Willingnessto Pay Analysis of Batik Craftsmen inKampungBatik Semarang

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Willingness to Pay Analysis of Batik Craftsmen in Kampung Batik Semarang

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Abstract

This study aimed at determining and analyzing the amount of willingness to pay and factors influencing the amount of willingness to pay to repair environmental damage in Kampung Batik Semarang. This study was a quantitative research, and used primary and secondary data. Meanwhile, the method of analysis used by the researchers to calculate the willingness to pay was CVM (Contingent Valuarion Method) approach. It aimed at obtaining the cost paid by respondents in this study. Then, multiple linear regression with Ordinary Least Square (OLS) method was employed to determine factors influencing WTP values of the Batik craftsmen in Kampung Batik Semarang. The results showed that the average of Willingness To Pay (WTP) of batik craftsmen in Kampung Batik Semarang was Rp. 5,413. Meanwh 15 the total / aggregate value of WTP in this study amounted to Rp 135,570 per month. Based on the results of multiple linear regression analysis, the variables of income and number of family dependents had a significant influence on the value of WTP.

Keywords: Batik Craftsmen, Kampung Batik Semarang, Pay Analysis

1. Introduction

Indonesia is a rich in natural resources and is known as cultural heritage country. Batik is one of the cultural heritages of Indonesiawhich is still preserved till now. Batik is a work of art with high values. Batik has been recognized by UNESCO in 2009 as a world cultural heritage [11]. This condition greatly affects to the level of demand for batik. It goes without saying the production process is also increased. In fact, the increase of batik production raises new problems that is environmental pollution. The waste produced from batik production causes pollution of soil and water [13].

Semarang is the capital city of Central Java province. It has a potential for the advance of batik art. One of the batik production areas in Semarang is Kampungbatik. Kampung batik is the origin area of semarangan batik. It continuously develops each yearalong with the number of batik craftsmen. In addition, Kampung Batik is also well known as tourist destination with batik theme in Semarang [12].

Unfortunately, there are many batik craftsmen in Kampung Batik Semarang who directly dispose of their production waste into the drain or toilet without beingprocessed [9]. The reason of this habit iss because the majority of craftsmen do not yet have a Waste

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Water Management Installation (WWTP). The waste disposal without treatment results the soil conditionin the surrounding area starts to change and pollutes the water. The batik industry waste comes fromchemical coloring materials which are difficult to decompos. As a result, almost all ofdrains around the Kampung Batik turn filthyand smelly. Even more when the dry season comes, the drain condition is getting worse because there is no water to flow the batik waste into the sea. Consequently, the batik waste certainly precipitates. Surely, the sludge of batik waste causes the water and soil become polluted due to the contamination [14].

According to Law No. 23 of 1997 concerning Environmental Management, environmental destruction is defined as an act that causes direct or indirect changes into the physical and/or biological characteristics that deactivatesits function in supporting the sustainable development. The environmental damage is a form of negative externality in which the production or consumption activities by one party affect the utility of another party undesirably (environmental damage), while the party that makes the externality does not provide compensation to the affected party [2]. The environmental damage will cause a decrease in the carrying capacity of nature in maintaining human survival. Thus, the carrying capacity of nature is very important to be maintained in order to prevent the negative effects on humans [15].

Further, value is a person's perception about the price given by someone at a certain place and time. Economic value itself has a definition as a measurement of the maximum amount that someone is willing to spend to get other goods and services or in other words, the willingness to pay by someone [2]. Willingness to pay is the willingness of individuals to pay for an environmental condition caused by the use of resources in order to improve the environmental quality [7]. Itcalculatesthe extent to which the ability of individuals or communities aggregately pays or spends money in order to improve the environmental conditions. Willingness to pay is the highest price that is willing to be paid by each consumer and a measure of how much the consumers appreciate the goods and services [6]. Meanwhile in this study, the willingness to pay is the highest value that is willing to be paid (WTP) by batik craftsmen to maintain the environmental damage caused by batik waste disposal activities.

The results of Ladiyance and Yuliana's study show that there are several factors that influence the value of WTP namely gender, latest education, household income, the number of family members, the knowledge of river pollution, the main source of drinking water, and the status of home ownership [4]. The influential factors are education, knowledge, home ownership status and income, while other variables do not significantly influence. Another study conducted by Tuaputy et al reveals that the variables that significantly influence WTP are income and gender [10]. While the others have no significant effect. Mean while Gravitiani et al claims gender, age, education and income significantly influencerather than the other factors [3]. Therefore, this study aimed to determine and analyze the amount of the value of willingness to pay and the factors that influenced the value of willingness to pay for environmental damage repair in Kampung Batik Semarang.

