# Analysis of Willingness to Pay toward Green Products

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| Abstract | Plastic waste is a waste that difficult to decompose. Consumer awareness to behave environmentally friendly consumption becomes very important. This study aims to analyze the Willingness to Pay (WTP) value of consumer households in Surabaya City on green products and the determinants of the WTP. This study uses primary data from 100 respondents who were analyzed using the Contingent Valuation Method and Binary Logistics Regression. The results show the average maximum WTP value varies depending on the product's type offered. The perception of the green products' price and the behavior of considering environmental issues in the buying process have a significant positive effect on WTP. The implications of this study are Government regulations and socialization are needed to increase awareness of environmentally friendly behavior for the community. Producers are expected to increase the variety of the green product and expand their distribution area so the products can be more easily obtained by consumers. |
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| **Keywords** | **Willingness to Pay; Consumer Household; Green Products; Contingent Valuation Method; Environmental Issues** |

## INTRODUCTION

The achievement of sustainable development goals is an important agenda for every country. The Department of Economic and Social Affairs of the United Nations states that in line with population growth, production followed by unsustainable consumption patterns can lead to increased environmental problems (UNDESA, 2010).

Based on research by Lebreton & Andrady (2019), around 60 to 99 million metric tons of unmanaged plastic waste was generated globally in 2015 and is predicted to triple by 2060. Based on this research, in million metric tons/yard Mismanaged Plastic Waste (MPW), Indonesia ranks 9th as the highest MPW country in the world, which is 1.63, after China (17.2), India (14.4), Philippines (4.52), Brazil (3.68), Turkey (2.15), Nigeria (1.90), Tanzania and Thailand each with 1.77 million metric tons/yard. Indonesia's position is higher than Egypt's (1.62). This large amount of unmanaged waste, especially plastic waste, can cause environmental, health, and socio-economic disturbances. The household is one of the parties that act as a producer of waste.

Modern waste management, including efforts to Reduce, Reuse, and Recycle, is expected to minimize the amount of waste generated. However, based on BPS data (2018a), the percentage of households in Indonesia that handle their waste properly is still low. The percentage of households that recycle waste is 0.1 percent, households that use their waste as compost is 0.6 percent, and 0.4 percent are deposited into the waste bank. Meanwhile, the handling of waste by burning has the highest percentage, namely 53 percent, followed by 5 percent of households choosing to throw it into rivers, 2.1 percent choosing to be piled up, and 2.7 percent throwing their garbage in any place.

One type of waste that is difficult to decompose is plastic waste. In Indonesia, the packaging sector is the largest plastic user, which is 65 percent of the total national consumption (Purwoko & Wibowo, 2018). The increase in plastic packaging is caused by changes in human lifestyles that want convenience by using lighter, durable, stronger, flexible, and low-cost plastic types, thus shifting the trend from reusable packaging to single packaging. use plastic (Geyer et al., 2017; BPS, 2018a).

Purwoko & Wibowo (2018) states that plastic producers in Indonesia find it difficult to replace their plastic materials with plant-based raw materials/biodegradable due to three factors, namely the high selling price of

biodegradable plastics, low consumer education on biodegradable plastics, and the majority of consumers still choose conventional plastics because low price. In addition to plastic production which is difficult to suppress, household behavior can also affect the volume of plastic waste produced. Based on the Indonesian Environmental Statistics report (BPS, 2018b), household behavior in carrying shopping bags to reduce the use of plastic bags is still low, 54.8 percent of households say they never bring their shopping bags.

In addition to shopping bags, the Fast Moving Consumer Goods (FMCG) industry also contributes to donating plastic packaging waste. Greenpeace defines FMCG as a product that is low in cost but has a high level of demand because it is purchased regularly by households due to its perishable or fast-perishing properties, such as food, beverages, cosmetics, and health, as well as household products, such as personal cleaning products. Due to their nature, the accumulation of packaging waste from these products increases rapidly in line with the high intensity of purchasing FMCG products by households.

In response to this, awareness of the role of consumers in overcoming environmental problems is very important. The trend of environmentally friendly lifestyles carried out by various organizations is trying to change their daily lifestyle to avoid overconsumption behavior and be more environmentally friendly. Green products are also increasingly recognized and available in the market. Karunarathna et al. (2017) stated that green products are products that have a minimum impact on the environment and are related to strategies for using recycled materials, reducing packaging, and using harmless substances.

Based on the results of a survey by WWF and Nielsen in 2017 (World Wide Fund Indonesia, 2017), as many as 63 percent of Indonesian consumers are willing to consume environmentally friendly products at higher prices. However, the willingness to buy green products cannot always be interpreted as the actual buying behavior of green products (Akehurst, 2012). Suharjo et al. (2016) mention that although the number of consumers who want to buy green products has increased in recent years, the market share of green products which is only 1-3 percent of the total market shows that consumers' consideration of environmental

sustainability in making purchasing decisions is still low.

