Measuring economic value for tourism destination using contingent valuation method: The Sangiran Sites, Central Java Province, Indonesia

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Abstract. This purpose of study aims to estimate the economic value for quality improvement in Sangiran, Indonesia. This paper used contingent valuation method. The study was found significant factors affecting the probability of individuals to be willing to pay for quality improvement are the nominal amount bid, gender, and income. The economic value of Sangiran sites tourism was estimated between Rp 2.219 billion per year until Rp 2.756 billion per year. This value can be a guidance for management of the Sangiran as a basic reason for Sangiran's improvement. The improvement includes to add the collection, to build supporting infrastructure in Sangiran, to increase services, to arrange training for Sangiran staff, and others. The suggestion from this paper, we must support the local government for Sangiran improvement, because it can be profitable and it can give benefits from many aspects includes economic, historical, and education.

1. Introduction

Sangiran is located in Central Java Province, Indonesia. Sangiran includes in Sragen Regency and Karanganyar Regency, Central Java Province, Indonesia. In Sragen, Sangiran is located in three districts, they are Kalijambe, Plupuh, and Gemolong. In Karanganyar, Sangiran is located in the District Gondangrejo [1]. Sangiran is known as central for the study of early humans in the world. Sangiran give some informations over 100 ancient human individuals, so it makes Sangiran to be place that reflects human and cultural evolution, because the cultural materials came from their original layers over two million years ago [1-3].

Sangiran can be defined as cultural, environmental, and historical heritage. Sangiran also has a role as intangible heritage besides as tangible heritage. Based on the Convention for the Safeguarding of the Intangible Cultural Heritage, it defined that the practices, representations, expressions, as well as

knowledge and skills, which is owned by individuals or communities, because Sangiran was a part of the cultural heritage [2-4].

This study analyzed changes occurring conditions associated changes in the condition or quality of tourism in Sangiran Sites. The change condition or quality of tourism could be expected to affect the preferences of visitors and potential visitors to Sangiran. Based on this background, the objective of this study are measuring the economic value for quality improvement in Sangiran.

2. Methods
2.1. Data
The data used in this paper come from visitors in Sangiran. Each visitors were chosen as respondents for interview. Preliminary survey or pre test was conducted to obtain input and suggestions for the questionnaire. Totally, we distributed 100 questionnaries and only 64 questionnaries can validated. Each questionnaire have five sections, it covering (1) information for Sangiran Sites and research purposes; (2) demographic characteristics of respondents; (3) this section wants to confirm the understanding of respondents to variables forming the utility of the development of tourism in Sangiran. The question consist of motivation, desire, activity of respondents, perception, assessment of historical and cultural value, as well as environmental services; (4) this section consist of a selection of hypothetical scenarios faced by the respondents. In this part, questionnaire consisted of multiple choice questions and dichotomous yes or no question.

2.2. Contingent valuation method
Contingent Valuation Method measures non use value of public goods. This method are based on surveyed consumer preferences rather than actual market data. These method uses hyphotetical market situation to assess how much the public value of this sites [5-10]. This study used entrance fee because an entrance fee could be a logical and realistic payment vehicle for users of recreational services [2,6,8,9]. To construct the question in the form of contingent valuation, we apply the question like this "if the Sangiran Sites will improved to be better condition. Will you agree if the entrance fee increase amount of Rp Y, - per trip?" [4,6,10].

In contingent valuation method, this model is built on the assumption that the individual or visitors will maximize utility. Individual utility will be maximum if the individual is willing to accept the offer ticket prices. The condition can be described in the following equation [6,8-11].

$$V(1, Y-A; S) + \varepsilon_1 \geq V(0, Y; S) + \varepsilon_0 \tag{1}$$

Otherwise, individuals who refused the offer ticket prices, it assumes that individuals can not maximize their utility, this condition can be described as

$$V(1, Y-A; S) + \varepsilon_1 \leq V(0, Y; S) + \varepsilon_0 \tag{2}$$

In equation (1) and (2), the notation of V is indirect utility function; Y is individuals income, A is the offer ticket prices, S represents socio-demography characteristics of individuals, and ε_0 ε_1 are stochastic component. Because the utility difference between individuals who agree or not agree with the offer ticket prices defined as follows

$$\Delta\eta = V(1, Y-A; S) - V(0, Y; S) + (\varepsilon_1 - \varepsilon_0) \tag{3}$$

