



Strategy to Improve 3R-Based Solid Waste Services in Jatihandap Village Through the Implementation of the "CVM" Contingent Valuation Method

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Strategy to Improve 3R-Based Solid Waste Services in Jatihandap Village Through the Implementation of the "CVM" Contingent Valuation Method

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ABSTRACT:

Jatihandap is one of the villages in the Mandalajati sub-district, Bandung City, West Java province. The increasing population in Indonesia is directly proportional to the growth of new settlements. In line with this, the growth of waste volume in Indonesia is closely related to the growth of its population. The level of welfare and lifestyle in Indonesia has resulted in a significant increase in waste generation, especially in urban areas. One way that can be done to measure the willingness of citizens to improve waste services is to measure the Contingent Valuation Method. Contingent Valuation Method (CVM) Based on the results of this study, WTP values were 138 people from 158 samples selected. The estimated WTP (EWTP) is Rp. 12,971 and the total WTP (TWTP) is Rp. 80,385,000 / month. From the multiple linear regression analysis, factors that influence household willingness to pay for increasing waste services in Jatihandap are occupation and sex.

Keywords—*Contingent Valuation Method, Willingness to Pay*

1. INTRODUCTION

Garbage is the remnants of goods from human activities that are not used anymore and thrown away. The increasing population in Indonesia is directly proportional to the growth of new settlements. In line with this, the growth of waste volume in Indonesia is closely related to the growth of its population. The level of welfare and lifestyle in Indonesia has resulted in a significant increase in waste generation, especially in urban areas.

From the waste problems that occur, it can be concluded that this problem cannot be solved by the government alone but needs to be solved jointly between the government and the community. The community needs to be active in handling solid waste because it is very close to the source directly. Therefore, every household should manage waste individually or in groups in their respective neighborhoods.

One way that can be done to measure the willingness of citizens to improve waste services is to measure the Contingent Valuation Method. Contingent Valuation Method (CVM) is a survey method that is conducted by asking respondents directly individually and has been developed by economists to estimate the social value associated with environmental problems. With this method we can find out how much the ability and willingness of residents to upgrade the TPS facilities to 3R TPS. Because this method is a direct survey of respondents, a hypothesis can be drawn regarding how much money the community wants to spend to improve waste management services in Jatihandap Village.

This final project research was conducted on the environmental economic value of improving waste services through Cikadut TPS by using the Contingent Valuation Method (CVM). The economic value of the environment can be useful as an effort to improve PD Cleanliness services to the community for participation in the willingness to pay more to achieve this.

2. STUDY AREA AND DATA

In this study, the location of the study was conducted in Jatihandap Village. The object of the research object was the community served by PD Cleanliness in Bandung City through Cikadut TPS in Jatihandap Village.

There are 2 types of data used in this study, namely secondary data and primary data. Secondary data from this study came from various sources including: (Books, Scientific Journals, RPJMD of Bandung City, Jatihandap Village and Cikadut TPS) which contained research-related information such as programs carried out by local governments to improve the quality of the environment based on the Bandung RPJMD , general description of Jatihandap Kelurahan and existing conditions at Cikadut TPS. Primary data of this study were obtained through questionnaires and interviews with respondents / research subjects in Kelurahan Jatihandap and also documentation directly at the research location.

3. METHODOLOGY

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This study uses Slovin's calculations to get the number of samples to be interviewed and given a questionnaire. The number of family heads (KK) in Jatihandap in 2019 was 6,285 households and the following is the calculation of the number of samples with an error rate of 8%:

For $d = 8\%$

$$n = \frac{N}{Nd^2 + 1} = \frac{6285}{6285 \times (0,08)^2 + 1} = 152,47 \approx 153 \text{KK}$$

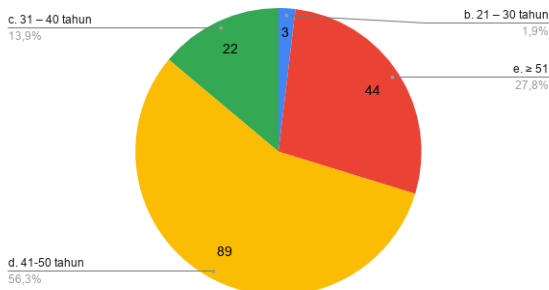
Where n = number of samples; N = number of households; d = % error rate

Then from the number obtained interviews and questionnaires were distributed randomly as many as 153 families from 6,285 families in Jatihandap to get information related to the research.

