. Transparency in the use of retribution funds and the involvement of stakeholders in decision-making will build trust and increase public participation.

Overall, the results of this study confirm that Gedong Songo Temple has great potential to be developed as a sustainable ecotourism and cultural tourism destination. Strong support from tourists through WTP values provides a solid economic foundation, but the success of development is highly dependent on the commitment of managers to preserve the site, improve the quality of facilities, empower the community, and ensure that all forms of development are carried out in a responsible, inclusive, and long-term sustainable manner.

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