One of the green product segments is organic food. Perceptions about the price of organic food products that are more expensive, difficult to obtain, and limited information owned by consumers are barriers for consumers to buy green products (Thio, 2008; Priambodo & Najid, 2014; Suharjo et al., 2016). However, willingness to pay for green products can increase due to good perceptions of product quality and safety (Krystallis & Chryssohoidis, 2005) and consumer awareness of the environment (Junaedi, 2005). Willingness to buy green products can also be influenced by socio-demographic factors. Karunarathna et al. (2017) mentioned that educated young consumers tend to feel more environmentally responsible and open to new ideas. While Laroche et al. (2001) state that the majority of consumers who are willing to pay more for green products are women who are married and have children.

Based on the theory of demand, many factors can affect the quantity of demand, one of which is the population. Suparmoko (2012:11) states that with the increasing population, more goods and services are needed to meet needs. An increase in the number of goods and services encourages an increase in production factors that are processed and produce by-products in the form of waste that pollutes the environment. Table 1. shows population growth in the six capital cities of Java Island from 2016 to 2017 which is directly proportional to the increase in the amount of daily waste produced.

Based on Table 1. it is known that DKI Jakarta is the city with the most population, which is 10,374,235 thousand people, followed by Surabaya City, in second place at 3,074,883 thousand people. However, the increase in the estimated daily waste production in Surabaya City is more than DKI Jakarta. Based on the percentage of transported waste, Yogyakarta is the city with the largest percentage of transported waste, which is 99.26 percent, while Surabaya City is in fifth place, which is 54.84 percent. The data illustrates that with the high population, the volume of waste transported per day in Surabaya City is not as optimal as in other capitals.

Surabaya City, as the capital of East Java province, is a metropolitan area with a strategic position that makes Surabaya City a center of dynamic community economic

activity. The number of households in Surabaya City is 935,089 units and has the largest total waste generation of 2,790.9 tons/day (43 percent) in 2017. Other sources of waste generation come from public facilities and commercial centers with 13 percent each, traditional market and office each amounted to 5 percent, region 6 percent, and 15 percent sourced from others (Surabaya City Environmental Service, 2018).

A large number of household actors is because most community activities are carried out in the area and reflect the large role of household consumption activities in the generation of waste produced. Economic conditions, city functions, and people's lifestyles are also able to determine the composition of a city's waste. Surabaya City has a diverse composition of waste. Based on the composition of waste in 2017, the largest composition came from food waste, which was 54.31 percent. In the second place, the composition of plastic waste reaches 19.44 percent of the total city plastic waste and makes the composition of plastic waste the largest inorganic waste composition among other compositions (Surabaya City Environmental Service, 2018).

Based on previous studies, it is stated that price is the main inhibiting factor for consumers in buying green products and an analysis of willingness to pay (WTP) can be done to determine the maximum value that consumers are willing to pay for green products. Priambodo & Najid (2004) use the analysis of WTP as a method to find out the maximum value that consumers are willing to pay for improving the quality of a product. WTP in this study is the dependent variable that measures the maximum level of a person's willingness to pay a higher price for green products than similar conventional products. This willingness to pay is calculated using the Contingent Valuation Method (CVM). Based on the description, it is important to study the WTP for Green Products.

This study is very important considering the inconsistency between the high interest of consumers to consume green products and the low number of consumers who fulfill these desires. This is caused by various purchasing barriers, such as high prices, difficulty in obtaining products, perceptions of quality, and low environmental awareness.

Surabaya City has the second-highest population after DKI Jakarta so that the level of consumption is getting higher. Increasing consumption makes the amount of household waste in Surabaya City increase. However, the percentage of waste transported in 2017 in Surabaya City is still relatively low compared to other capital cities on the island of Java. This shows that waste management in Surabaya City is not optimal enough to balance its daily waste production. In such conditions, besides requiring the role of the government and producers, consumers are also able to take a role in managing waste, especially household waste. Although no regulation strictly prohibits the use of plastic, in Surabaya City, some facilities allow households to behave environmentally friendly in their consumption activities, such as the availability of waste processing facilities such as waste banks, 3R TPS, and compost houses, organic vegetable markets, to the eco-friendly bulk store. Therefore, based on the phenomenon of the problem, this study aims to analyze the value of willingness to pay (WTP) of consumer households in Surabaya City for green products and also analyze the factors that influence the WTP.

## METHODS
This research was conducted in Surabaya City using cross-section data in October 2019. The population of this study was consumer households in Surabaya City who knew green products. For unknown population size, Suliyanto (2018: 198) states that for determining the sample, it can use the proportion formula to determine the minimum sample. With a significance level of 5 percent and an error tolerance level of 10 percent, the calculation of the number of research samples is 96.04 which is rounded up to 100 samples. Respondents were determined using purposive sampling with the criteria, namely: 1) female consumers with the assumption that women tend to be decision-makers in purchasing household needs, 2) representing one ordinary household, and 3) aged 17 years and over (Junaedi, 2005, Priambodo & Najid, 2014, Khoiryah & Toro, 2014). Furthermore, the sampling of members is done by accidental sampling (Hasan, 2002:68).

