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Analysis of Community Willingness to Pay in Waste Management

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ABSTRACT

This article examines the public's willingness to pay, considering that the local revenue data from the waste levy has not reached the 2022 target, while population growth, economic growth and changes in consumption patterns have experienced changes that affect the amount of waste generation in the city of Pekanbaru.The purpose of this study is to analyze the effect of education, income and work community on willingness to pay in waste management. The sample is 100 heads of families. The sampling technique is done by purposive sampling. The results of the hypothesis test show that the education variable and the job variable do not significantly influence expenses. While income is proven to have a significant effect on paying expenses. It was also found that simultaneously the variables of education, income and work influence the awareness of paying. Furthermore, it is obtained that payment receipts are influenced by changes in the values of education, income, and employment variables of 31.9% while 68.1% are determined by other variables that are not in this research model.

INTRODUCTION

By 2030, the world's population will reach five billion and 60 percent of them will live in cities (Prasetyono, 2017). This waste problem is one of the topics in developing countries, especially for cities that are experiencing rapid progress (Tsheleza, et.al, 2017). Many countries have established community awareness programs in the form of agreements (Tasbirul Islam, et.al, 2018). Developed countries have made waste an interesting problem, while developing countries are still a serious problem. Developed countries have made efforts to preserve and monitor the implementation of Zero waste (Africano, 2022; Iskamto, 2022; Karim et al., 2023; Puspitasari et al., 2022).

Waste management in Indonesia is still lagging behind in developed countries. Currently, the increasing population and increasing activity of residents in big cities in Indonesia has resulted in an increasing amount of waste that must be disposed of at the Final Processing Site (TPA). However, only 60% of the waste reaches landfill (Padmi and Damanhuri, 2010).

For example, Pekanbaru City is now a big city with a population of 1,028,237 people (Central Statistics Agency, 2020) or 301,226 families, growing rapidly from 2010 to 897,768 people (Central Statistics Agency, 2010). This means that Pekanbaru has been included in the category of a city which in 2010 was still a small city. Currently, household waste production in Pekanbaru City is estimated to reach 500 tons and the rest from supermarkets, people's markets, grocery stores, food stalls reaches 269 tons a day. Assuming that 1 person produces 0.5 kg of waste every day.

Waste management in the city of Pekanbaru still uses the old paradigm, namely; Collect-Transport-Dispose. Even this still seemed not to be on time during transportation and many illegal TPS appeared. In fact, on the main roads there is still a lot of garbage collected from community waste that no longer has Temporary Disposal Sites (TPS). Only 12 official polling stations are available from 700 regions. As many as 85 villages have promised to find temporary shelters, only 25 villages or 25 TPS have been fulfilled (Tribun, 2017).

Waste management in Indonesia is strengthened by laws on waste management, namely; UU no. 18 of 2008. Then, it is regulated in detail by Government Regulation Number 81 of 2012 concerning Household Waste Management and Types of Household Waste. These laws and regulations are intended to preserve environmental functions and public health. In addition to the government, communities and companies must be actively involved in environmental management in Indonesia. Furthermore, in cities, Regional Regulations are stipulated as the basis for solving waste problems in their respective regions. Furthermore, Pekanbaru City uses Regional Regulation No. 08 of 2014 concerning Waste Management. To ensure garbage/cleaning services, Pekanbaru City Mayor Regulation No.

Various studies state that an increase in population will also increase the volume of waste (Hertomo at.al, 2018) and the rate of economic growth (Annisa at.al, 2015), changes in consumption patterns and lifestyle (Faroz and Suryadharma, 2020) also affect the increase in waste volume.

According to the Pekanbaru City Government in 2021, 70 percent of household waste management in Pekanbaru City is managed illegally by the community independently which is disposed of in illegal TPS, there is also residential waste management which is disposed of in TPS/Trans Depo. Only 30 percent is managed by the Pekanbaru City Environment and Sanitation Service (DLHK) (Pemko Pekanbaru, 2021). This is one of the reasons, the achievement of local revenue (PAD) from waste fees until July 28, 2022 has only reached 2 billion of the 45 billion target this year. Until the financial resources for waste management experience problems caused by the willingness to pay the people who have not paid properly. On the other hand, population growth, economic growth and settlement development are accelerating which has an impact on the amount of waste that increases every day.