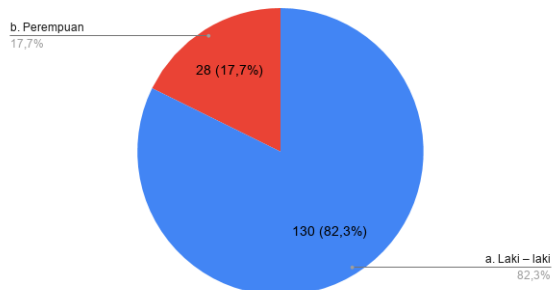
The questionnaire distributed was distributed to respondents containing 3 main sections. First, respondent data containing the respondent's personal information consisting of age, gender, education history, type of work, income, number of people in one house, monthly garbage contribution. Second, assessment of the quality of waste management which contains questions about the current quality of waste management such as the amount of waste transportation per month, timely transportation activities and assessment of each respondent. Third, the participatory attitude of citizens and the willingness to pay more (WTP) contains questions about how the participatory attitude of citizens towards the conditions of existing solid waste management and the amount of WTP values to be excluded from each respondent. The hypothetical market formed in this questionnaire is that the waste problem cannot be solved by the government alone but needs to be solved jointly between the government and the community so that the community needs to play a role in overcoming it as well.

Respondent characteristics are represented through data on age, sex, education history, type of work, income, number of people in one house, monthly garbage contribution.

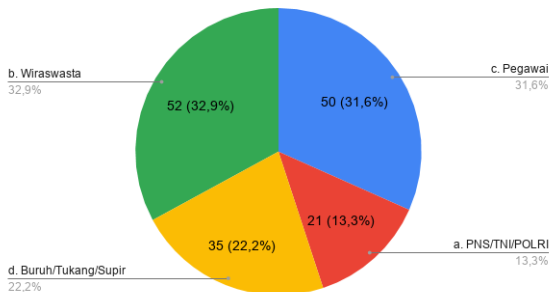
Jumlah 1. Berapakah usia Anda saat ini ?



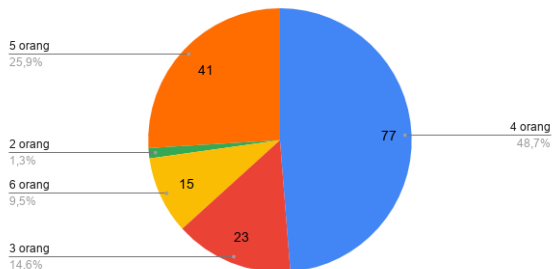
Jumlah 2. Jenis Kelamin



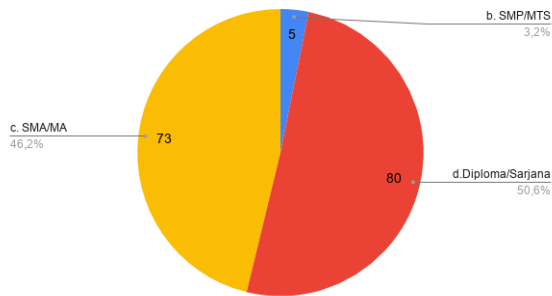
Jumlah 3. Apa jenis pekerjaan anda ?



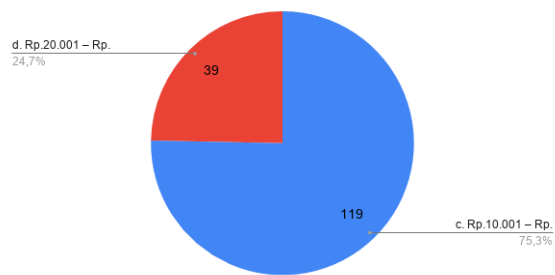
Jumlah 5. Berapa jumlah orang yang tinggal dalam 1 Kepala Keluarga (KK) saat ini ?



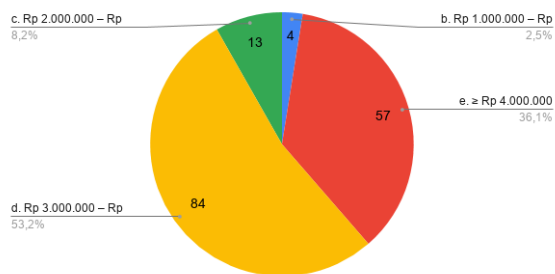
Jumlah 4. Tingkat pendidikan yang terakhir anda tempuh ?



Jumlah 7. Berapa rata-rata tagihan persampahan anda dalam sebulan di rumah ini?



Jumlah 6. Berapa rata-rata penghasilan anda (KK) dalam sebulan ?