### Analysis of the Value of Willingness to Pay Toward Green Products
This study refers to Priambodo & Najid (2004) who uses the analysis of WTP as a method to determine the maximum value that is willing to be paid from improving the quality of a product. To find out preferences for willingness to pay, the Contingent Valuation

Method (CVM) can be used (Suparmoko et al., 2014:55). The stages in CVM according to Hanley & Barbier (2009:45), Suryahani et al. (2011), and Aufanada et al. (2017) are: a) constructing a hypothetical market, b) obtaining the bid value (Bid) of WTP, c) estimating the average value of WTP. Setiyadi et al. (2016) used the formula for the estimated average WTP, namely:

$$EWTP = \frac{\sum_{i=1}^{n} W_i}{n} \ \dots\dots\dots\dots\dots\dots \ (1)$$

Note: EWTP = estimated average value of WTP; Wi = the i-th WTP value; n = number of respondents; i = the i-th respondent who is willing to pay (i=1, 2, 3, n).

d) estimate the WTP curve that describes the relationship between the WTP level and the cumulative number of respondents who are willing to pay at the WTP level, e) add up the data from the total WTP with the formula:

$$TWTP = EWTP_i \ x \ P \ \dots\dots\dots\dots\dots \ (2)$$

Note: TWTP = Total WTP; EWTPi = the average value of the i-th WTP; P = respondent.

### Analysis of Factors Affecting Willingness to Pay Toward Green Products

In this study, a Likert scale was used to measure the attitudes, perceptions, and behaviors of respondents. To be analyzed with parametric statistics, the data is first transformed into interval data using the Method of Successive Interval (MSI) (Suliyanto, 2005:25).

Furthermore, the method used to analyze the factors that influence consumers' willingness to pay higher for green products is the Binary Logistics Regression model (Ghozali, 2002:74) with the following equation:

$$Ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \ \dots\dots(3)$$

Note:

P = Probability of respondents saying "yes"

$\left(\frac{P}{1-P}\right)$ = Oddss Ratio (Opportunity Ratio) or the comparison between something happening and not happening.

To find out consumers' willingness to pay more for green products, the equations used in this study are:

$$Ln\left(\frac{P}{1-P}\right) = WTP = \beta_0 + \beta_1 USIA + \beta_2 KEL + \beta_3 NKH + \beta_4 PDD + \beta_5 PDT + \beta_6 HRG + \beta_7 KUAL + \beta_8 KTD + \beta_9 STR + \beta_{10} LING + \varepsilon \ \dots\dots \ (4)$$

Note:

$Ln\left(\frac{P}{1-P}\right)$= higher willingness to pay for green products; $\beta_{0, 1, 2, \dots, 10}$ = regression coefficient; $\varepsilon$ = *error term*; USIA = respondent's age; KEL = number of family members; NKH = marital status; PDD = education; PDT = income; HARGA = green product price perception; KUAL = perceived quality/benefit of green products; KTD = perception of green product availability; STR = behavior of depositing waste to waste processing facilities; LING = behavior considering environmental issues in the buying process.

To test the validity of the model, several tests were carried out, such as testing the significance of the model using: a) Ghozali's Overall Model Fit Test (2002:78) b) Wald's test, to partially test the effect of the independent variables (Aufanada, Ekowati, and Prastiwi, 2017). c) Model Feasibility Test (Hosmer and Lemeshow's Goodness of Fit) Ghozali (2002:79) d) Negelkerke's R square to show the variability of the dependent variable which can be explained by the variability of the independent variables in the study, e) Classification Table. The 2 x 2 Classification Table explains the accuracy of the model prediction by calculating the correct and incorrect estimation values (Ghozali, 2002: 80), f) Multicollinearity Test.

## RESULTS AND DISCUSSION

## RESULTS

### Analysis of Willingness To Pay Toward Green Products

The results of the analysis of WTP for green products show that 91 percent of respondents stated that they are willing to pay higher for green products. while 9 percent said they were not willing. Respondents who stated that they were not willing to pay more for green products generally reasoned that higher prices should be for improving product quality to be more environmentally friendly, not borne by consumers, but to producers. Another reason is that respondents are satisfied with using existing conventional products.

A WTP analysis was conducted to determine the maximum value that a person is willing to spend on green products. To obtain the value of consumers' willingness to pay for green products, the CVM analysis is used with the following stages:

The first stage, creating a hypothetical market, in this study is described in the research questionnaire. In the second stage, determining the bid value obtained through interviews using the Tiered Bidding/Bidding Game method. The last price reached is defined as the maximum WTP value of the respondent. The distribution of respondents to the prices offered based on each type of green product is presented in Table 2.
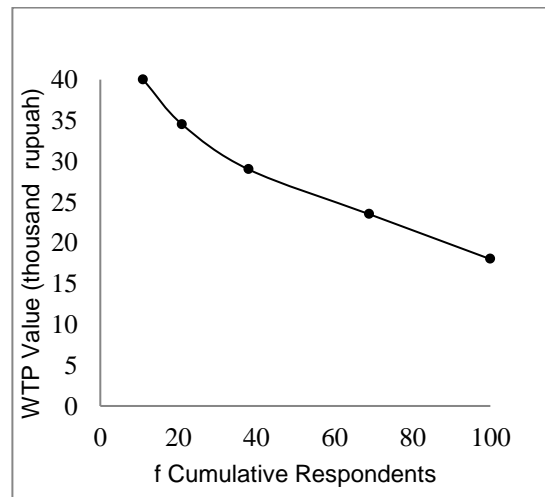
The third stage, calculating the maximum average WTP of green product consumers, is shown in Table 3.