2. Research Method

This study was a quantitative study which used primary and secondary data. The secondary data came from the Central Bureau of Statistics (BPS), the Office of Cooperatives and SMEs Semarang City and the Office of Environment of Semarang. Meanwhile, the primary data were from observations and questionnaires. The sampling of this study was done by taking the entire population of 25 respondents. It was done based on Arikunto who says if the population in the study amounted to less than 100 then the

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sample taken is a number of that population [1]. Meanwhile, the variables of this study consisted of the dependent and independent variables. The dependent variable (Y) was the value of WTP, while the independent variables were age (X1), education (X2), income (X3) and number of family dependents (X4).

Additionally, this study used two data analysis methods. The first method was the Willingness To Pay (WTP) analysis with the CVM (Contingent Valuation Method) approach. This method was used to obtain the value of costs that the batik craftsmen in Kampung Batik Semarang would pay as compensation for environmental damage caused by batik waste. In the WTP analysis, there were several steps that must be done, namely (1) creating a mortgage market, (2) getting the WTP auction value, (3) calculating the average WTP value, (4) estimating the WTP curve, and (5) calculating the aggregate WTP value. The formula used to calculate the average WTP value was based on research conducted by Tuaputy et al (2014) as follows:

(1)

$$EWTP = \sum_{i=1}^{n} WiPfi$$

Notes:

aThe estimated average WTP valueWi= the i WTP valuePfi= Relative frequencyn= The number of respondentsi= Thei-respondent who is willing to pay

Then, the formula for estimating the WTP curve was as follows:

$$Wi = f(U, PEND, JTK, PNDPT, JR)$$
(2)

Notes:

Wi = The WTP value of respondents U = Age PEND = Education JTK = The number of Family Dependents PNDPT= Income JR = Distance of Home

Whereas the formula for calculating aggregate WTP values was as follows:

(3)

$$TWTP = \sum_{i=1}^{n} WTP \left(\frac{ni}{N}\right) P$$

Notes:

TWTP = Total Respondents' WTP

WTP = The respondents' WTP value 5

- *ni* = The number of i sample that is willing to pay as WTP
- N =The number of samples
- P = The number of population
- = Thei-respondent who is willing to pay

The second analysis method was multiple linear regression analysis with the Ordinary Least Square method (OLS) using Software Eviews 10. The multiple linear regression analysis was used when the independent variables are two or more. This analysis aimed to determine the factors that influence the WTP value of batik craftsmen in

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to estimate a regression line by minimizing the sum of the squares of errors per observation. The models used are as follows:

 $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + ei \quad (4)$ Notes:

Y : WTP value

 β_o : Interception / constant

X₁ : Age

X₂ : Education

X₃ : Income

X₄ : The number of family dependents

 $\beta_1 \dots \beta_3$: Slope or direction of the regression line stating that the value of Y is the result of a change in one unit of variable X,

ei : The residual error variable that represents other factors that effect on Y but not included in

the model.

To obtain the results that in $\begin{bmatrix} 34 \\ 28 \end{bmatrix}$ with the previous research hypotheses, a number of tests were carried out to obtain $\begin{bmatrix} 28 \\ 28 \end{bmatrix}$ influence of the independent variables on the dependent variable simultaneously (F test) and partially (t test $\begin{bmatrix} 25 \\ 28 \end{bmatrix}$ The coefficient of determination (R²) was also performed to determine how far the ability of the model in explaining the variation of the dependent variable

3. Results and Discussion

This study uses the CVM (Contingent Valuation Method) approach to calculate the value of willingness to pay for environmental damage caused by batik industry waste inKampung Batik in Semarang. Apparently, not all of craftsmen were willing to pay fees for environmental damage caused by the batik waste they produce. The reasons why respondents had their own reasons to pay or not to pay are presented in the following table.

Table 1. Willingness and Unwillingness to Pay from Respondents

Respondents	Reason	Total	Percentage
Willing to pay	 Realizing the urgency of protecting environment 		560
	2. Being susceptible to other craftsmen	14 people	56%
Unwilling to pay	1. There is no certain regulation related to the obligation to pay		
	Feeling that the environmental damage is not only caused by		
	the batik waste, but also household waste	11 people	44%
	3. The low income		
	4. The high family economic		
	burden		6
Total		25people	100%

Source: primary data processed, 2019

Based on Table 1, the total batik craftsmen in Kampung Batik who were willing to pay the costs for environmental damage due to batik waste was 56% or around 14 people. Meanwhile, the remaining 44% or around 11 people were not yet willing to pay. Some of the unwilling-to-pay-respondents assumed that there were uncertain and binding

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regulations related to their obligation to pay the cost of environmental reparation. Then, some of them claimed that the environmental damage was not only caused by batik industry waste, but also household waste. Thus, they assumed that not only the craftsmen, the community also should pay the cost of environmental improvement as their responsibility. In addition, several respondents stated that their income was still very low so that if they have to pay, it would greatly burden their economy.