The equation (3) if a format of dichotomous choice from contingent valuation method. In this equation, we have a binary choice as dependent variable so there are two options for estimate this case, namely logit and probit model. This study used logit model. In logit model, individuals who are faced with a choice of whether to accept or reject the bid level market hypothesis, would have a probability (Pi), where the individuals who will receive offers fee entrance could be expressed in logit model as follows:

$$P_i = E(Y_i = 1|X_i) = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i)}} \tag{4}$$

Equation (4) can be rewriten as

$$P_i = \frac{1}{1 + e^{-Z_i}} = \frac{e^{Z_i}}{1 + e^{Z_i}} \tag{5}$$

Where $Z_i = \beta_1 + \beta_2 X_i$.

If P_i identified the probability of individuals who will receive offers fee entrance so the probability of individuals who will not receive offers fee entrance ($1-P_i$) are

$$1 - P_i = \frac{1}{1+e^{Z_i}} \tag{6}$$

Then,

$$\frac{P_i}{1-P_i} = \frac{1+e^{Z_i}}{1+e^{-Z_i}} = e^{Z_i} \tag{7}$$

If we take natural log for equation (7), we get

$$L_i = ln = \left(\frac{P_i}{1-P_i}\right) = Z_i = \beta_1 + \beta_2 X_i \tag{8}$$

L is log form odds with linear in X and parameters. L called logit then equation (8) are logit model. From equation (5), the model for this study as follow

$$Y_i^* = \beta_0 + \beta_1 Bid_i + \beta_2 Income_i + \beta_3 Gender_i + \beta_4 Marital + u_i \tag{9}$$

Logit model in equation (9) then estimated using the method of maximum likelihood (ML), which is a technique commonly used to estimate the logit model. There are three procedure to test this model, (1) individual test, this test compares p value with a certain alpha (α) and this test uses two way hipothesis, (2) overall test, this compares likelihood ratio statistics with chi squared, and (3) godness of fit test, this test uses Pseudo R-Squared. The description of the variables is explained in the Table 1.

Table 1. Description of variables

Variable	Description
PROB	Dependent variable, represent where 1 if respondents choose a hyphotetical condition so they received an entrance fee, 0 if the respondents do not choose a hyphotetical condition so they do not received an entrance fee
BID	Offer admission for a certain nominal value in hyphotetical condition
INCOME	Respondent income
GENDER	1 if male; 0 if female
MARITAL	1 if married; 0 if others

3. Result and discussion

In this section, we will describe about demographic profile of respondents in Sangiran. Following the previous studies, we include three sociodemographic variables are usually used. These variables are, (1) Age is the most commonly socio-demographic variable used in individual or households modelling studies. (2) Income measured either as a numeric variable or as a set of dummies is another frequent regressor in individual or households modelling studies. Last, the regressor is gender, measured as a set of dummies. In this paper, the demographic profile of respondents includes sex, marital status, age, education, respondent origin, and monthly income.

Based on Table 2, the proportion of male respondents (68.75%) is higher than female respondents (23.33%). The marital status of respondents with married status represent 43.75%. It's lower than other status (single), represent 50.00%. Age groups were also relatively distributed, except for people age 51 or older. Majority respondents have attended senior high school, eventhough many respondents have attended colleges or university graduates. Respondents that have attended junior high school or less, represent 21.88% of respondents, whereas 4.69% of the respondents had diploma degree. Based from respondent origin, majority respondents do not come from Sragen regency with 68.75% and from Sragen regency only 31.25%. Persons with a monthly household income of 1.51 – 3 million rupiah and 3 million rupiah or above, it's accounted for 51.56% and 10.94%. While those, respondents with incomes less than 1.5 million rupiah represented 37.5%.