Based on Table 3, it is known that the average maximum WTP value for green products varies depending on the type of product offered. Reusable shopping bags have the highest average maximum WTP value, while reused straws have the lowest average value.

Next stage, the WTP curve is estimated, as shown in Figures 1, 2, 3, and 4. The WTP curve for the four green products tested shows a negative slope, which means that the lower the WTP value offered, the more respondents are willing to pay. A sloping or steep curve shows the movement of the curve from one WTP point to the next with different frequencies of increasing respondents. The smaller the difference between respondents from one point of WTP to the next, the steeper the curve will be. On the other hand, the greater the difference between respondents from one point of WTP to the next, the more sloping the curve will be.

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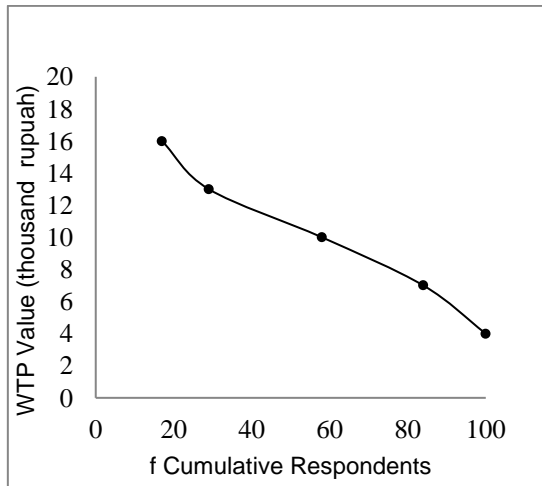


Source: Primary Data Processed, 2019

Figure 1. The WTP Curve of Reusable Menstrual Sanitary Equipment.

Based on Figure 1, as many as 11 respondents are willing to pay for menstrual sanitation equipment for reuse in the form of cloth pads for Rp. 40.000,00, 10 respondents are willing to pay for Rp. 34.500.00, 17 respondents are willing to pay for Rp. willing to pay at the price of Rp. 18,000.00.
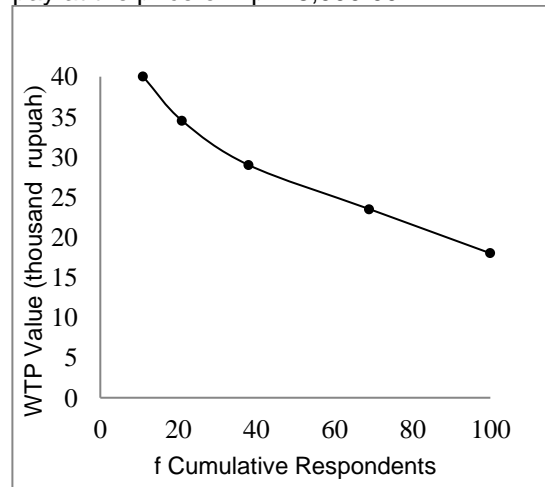


Source: Primary Data Processed, 2019

Figure 2. The WTP Curve of Environmentally Friendly Toothbrush

Based on Figure 2, only 3 respondents are willing to pay for an environmentally friendly toothbrush at the highest price level of Rp. 30,000.00, 6 respondents are willing to pay at the price of Rp. 25,500.00, 14 respondents are willing to pay at the price level of Rp. 21,000.00, followed by 31 respondents who are willing to pay for Rp. 16,500.00, and the highest number of respondents, 46 respondents, is willing to pay at a price level of Rp. 12,000.00.

Source: Primary Data Processed, 2019
Figure 3. The WTP Curve for Reusable Straws

Figure 3 regarding the WTP of reused straws illustrates that 17 respondents are willing to pay for reusable straws made of stainless steel with the highest price of Rp. 16,000.00, 12 respondents are willing to pay the price of Rp. 13,000.00, 29 respondents are willing to pay the price of Rp. 10,000, 00, 26 respondents are willing to pay the price of Rp. 7,000.00, and 17 respondents are willing to pay the price of Rp. 4,000.00.
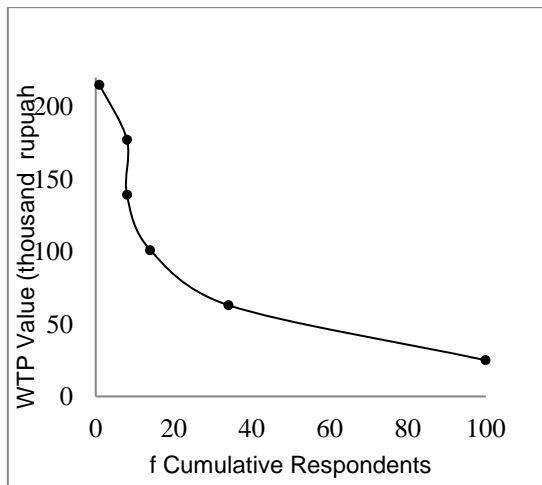


Source: Primary Data Processed, 2019
Figure 4. The WTP Curve for Reusable Shopping Bags

The WTP curve for reusable shopping bags made from environmentally friendly fabric fibers is shown in Figure 4. There is 1 respondent who is willing to pay for Rp. 215,000.00, 7 respondents are willing to pay for Rp. 177,000.00, 6 respondents are willing to pay for Rp. 101,000.00, 20 respondents are willing to pay the price of Rp. 63,000, and the majority of respondents, 66 respondents, are willing to pay at the price of Rp. 25,000.00.