Further, there were several steps in conducting the CVM (Contingent Valuation Method) approach in order to calculating the value of willingness to pay. The first stage was creating a hypothetical market. The hypothetical market was created to provide the explanations and knowledge related to the impact of environmental damage caused by batik waste. Through this step, the batik craftsmen were expected to be more aware of the importance of protecting the environment and participate in maintaining and improving the quality of the environment that has been polluted by batik waste.

The second step was obtaining the WTP auction values by using the bidding game technique. It wasconducted by repeatedly asking questions to respondents until they gained certain amount of willingness to pay. Additionally, this study also used dichotomous choice technique which is a technique carried out by giving a certain amount of value of value of the respondent. Later on the respondents were asked whether they are willing or not to pay the amount of money as an effort to maintain and improve the environmental quality in Kampung Batik Semarang. Through two teceniques, the researchers obtained the auction value or the offer of WTP payment, namely Rp 3,000, Rp 4,000, Rp 5,000, Rp 8,000 and Rp 10,000.

After the auction value was obtained and offered to the respondent, the next step was calculating the average WTP valueobtained from the respondent's answers. To calculate the average value of WTP, the following formula was used [10]:

 $EWTP = \sum_{i=1}^{n} WiPfi$

(5)

Notes: **S**WTP =The average of WTP value Wi = The i WTP value Pfi = Relative frequency n = The number of respondents I = Thei-respondent who is willing to pay

The results of the average of WTP valuebased on the results of the calculation of respondents' answers are presented in table 2.

No 14	WTP Value	Total	Frequency (Pf _i) (%)	The Mean of WTP value
1	Rp 3.000	3	21,4	Rp642
2	Rp 4.000	4	28,5	Rp1.140
3	Rp 5.000	5	35,7	Rp1.785
4	Rp 8.000	2	14,2	Rp1.136
5	Rp 10.000	1	7,1	Rp710
7 otal		14	100	Rp5.413

Table 2. The Average of WTP Value

Source: Primary data processed, 2019

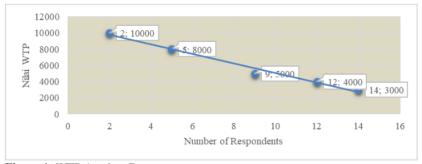
Based on table 2, it can be seen that the average of WTP value was Rp 5,413. In addition, the majority of respondents who were willing to pay for WTP were in the range

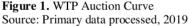
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of Rp 5,000 with a frequency of 35.7%, while the smallest frequency was atRp 10.00, namely 7.1% or only about 1 person.

The fourth step was estimating WTP curve. This curve was used to show changes in WTP values caused by the influence of changing factors which affected it. Auction curve can be made of the results of WTP auction amount that have been offered to the respondents. Further, the auction curve in this study is presented in the following figure:





The Figure 1 showed that the curve of WTP amount gained negative slope, meaning that the greater the burden of costs assigned to environmental damage repair, the low number of people willing to pay would be, and vice versa. When the cost burden to pay was Rp 3,000, the number of craftsmen who were willing to pay were 14 people. When the cost burden was Rp 4,000, the number of craftsmen who were willing to pay decreased to 12 people. Meanwhile, when the cost burden was Rp 10,000, the number of craftsmen who were willing to pay decreased to 12 people.

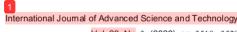
The fifth step was to aggregate the amount of WTP. This was used to determine the amount of economic value of natural resources and environment. To obtain WTP aggregate value, there is a need to calculate the distribution of WTP respondents. It was done by formula in the following [10]:

$$TWTP = \sum_{i=1}^{n} WTP \left(\frac{m}{N}\right) P \qquad (6)$$

Notes: TWTP = Total Respondents' WTP WTP = respondent's WTP amount **5** = Number of i sample that was willing to pay the WTP amount N = Number of samples P = total population **i** = i-respondent who was willing to pay

The results of aggregate calculation in this study are presented in the following Table 3:

Table 3. Total Value of Willingness To Pay



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WTD Amount	Number	of	Population	Total
w I P Amount	Respondents (n _i)		(P)	(TWTP)
Rp 3,000	3		5.35	16,050
Rp 4,000	4		7.14	28,560
Rp 5,000	5		8.92	44,600
Rp 8,000	2		3.57	28,560
Rp 10,000	1		1.78	17,800
~	14		25	135,570
	Rp 4,000 Rp 5,000 Rp 8,000	WTP Amount Respondents (n _i) Rp 3,000 3 Rp 4,000 4 Rp 5,000 5 Rp 8,000 2 Rp 10,000 1	WTP Amount Respondents (ni) Rp 3,000 3 Rp 4,000 4 Rp 5,000 5 Rp 8,000 2 Rp 10,000 1	WTP Amount Respondents (n _i) (P) Rp 3,000 3 5.35 Rp 4,000 4 7.14 Rp 5,000 5 8.92 Rp 8,000 2 3.57 Rp 10,000 1 1.78

Source: Processed Primary Data, 2019

Based on Table 3, it was known that the aggregate value/ total of WTP gained for the improvement of environment quality in Kampung Batik Semarang was RP 135,570 per month. This value indicated the amount of potential earned compensation as an effort to preserve environment and as a form of participation by craftsmen in preserving and improving their surrounding environment.

The Analysis of Factors Influencing the Value of Willingness To Pay (WTP)

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In order 18 determine the factors influencing the amount of WTP values, the researchers used multiple linear regression. This analysis was applied to 185 respondents. For the variables, the analysis involved the value of respondents' WTP as the dependent variable, while the independent variables were age, education, income, and the number of family dependents. The results of the multiple linear regression analysis in this study are presented in table 4 as follows:

Table 4. The Results of	Multiple Linear Re	gression		
Variables	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.244734	3.105760	0.078800	0.9380
Age	-0.014793	0.031386	-0.471326	0.6425
Education	0.400990	0.202837	1.976906	0.0620
Income	0.175434	0.050434	3.478479	0.0024
Number of labor	-1.036744	0.194532	-5.329435	0.0000
R-Squared	0.860298			
Adjusted R-Squared	0.832358			
F-Statistic	30.79045			0.000000
Durbin-Watson	2.418452			
Source: Processed Prima	arv Data, 2019			

ce: Processed Primary Data, 2019

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The results of multiple linear regression in table 4 indicated that the model used in this study was considered good by having the value of determination coefficient (R^2) of 0.86. It showed that there were approximately 86% WTP value could be explained by the independent variable in the model, while the rest 48% was explained by other variables outside the model.

T test was carried out with the aim of determining the extent to which one independent variable individually or partially influenced dependent variable. This test was done by considering the probability value of each variable, and the alpha used. If the probability value was smaller than alpha, meaning that the variable has significant influence. In addition, the value of alpha used in this study was 5%. After the test, it was known that the probability value of age variable (X1) was 0.6245>0.05. It meant that age variable did not significantly influence WTP value. Meanwhile, the probability value of education variable (X2) was 0.0620>0.05. It meant that education variable did not significantly influence WTP value. Next, the probability value of income variable (X3) was 0.0024>0.05. It meant that income variable significantly influenced WTP value. For

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more, the probability value of family dependents variable (X4) was 0.6245>0.05. It meant that this variable significantly influenced WTP value.

F test was performed to determine whether all independent variables in the model jointly contributed significant influence on dependent variable or not. This test was done by core aring F-statistic probability value with alpha. If F-statistic probability value < alpha, meaning that the independent variable jointly contributed significant influence on dependent variable. Based on the results of multiple linear regression, the researchers obtained F-statistic probability value of 0.000000 4 This number showed that the dependent variables included in the model, covering age (X1), education (X2), income (X3), and the number of family dependents (X4) jointly contributed significant indluence on the WTP value in Kampung Batik Semarang.

The Influence of Age on the Willingness To Pay Value of Environmental Quality Improvent in Kampung Batik Semarang

Based on the results of regression analysis, it was known that age variable (X1) negatively and not significantly influenced the value of WTP with the coefficient value of -0.014793. This proved that that when the age of batik craftsmen increases, the WTP value will decrease further. That is, if there is an increase in age of 1 unit, it will cause a crease in the value of WTP of -0.014793 assuming other variables are constant. The results so this study are in line with a study conducted by Ladiyance and Yuliana (2014) which show that age has no significant influence on the value of PAPs. However, this study is not in line with a study conducted by Gravitiani, et al which explains that age has a significant influence on the value of PAPs [3].

The findings of this study illustrated that age cannot be a benchmark for the WTP value of batik craftsmen in Kampung Batik Semarang. The higher the age of the craftsmen did not necessarily have a higher environmental concern. The facts in the field showed that most batik craftsmen assumed that the environmental damage that occurred was not only caused by batik waste but also household waste around it. This was the reason why not all craftsmen were willing to pay the cost of environmental improvement.