4. RESULTS AND DISCUSSIONS

Respondent's WTP value is obtained from the difference in the cost of garbage that is willing to be paid less the cost of existing waste fees. Following are the WTP values of 138 respondents who have WTP values.

Table I Distribution of Respondent EWTP Value

| No | WTP (Rupiah) | Responden (KK) | Frekuensi Relatif (Pfi) | EWTP (Rupiah) |
|---------------|--------------|----------------|-------------------------|---------------|
| 1 | Rp 10.000 | 63 | 0,457 | Rp 4.565 |
| 2 | Rp 15.000 | 68 | 0,493 | Rp 7.391 |
| 3 | Rp 20.000 | 7 | 0,051 | Rp 1.014 |
| Jumlah | | 138 | 1 | Rp 12.971 |

(Source: Data Analysis Results, 2019)

Based on Table I, it shows that the respondent's EWTP value is in addition to the existing garbage contribution costs of the Jatihandap Kelurahan respondents in an effort to increase solid waste services through Cikadut TPS totaling Rp 12,971 / month. The WTP value is obtained through the bidding game method submitted to respondents, then reduced by the cost of the previous waste levy, so the TWTP value obtained will be purely to increase solid waste services in Jatihandap Village without calculating the cost of facilities or operations that have run previously.

Table II Distribution of Respondents TWTP Value

| WTP | Frekuensi (Responden) | Populasi (KK) | TWTP |
|--------------|-----------------------|---------------|---------------|
| Rp 10.000 | 68 | 3.097 | Rp 30.970.000 |
| Rp 15.000 | 63 | 2.869 | Rp 43.035.000 |
| Rp 20.000 | 7 | 319 | Rp 6.380.000 |
| Total | 138 | 6285 | Rp 80.385.000 |

(Source: Data Analysis Results, 2019)

Based on Table II, it shows that the people of Jatihandap Urban Village who are willing to pay in an effort to increase solid waste services are estimated at 5,489 households (87.34% of the total population) with a TWTP value of Rp 80,385,000 / month. TWTP value is a reference for recommendations in an effort to improve solid waste services in Jatihandap Village through Cikadut TPS in terms of budget / financing funds.

Then the t-test, F-test and coefficient of determination are performed to determine what factors most influence the WTP value. T-test analysis aims to determine the effect of independent variables with the dependent variable with a significance level of 0.05.

The hypothesis used is as follows:

- Ho = There is no significant effect between the independent variable and WTP.
- Ha = There is a significant influence between the independent variable and WTP.

Table III Test Results t

| No | Variabel Independen | t Hitung | t Tabel | Keterangan |
|----|---------------------------|----------|---------|--------------------|
| 1 | Usia | -1,022 | 1,97882 | t hitung < t tabel |
| 2 | Jenis Kelamin | 0,387 | 1,97882 | t hitung < t tabel |
| 3 | Pekerjaan | -0,999 | 1,97882 | t hitung < t tabel |
| 4 | Tingkat Pendidikan | -6,014 | 1,97882 | t hitung > t tabel |
| 5 | Jumlah Orang Setiap Rumah | 1,219 | 1,97882 | t hitung < t tabel |
| 6 | Tingkat Pendapatan | -1,972 | 1,97882 | t hitung < t tabel |
| 7 | Iuran Sampah | -9,508 | 1,97882 | t hitung < t tabel |

(Source: Data Analysis Results, 2019)

T test analysis in this study uses the following testing criteria: • Ho = rejected if the value of t count > t table. • Ho = accepted if the value of t count < t table. The independent variable with the statement Ho rejected is the variable number of people per house. This shows that the independent variable number of people per unit house (own) has a significant influence on the dependent variable (WTP). F test analysis was performed to determine the effect of all independent variables on the dependent variable with a significance level of 0.05. The hypothesis used is as follows: • Ho = There is no significant effect between all independent variables simultaneously on the dependent variable. • Ha = There is a significant influence between all independent variables simultaneously on the dependent variable

Table IV Test Results F

| F Hitung | F Tabel | Keterangan |
|-----------------|----------------|--------------------|
| 4,586 | 2,080 | F Hitung > F Tabel |

(Source: Data Analysis Results, 2019)

The F test analysis in this study uses the following testing criteria:

- Ho = accepted if F arithmetic < F table.
- Ho = rejected if F arithmetic > F table.

Based on Table IV, the determination of the effect of all independent variables is based on a comparison of the calculated F value with the F table for a significance of 5%. It is known that the results of the comparison show Ho is rejected. This shows that every independent variable that exists has a relationship with each other (simultaneously) that affects the dependent variable (WTP).