Furthermore, the aggregation of the total WTP is carried out. Aufanada et al. (2017) mention that the aggregation value of WTP is important for marketers to know to obtain sales value at the maximum price consumers are willing to pay based on each type of green product. The results of the calculation of the WTP aggregation can be seen in Table 4. Based on Table 4, it is known that the WTP aggregation for each type of green product shows different values. The ranking of types of green products based on the aggregation value from the highest to the lowest sequentially is reusable shopping bags, reused menstrual sanitation equipment, environmentally friendly toothbrushes, and finally reusable straws.

## Analysis of Factors Affecting Willingness to Pay Toward Green Products

The results of the binary logistic regression analysis of the factors that affect wtp toward a green product in surabaya city are as follows:
a. Overall Model Fit Test Results
   The results of the overall model test (Table 5) show that the difference in -2 Log-Likelihood in Block 0 and Block 1 is 36.553, greater than the chi-square table value of 18.307 so that the hypothesized model fits the data and is feasible to use.
b. Model Feasibility Test Results (Hosmer and Lemeshow's Goodness of Fit)
   Based on the results of the model feasibility test, the significance value of the Hosmer and Lameshow test is 0.961, greater than the p-value of 0.05. It can be interpreted that the model is feasible.
c. Nagelkerke's R Square
   The value of Nagelkerke's R square in the research model is 0.674. This indicates that the variable of consumers' willingness to pay for green products can be explained by independent variables in the study of 67.4 percent while 32.6 percent is explained by other variables not used in the study.
d. Classification Table Test
   Based on the results of the classification table test (Table 8), the results of the overall percentage or the accuracy of the model explain the willingness of respondents to pay higher for green products by 94 percent.
e. Multicollinearity Test
   The results of the multicollinearity test using Matrix Correlation showed that there

was no correlation value of 0.9 so that is no multicollinearity in the model. If the correlation coefficient between the dependent variables is 0.9, it can be indicated that there is multicollinearity symptoms (Ghozali & Fuad, 2008:38).

f.  Wald test
   The results of the Wald test are shown in Table 9 with = 5%.

   Based on Table 9, partially the variables that affect the willingness to pay for green products are the price perception variable (PRICE) and the behavioral variable considering environmental issues in the purchasing process (LING). While other variables have no significant effect on willingness to pay. Based on Table 9, the Odds Ratio or Exp (B) of the price perception variable (PRICE) is 13.713, which means that households that have better price perceptions have a 13.713 times greater chance of being willing to pay higher than households with unfavorable price perceptions. While the LING variable has an Exp (B) value of 36,872 which means that households who often consider environmental issues in their purchasing process have a 36,872 times greater chance of being willing to pay higher compared to households who less often consider environmental issues in the buying process.

   The regression equation model formed is as follows:

   Ln (P/(1- P)) = WTP = -27,479+ 2,618HARGA + 3,607LING…..(5)
   or in the form of probabilities, namely:

$$P = \frac{e^{-27,479+\ 2,618\text{HARGA}\ +\ 3,607\text{LING}}}{1\ +\ e^{27,479+\ 2,618\text{HARGA}\ +\ 3,607\text{LING}}}$$
   …… (6)

## DISCUSSION

### The Value of Willingness to Pay for Green Products

In the Contingent Valuation Method analysis, based on Table 3, it is known that reused shopping bags have the highest maximum WTP average value, while reused straws have the lowest average value. The high average value of the maximum WTP for reusable shopping bags can be caused by the high price of these products, ranging from Rp. 25,000.00 to Rp. 215,000.00. On the other hand, the low maximum WTP value for reused straws is caused by the low price of the product, which ranges from Rp. 4,000.00 to Rp. 16,000.00. This is in accordance with the research of Aufanada et al. (2017) and

Krystallis & Chryssohoidis (2005) which state that the maximum value consumers are willing to pay varies depending on the type and price of the product itself.

Likewise, when aggregating the total WTP, each type of green product shows a different value (Table 4). The value of the WTP aggregation on green products shows the total revenue that can be obtained by producers based on different types of green products. The greater the WTP aggregation value, the greater the revenue that producers will get from the green product.

### The Influence of Demographic-Economic Factors on Willingness to Pay for Green Products

Demographic-economic factors which include age, marital status, number of family members, education level, and income have no significant effect on the WTP for green products of consumer households in Surabaya City. This is because households who are willing to pay higher and households who are not willing to pay higher have almost the same demographic-economic conditions so that they have the same opportunity to be willing or unwilling to pay higher for green products.

This finding is different from previous studies which state that demographic-economic factors have a significant influence on consumers' willingness to pay (Setiyadi et al., 2016; Aufanada et al., 2017). However, the results of this study are in line with Priambodo & Najid (2014) and Krystallis & Chryssohoidis (2005) which show that demographic-economic factors do not have a significant influence on consumers' willingness to pay for green products and cannot be a good predictor of consumer profiles green. Priambodo & Najid (2014) added that socio-economic factors play a relatively small or even no role in consumer decisions to buy green products because consumers are more influenced by product knowledge, price sensitivity, and personal values they have.