Table 2. Demographic profile of respondents in Sangiran

Characteristics	Freq.	Percentage	Characteristics	Freq.	Percentage
Sex			Respondent Origin		
Male	44	68.75	Sragen Regency	20	31.25
Female	20	31.25	Others	44	68.75
Age			Education		
16 – 25	20	31.25	Junior High School or Less	14	21.88
26 – 35	17	26.56	Senior High School	27	42.19
36 – 45	10	15.63	Diploma	3	4.69
46 – 55	14	21.88	Sarjana or Over	20	31.25
> 55	3	4.69	Monthly Income (in Rupiah) 1US$ = Rp 13000		
Marital Status					
Not Married	32	50.00	<= 1,5 million	24	37.50
Married	28	43.75	1,51 - 3 million	33	51.56
Not Answer	4	6.25	> = 3,01	7	10.94

Tabel 3. Estimation results

Model 1				Model 2			
Variable	Coef.	Std.Error	Sign.	Variable	Coef.	Std.Error	Sign.
BID	1.E-04	8.E-05	*	BID	2.E-04	1.E-04	*
GENDER	1.013	0.613	*	GENDER			
MARITAL				MARITAL	-0.685	0.725	
INCOME				INCOME	2.113	0.641	***
CONS	-3.E-01	0.615		CONS	2.799	1.054	***
Num of Obs		64		Num of Obs		64	
LR chi2		6.400		LR chi2		20.820	
Prob> chi2		0.041		Prob> chi2		0.000	
Pseudo R2		0.086		Pseudo R2		0.281	
*** : sign α = 1%; **; sign α = 5%; * sign α = 10%							

Based on Table 3, we can be known that the factors that influence the willingness of the respondents accepted the offer price of entrance fee in the market to hypothesize scenarios in Sangiran. In model 1, the significant factor influence the offer ticket price with market hypothesis condition are bid and gender. In model 2, the significant factor influence the offer ticket price with market hypothesis condition are bid, marital, and income. The positive sign for income and also significant indicated that there is an income effect for the higher the probability willingness to pay [5,10,11]. For bid variable, the positive sign indicated that the higher bid amount, the higher the probability of willingness to pay [6,10,11]. Other explanation, we can suggest that visitors who come into a tourist attraction in Sangiran is not segmented in the range of age groups and specific gender specific, as shown in the above demographic profile. Based on these findings, the respondents or visitors want an improvement for tourist attraction that has complete collection, good facilities, excellent services, and an opportunity for visitors can interact with the local community [12]. If it can be fulfilled by management, probably, the number of visits have a positive response likes an increasing in number of visits in Sangiran Sites.

Table 4. Economic value (Rp)

WTP	Ticket Price*	Ticket Price + WTP	Num. of Visitors**	Total (Rp)
2,759	5,000	7,759	285,651	2,219,222,619
4,649	5,000	9,649	285,651	2,756,246,499

*Based on Sragen government regulation No. 2 Year 2011

**Domestic visitors in average between 2011 – 2014

Based on Table 4, the economic value per year in Sangiran amounted to Rp 2.219 billion per year until Rp 2.756 billion per year. This calculation obtained by the hyphotetical market that used in the study. This value represented that it should be a commitment to the preservation of historical, cultural, dan educational responsibility. We need support from the residents around this sites and visitors to participate in Sangiran development program. In addition, we must aware with the historical costs because it has a role in the existence of sustainable value for Sangiran. Besides, the price of historical resource must be an awareness for any generations, especially for future generations. We hope that they can contribute to keep the historical function in Sangiran.

4. Conclusion

According to the analysis and findings, this study found that (1) significant factors affecting the probability of individuals to be willing to pay a certain nominal value is the nominal amount or bid, marital, and income; (2) the economic per year due to hyphotetical market scenario of the Sangiran amounted to Rp 2.219 billion per year until Rp 2.756 billion per year. This value can be a guidance for management of the Sangiran as a basic reason for Sangiran's improvement. The improvement includes to add the collection, to build supporting infrastructure in Sangiran, to increase services, to arrange training for Sangiran staff, and others.

Suggestion from this paper, (1) Sangiran's management should have to raise the price of an entrance fee at Sangiran; (2) the government needs to formulate some policies in Sangiran, likes to complete collection, to build good facilities, to increase excellent services, and to give an opportunity for visitors can be interacted with the local community.

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