Multiple correlation analysis is performed to determine the relationship between two or more independent variables with the dependent variable simultaneously. The coefficient of determination is indicated by the value of R square or adjusted R square. The results of the multiple correlation test and determination can be seen in Table V

Table V Results of Double Correlation and Determination Tests

| Model Summary | | | | |
|----------------------|----------|-----------------|--------------------------|-----------------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0,445 | 0,198 | 0,155 | 0.54004 |

(Source: Data Analysis Results, 2019)

Based on Table V, an R value of 0.445 is obtained. This shows that there is a moderate relationship between the independent variable and the dependent variable. Interpretation of this moderate relationship can be seen in the Correlation Coefficient Table, where the R value of 0.573 belongs to the range of 0.400 - 0.599 which has a moderate relationship. Based on Table VI, an R square value of 0.198 (19.8%) and adjusted R square value of 0.155 (15.5%) were obtained. This shows the percentage of the effect of independent variables on the dependent variable, namely the variation of the independent variables used in the model is able to explain 19.8% or 15.5% of the dependent variable. The remaining percentage of 80.2% or 85.5% is influenced or explained by other independent variables not included in the research model. Based on the Correlation Coefficient Table, the interpretation of the adjusted R square value has a low level of accuracy, because 0.155 is included in the coefficient interval 0.11-0.30. A low level of accuracy means that there are still many independent variables outside the research model related to the WTP value. Multiple linear regression analysis is used to formulate the relationship between the dependent variable and the independent variable using respondents who have a WTP value. The independent variable is considered to have a significant effect, if the Sig. This variable has a value smaller than the value of alpha (α) < 0.05. The results of the output coefficient can be seen in Table VI

Table VI Output Coefficient

| Model | | Coefficients ^a | | | | |
|-------|-----------------|-----------------------------|------------|---------------------------|--------|--------|
| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 10.356,005 | 2020,932 | | 5,124 | 00000 |
| | Usia | -253,067 | 367,692 | -0,060 | -0,688 | 0,5493 |
| | Jenis Kelamin | -555,320 | 608,705 | -0,073 | -0,912 | 0,363 |
| | Jenis Pekerjaan | 1137,500 | 332,509 | 0,369 | 3,421 | 0,001 |
| | Pendidikan | 265,244 | 564,519 | 0,049 | 0,470 | 0,639 |
| | Jumlah Orang | -310,862 | 291,295 | -0,090 | -1,067 | 0,288 |
| | Penghasilan | -138,596 | 477,965 | -0,031 | -0,290 | 0,772 |
| | Iuran | 1741,900 | 837,647 | 0,174 | 2,080 | 0,040 |

a. Dependent Variable: WTP

(Source: Data Analysis Results, 2019)

Based on Table VI, it is found that significant variables are the level of education and the cost of waste fees. After getting a significant independent variable, then we get the multiple linear regression equation using (3.6) as follows:

$$WTP_i = 10,356,005 + 1,137,500 JP - 555,320 JK$$

Based on the multiple linear regression equation above, it can be interpreted as follows (Priyatno, 2013):

- A constant of 10,356,005, meaning that if the selected variable has a value of 0, then the WTP price is Rp. 10,356,005.
- The regression coefficient of the type of work variable is 1137,500, meaning that if other independent variables have a fixed value and the variable has an increase in the type of work, then the price of WTP will increase by Rp 1,137,500. Positive coefficient means that there is a positive relationship between the variable Type of Work and WTP, the more the variable rises, the more WTP increases.
- Regression coefficient for gender variable is -555,320, meaning that if other independent variables have a fixed value and the variable has a 1% increase in the cost of waste retribution, the WTP price will decrease by Rp. 555,320. Negative coefficient means that there is a negative relationship between the sex variables with the WTP, the more the variable increases, the lower the WTP.

Based on the explanation above, the respondent's WTP value in an effort to improve solid waste services in Jatihandap Village and / or others, can be done in areas that have higher types of work and less gender in common, with explanations and clear visualization of hypothetical markets to respondents

5. CONCLUSIONS

Based on the results of the calculation, the value of WTP loyalty in Jatihandap Village is Rp. 12,971 / month and total WTP of IDR 80,385,000 / month. Factors that influence the value of WTP are occupation and gender. Based on the WTP value obtained, a number of recommendations can be given including renovating / redesigning the Cikadut TPS to 3R Cikadut TPS, adding to the fleet of garbage collection equipment, improving the garbage collection schedule so that it is more organized and efficient.

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