The effect of the age factor on WTP for green products in previous studies showed different results. Karunarathna et al. (2017) mention that age has a significant effect on young consumers who are willing to pay higher because they are more open to new ideas, while Setiyadi et al. (2016) stated that older consumers are willing to pay higher because they are aware of the health and safety of their families. However, this study found that age had no significant effect on the

willingness of consumer households to pay more for green products. Based on the age distribution data of respondents obtained from the survey results, it is known that the average group of respondents who are willing to pay higher and those who are not willing to have the same average age, namely 25 years. The results of this study are in line with Krystallis & Chryssohoidis (2005), Priambodo & Najid (2014), and Laroche et al. (2001) which states that the age of consumers does not determine their willingness to pay higher for green products and cannot be a good predictor to determine the profile of consumer households who are willing to pay higher for green products.

The factors of marital status and the number of families also have no significant effect on WTP. Based on survey data, the majority of respondents from the group who are willing to pay (69 percent) and those from the group who are not willing (78 percent) are unmarried and have the same average number of family members, which is 4 people. The results of this study found that marital status and the number of family members of consumers' households in Surabaya City had no significant effect on higher WTP for green products. These results confirm Krystallis & Chryssohoidis (2005) and Priambodo & Najid (2014) which show that marital status and number of family members do not affect consumers' willingness to pay for organic products.

Regarding education level, Aufanada et al. (2017) stated that the education factor had a significant effect on the willingness to pay for environmentally friendly products. The higher the education, the better ecological knowledge and environmental awareness one have. In this study, the majority of respondents from the group who are willing to pay (57 percent) are university graduates and from the group who are not willing to pay (67 percent) are high school graduates. However, the results of the study show that the latest level of education in consumer households in Surabaya City does not determine the WTP significantly higher for green products. This result is in line with Priambodo & Najid (2004) which shows that consumer education does not play a significant role in determining WTP higher for green products.

The results of this study also found that the income factor had no significant effect on the WTP for green products. Based on the results of a survey regarding the distribution of respondent's income, the income of 50 percent of respondents is in the lowest range, namely Rp. 400,000 - Rp. 1,600.000 per month, with the status of a student. Based on their willingness, respondents who are willing to pay higher tend to have higher incomes than respondents who are not willing. In previous studies, income has a significant effect on WTP higher for green products in consumers with higher incomes because the price of green products tends to be high (Awad in Akehurst, 2012; Aufanada et al., 2017). However, the results of this study indicate that the income factor does not affect the willingness of consumer households to pay higher for green products and confirms Priambodo & Najid (2014) which shows that income only plays a small role in consumers' willingness to pay for green products.

## The Influence of Consumer Attitudes Toward Green Products on Willingness To Pay For Green Products

Consumer attitudes towards green products are known by using indicators of perceived green product prices, perceived quality/benefits of green products, and perceived availability of green products. The price perception factor has a significant positive effect on consumers' willingness to pay higher for green products. Based on the survey data, the consumer households who are willing to pay higher tend to have a better perception of the price of green products than those who are unwilling, while respondents who are not willing to pay higher have lower perceptions of the price of green products.

The positive relationship between perceived affordability of prices and higher willingness to pay for green products can be interpreted that households with a good perception of the affordability of green products or feel that the price of green products are affordable for them, have a greater chance of being willing to pay higher prices for green products. On the other hand, consumer households who perceive that green products are expensive, have a lower chance of being willing to pay higher prices for green products.

Based on the Odds ratio value, consumer households with a better price perception (feeling that the price of green products is cheap) have a 13.713 times greater chance of being willing to pay higher prices compared to consumer households with a less favorable price perception (feeling that the price of green products is expensive).

A good perception of the price of green products can be caused by the high purchasing ability of consumers because it is supported by their income level. In addition, this good perception of the price of green products can be driven by consumer awareness of the benefits and importance of green products so that they do not object to the prices of green products offered even though the prices are relatively higher than conventional products.

The consumer perception factor regarding the quality/benefit is known to have no significant effect on the availability of paying for green products. Based on the survey data, the group of respondents who are willing to pay higher mostly agree/strongly agree that the quality of green products is superior to non-green products and agree that their use can be a solution in overcoming environmental problems. Meanwhile, in the group of respondents who are not willing to pay higher, they are neutral for both perceptions. So that based on perceptions of product quality/benefits, consumer households in the Surabaya City have the same opportunity to be willing or unwilling to pay higher for green products and make the quality/benefit factor of the product not an important factor influencing consumers' willingness to pay higher for green products.

The consumer perception factor on the availability of green products also does not affect the willingness to pay for green products. Based on the data obtained, consumer households, both those who are willing to pay higher and those who are not, assess that green products are difficult to find or rarely available in public shopping places. This is in accordance with the situation on the ground that the availability of green products is still limited, only in environmentally friendly specialty stores or in certain shopping centers with slight variations because they are still dominated by non-green products.