The Influence of Education on the Value of Willingness to Pay to Improve Environmental Quality in Semarang Batik Village

The results 12 multiple linear regression analysis showed that the educational variable (X2) had a positive and not significant effect on the value of WTP with a coefficient value of 0.400990. It confirmed that the higher the educational background of batik craftsmen, the higher the WTP value will also be. In details, if there is an increase in education by 1 unit, it will cause an increase in the value of W12 by 0.400990 by assuming other variables are constant. The results of this study are in line with a study conducted by Tuaputy, et al (2014) which shows that ducation has no significant effect on the value of WTP. However, this study is not in line with a study conducted by Gravitiani, et al which explains that education has a significant influence on the value of WTP [3].

Education can be a benchmark for the quality of one's human resources. The higher a person 15 ducation, the higher the quality of the person's human resources will be. Similarly, the higher a person's education, the higher his awareness of protecting environment shull be. However, the findings of this study actually apparently showed that education had no significant influence on the value of WTP. It indicated that the higher one's education did not merely reflect his WTP for the improvement of environment. For more, the findings also showed that the majority of batik craftsmen who

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were willing to pay WTP were mostly the graduates of Junior High School (SMP) not Senior High School (SMA).

The Influence of Income on the Willingness To Pay Value to Improve Environmental Quality in Kampung Batik Semarang.

The multiple linear regression analysis indicated that the variable of income (X3) positively and significantly influenced WTP value with the coefficient of 0.175434. This showed that the higher the income of batik craftsmen, the higher the WTP value will also be. That is, if there is an increase in income by 1 unit, it will cause an increase in the value of V2 P by 0.175434 by assuming other variables are constant. The results of this stud 33 are in line with a study conducted by Gravitiani, et al which shows that income has a significant influence on the value of WTP [3]. In the study of Nwofoke, et al it was also mentioned that income has a positive influence on the value of PAPs [8].

Income is a benchmark of one's economy. The higher one's income, the higher his economic ability will be. In the same way, income is strongly related to the value of WTP. The higher the income of batik craftsmen, the higher their WTP will be. It is because the higher income will result in their ability and willingness to pay WTP. However, the average income of batik craftsmen in Kampung Batik Semarang was uncertain. It caused not all of them were willing to pay costs for the improvement of environment. This matter was also caused by the feeling of the lack daily needs fulfillment by the craftsmen. The majority of craftsmen who were willing to pay the cost of environmental improvement were craftsmen who have already been established in financial matters.

The Influence of Number of Family Dependents on the Value of Willingness to Pay to Improve Environmental Quality in Kampung Batik Semarang

According to the results multiple linear regression, the variable of number of family dependents (X4) negatively and significantly influenced the value of WTP with the coefficient of -1.036744. This asserted that the more number of family dependents in a family of batik craftsmen, the lower WTP value will be. It meant that whenever there is an increase in family dependent by 1 unit, there will a decrease in W22 of -1.036744 by assuming other variables are constant. The results of this study are in line with a 3udy conducted by Nwofoke, et al which shows that the number of family dependents has a negative and significant effect on the value of WTP [8]. However, the results of this study are not in line with a study conducted by Ladiyance and Yuliana which states that the number of family dependents has no significant effect on the value of WTP [4].

The majority of batik craftsmen in Kampung Batik Semarang have been married, so they have a burden to fulfill family needs. The more their family members, the higher economic burden will be. As a results, their WTP value will be lower. On the other hand, one whose family members are few will tend to pay higher because his economic burden is not large. The results of field study showed that the majority of batik craftsmen who willingly paid costs for the improvement of their environmental quality were those whose family dependents less than four people.

4. Con 27 ision

Based on the results and discussion in this study, it can be concluded that the mean of the value of Willingness To Pay (WTP) of batik craftsmen in Kampung Batik Semarang is Rp. 5,413. Meanwhile th 32 tal / aggregate value of WTP in this study amounted to Rp 135,570 per month. From the results of multiple linear regression 11 lysis, partially income variable and the number of family dependents variable have a significant influence on the value of WTP. Oppositely, age and education variables do not

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have a significant influence on the 29 ue of WTP. Furthermore, simultaneously or jointly the variables of age, education, income and number of family dependents have a significant influence on the value of WTP. By referring to these findings, stakeholders are suggested to be wiser in determining the amount of WTP that will be charged to batik craftsmen in Kampung Batik Semarang as a cost of improving environmental quality.

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