### The Influence of Consumer Behavior Factors on The Environment on Willingness To Pay For Green Products

In this study, consumer behavior factors towards green products are reflected through consumer behavior in depositing household waste to waste processing facilities and behavior considering environmental issues in the buying process. The results showed that the behavior of consumer households in Surabaya City in depositing their household waste to waste processing facilities had no significant effect on willingness to pay higher for green products. Based on the data obtained, both consumer households who are willing to pay higher and those who are not, tend to never deposit their waste to a waste processing facility. Waste processing facilities in Surabaya City have special criteria for acceptable waste, such as only accepting certain types of waste and in clean and segregated conditions, so that households find it difficult to choose waste regularly so that it can be taken to the waste processing facility and prefer to handle the household waste more easily and practically, such as being transported by officers or disposed of to a garbage dump (TPS). The results of this study are in line with Laroche et al. (2001) who found that recycling behavior was not an important factor in determining consumers' willingness to pay more for green products.

The results of this study indicate that the behavior of considering environmental issues in the purchasing process has a significant positive effect on willingness to pay for green products. The more often the behavior is carried out, the more likely the respondent is willing to pay a higher price. This behavior is reflected through the behavior of ensuring that the packaging uses recycled materials, the behavior of refusing to purchase with excessive plastic packaging, and the behavior of reading environmentally friendly labels before buying the product. This shows that consumer households tend to behave more often considering environmental issues in the purchasing process, especially those related to plastic packaging and recycled materials.

Based on the Odds ratio value, consumer households that often consider environmental issues in the buying process have a 36,872 times greater chance of being willing to pay higher than households that rarely behave in this way. The positive relationship between willingness to pay and that behavior is because respondents have an awareness of environmental issues and the importance of the role of households in overcoming these issues. This awareness is then reflected in his commitment to environmentally friendly behavior in his daily consumption activities. Green products are intended as an alternative to making it easier for consumers to behave environmentally friendly so that households that apply environmentally friendly behavior will be willing to pay higher to get the benefits of green products. The results of this study are in line with Laroche et al. (2001) which shows that consumers who consider environmental

issues in the purchasing process tend to be more willing to pay higher prices for green products.

## CONCLUSIONS

This study found that 91 percent of consumer households in Surabaya City who know green products are willing to pay more to get these products. The maximum average willingness to pay (WTP) for green products varies depending on the type of product offered.

Factors that have a significant positive effect on the willingness of consumer households in Surabaya City to pay higher for green products are the perception of the price of green products and the behavior of considering environmental issues in the buying process. Meanwhile, the factors of age, marital status, number of family members, education, and income, perceptions of the quality/benefits of green products, perceptions of the availability of green products, and the behavior of depositing household waste to waste processing facilities did not significantly affect the willingness to pay higher for green product.

Consumer households in Surabaya City who have better price perceptions of green products have a 13.713 times greater chance of being willing to pay higher prices than consumer households with poor price perceptions. Consumer households that more often consider environmental issues in the process of purchasing their consumption needs have a 36,872 times greater chance of being willing to pay higher prices for green products compared to consumer households that behave less frequently.

The results of this study imply that consumer households in Surabaya City have relatively good environmental awareness and realize the importance of their role in protecting the environment, especially regarding waste accumulation. Environmentally friendly lifestyles such as zero waste or less waste which involve the use of green products have the potential to be accepted by the community. However, structural approaches such as socialization, policies, or government regulations are needed to make a great impact. Therefore, this potential should be supported by the Surabaya City government by optimizing existing environmentally friendly regulations and supported by increasing the procurement of environmentally friendly public facilities to increase household participation in overcoming environmental problems, including to behave more environmentally friendly by using green products.

Households in Surabaya City already have a good perception of green products but are still hampered by the limited availability of products in shopping centers. This should be a concern, both producers, suppliers, and marketers to be able to increase the variety or type of green products, and expand their distribution area so that green products can be more easily obtained by consumers.

Obtaining information about the characteristics of consumers who are willing to pay for green products and the maximum value that consumers are willing to spend on green products should be able to help producers and marketers of green products in developing appropriate marketing strategies, mapping potential consumers, and pricing green products better so that can increase the consumption of green products in the household.

The dissemination of knowledge and information related to environmentally friendly lifestyles and green products should be increased so that more households practice an environmentally friendly lifestyle, especially managing and processing their household waste. Thus, environmental problems, especially waste, can be overcome from the smallest units such as households.

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**List of Tables**

**Table 1. Total Population, Production, and Volume of Waste Transported per Day by Capital City in Java in 2016 – 2017**

| City | Year | Total population (thousand people) | Estimated Daily Waste Production (m³) | The volume of Garbage Transported Per Day (m³) | Percentage of Waste Collected (%) |
|---|---|---|---|---|---|
| DKI | 2016 | 10.277.628 | 7.099,08[1] | 6.016,30[1] | 84,75 |
| Jakarta | 2017 | 10 374 235 | 7.164,53[1] | 6.872,18[1] | 95,92 |
| Bandung | 2016 | 2.490.622 | 1.469,00[1] | 1.100,00[1] | 74,86 |
| | 2017 | 2.497.938 | 1.600,00[1] | 1.120,00[1] | 70,00 |
| Semarang | 2016 | 1.602.717 | 5.080,51 | 4.445,00 | 87,49 |
| | 2017 | 1.610.605 | 5.163,72 | 4.544,00 | 88,00 |
| Yogyakarta | 2016 | 417.744 | 904,80 | 880,00 | 97,26 |
| | 2017 | 422.732 | 1.048,00 | 1.040,00 | 99,24 |
| Surabaya | 2016 | 3.016.653 | 9.710,61 | 5.237,70 | 53,94 |
| | 2017 | 3.074.883 | 9.896,78 | 5.427,45 | 54,84 |
| Serang | 2016 | 655.004 | 1.638,00 | 710,00 | 43,3 |
| | 2017 | 666.600 | 1.638,00 | 710,00 | 43,3 |

Note: [1]Unit uses Ton
Source: BPS, 2018, processed

**Table 2. Distribution of Respondents' Maximum WTP Value by Type of Green Product**

| Green Product Type | No | WTP value (Rupiah) | Respondent (People) | Percentage (%) |
|---|---|---|---|---|
| A. Reusable | 1 | 18.000 | 31 | 31 |
| Menstrual | 2 | 23.500 | 31 | 31 |
| Sanitary | 3 | 29.000 | 17 | 17 |
| Equipment | 4 | 34.500 | 10 | 10 |
| (pads) | 5 | 40.000 | 11 | 11 |
| Total | | | 100 | 100 |
| B. Eco-Friendly | 1 | 12.000 | 46 | 46 |
| Toothbrush | 2 | 16.500 | 31 | 31 |
| | 3 | 21.000 | 14 | 14 |
| | 4 | 25.500 | 6 | 6 |
| | 5 | 30.000 | 3 | 3 |
| Total | | | 100 | 100 |
| C. Reusable Straws | 1 | 4.000 | 16 | 17 |
| | 2 | 7.000 | 26 | 26 |
| | 3 | 10.000 | 29 | 29 |
| | 4 | 13.000 | 12 | 12 |
| | 5 | 16.000 | 17 | 17 |
| Total | | | 100 | 100 |
| D. Reusable | 1 | 25.000 | 66 | 66 |
| Shopping Bags | 2 | 63.000 | 20 | 20 |
| | 3 | 101.000 | 6 | 6 |
| | 4 | 139.000 | 0 | 0 |
| | 5 | 177.000 | 7 | 7 |
| | 6 | 215.000 | 1 | 1 |
| Total | | | 100 | 100 |

Source: Primary Data Processed, 2019

**Table 3. Average Maximum Value of WTP by Type of Green Product**

| Green Product Type | Average Maximum WTP (Rupiah) |
|---|---|
| A. Reusable Menstrual Sanitary Equipment (pads) | 25.645 |
| B. Eco-Friendly Toothbrush | 16.005 |
| C. Reusable Straws | 9.640 |
| D. Reusable Shopping Bags | 49.700 |

Source: Primary Data Processed, 2019

**Table 4. Aggregation of WTP by Type of Green Products**

| Green Product Type | WTP Aggregation Value (Rupiah) |
|---|---|
| A. Reusable Menstrual Sanitary Equipment (pads) | 2.564.500 |
| B. Eco-Friendly Toothbrush | 1.600.500 |
| C. Reusable Straws | 964.000 |
| D. Reusable Shopping Bags | 4.970.000 |

Source: Primary Data Processed, 2019

**Table 5. Overall Model Test Results**

| *Omnibus Tests of Model Coefficients* | | |
|---|---|---|
| *Chi-square* | df | Sig. (*p-value*) |
| 36,553 | 10 | 0,000 |

Source:  *Output IBM SPSS Statistics 26*

**Table 6. Model Feasibility Test Results**

| *Hosmer and Lemeshow Test* | | |
|---|---|---|
| *Chi-square* | df | Sig. (*p-value*) |
| 2,514 | 10 | 0,961 |

Source:  *Output IBM SPSS Statistics 26*

**Table 7. Nagelkerke's R Square Test Results**

| *Nagelkerke's R Square* | | |
|---|---|---|
| *-2 Log Likelihood* | *Cox & Snell R Square* | *Nagelkerke R Square* |
| 23,955 | 0,306 | 0,674 |

Source:  *Output IBM SPSS Statistics 26*

**Table 8.  The Classification Table Test Results**

| *Classification Table* | |
|---|---|
| *Overall Percentage* | 94,0 |

Source:  *Output IBM SPSS Statistics 26*

**Table 9. Logistics Regression Test Results**

| Variable | Coefficient (B) | P-*value* (sig.) | *Oddss Ratio* (Exp(B)) | Decision |
|---|---|---|---|---|
| USIA | 0,083 | 0,710 | 1,086 | Not significant |
| NKH | 2,902 | 0,414 | 18,216 | Not significant |
| KEL | 1,516 | 0,094 | 4,556 | Not significant |
| PDD | -0,408 | 0,831 | 0,665 | Not significant |
| PDT | 0,380 | 0,800 | 1,463 | Not significant |
| HARGA | 2,618 | 0,037 | 13,713 | Significant |
| KUAL | 0,083 | 0,945 | 1,086 | Not significant |
| KTD | 0,796 | 0,508 | 2,216 | Not significant |
| STR | 0,193 | 0,817 | 1,213 | Not significant |
| LING | 3,607 | 0,034 | 36,872 | Significant |
| Constant | -27,479 | 0,188 | 0,000 | |

Sumber: Output IBM SPSS Statistics 26