Currently, the Tampan sub-district has been divided into the Bina Widya sub-district and the Tuah Madani sub-district on December 30 2020. Furthermore, this research will be conducted in the Tuah Madani sub-district which consists of 5 sub-districts, namely:

Table.1 : Population Data of Tuah Madani District

No.	Disctrict	Jumlah Penduduk	Amount
1	Sidomulyo Barat	52.030	12.805
2	Sialang Munggu	51.140	12.550
3	Tuah Karya	50.296	1.283
4	Tuah Madani	22.451	5.513
5	Air Putih	26.997	6.691
Total		**202.914**	**38.842**

ource; BPS 2020

Based on the table above, it is illustrated that 20 percent of the population of Pekanbaru City resides in Tuah Madani District and the remaining 80 percent live in 14 other districts. This sub-district is the center of education in Pekanbaru City, both private and public universities. In addition, this area is the entrance from West Sumatra and is directly adjacent to the new residential development area, namely the Tambang sub-district and Siak Hulu sub-district, Kampar Regency..

Based on data on the decrease in PAD, waste retribution for 2022 and population growth, it means that the sources of financing for waste management in Pekanbaru city are reduced, which come from the public's willingness to pay for waste management services. Over the past 10 years, scientific research on people's willingness to pay has been influenced by their level of income, education, number of family members, occupation and the weight of each family's waste.

The following are research findings on the willingness to pay for waste management in the community. Handayani, Chalid and Iyan's research (2015) found that the income variable (X1) had an effect on the willingness to pay for cleaning fees by the community, while the education variable (X2) and household waste weight variable (X3) had no effect on the willingness to pay garbage fees in the West Labuhbaru Village. Then it is known that the willingness to pay every month is IDR 13,384 for each family head. In Timang, Tjoli and Wambrauw's research (2017) it shows that all research variables are perceptions of waste management (X1), income level (X2), number of family dependents (X3),

Meanwhile, previous research that had different results, namely the variable number of family members, work and income did not affect the willingness to pay for the community in managing waste in Indralaya Ogan Ilir, South Sumatra. With a willingness to pay Rp. 10,650 per head of family. (Pratwi, 2017)

Based on this background, the title of this study is "The Influence of Education, Income and Community Employment on the Willingness to Pay the Community in Waste Management in Tuah Madani District, Pekanbaru City".

Research Quistion

Based on the description of the background of the problem, the formulation of the problem in this study is:

1. Does the education factor affect the willingness to pay waste management fees?
2. Does the income factor affect the willingness to pay waste management fees?
3. Does the work factor affect the willingness to pay waste management fees?
4. Do the factors of education, income, and work simultaneously influence the willingness to pay waste management fees?

Research purposes

Based on the formulation of the problem above, the purpose of this study is

1. Partially analyzing the educational factor influencing the willingness to pay waste management fees.
2. Partially analyzing income factors influences the willingness to pay waste management fees.
3. Partially analyzing work factors affecting the willingness to pay waste management fees.
4. Simultaneously analyze the factors of education, income, and employment that affect the willingness to pay waste management fees.

LITERATURE REVIEW

Waste management

The following is the definition of waste according to the law. Number 18 of 2008 concerning Waste Management, in article 1 paragraph (1) that: "Waste is the residue of human daily activities and/or solid natural processes". Meanwhile, according to the definition of the World Health Organization (WHO), waste is something that is not used, not used, not liked or something that is thrown away that comes from human activities and does not happen by itself (Chandra, 2006).

Meanwhile, the definition of household waste according to Law No. 18 of 2008 which comes from daily activities in the household, does not include certain dirt and waste. As a result of economic development and population growth, the contemporary world is facing a global increase not only in the amount of waste, but also in the variety of qualities. Waste that is not managed properly worsens the environment as well as public health, sometimes causing serious health problems. Sustainable development requires proper handling of waste problems (Ministry of the Environment of Japan, 2014).

Waste is a dense daily human activity and/or process. Currently, most people still see waste as useless waste, not as a resource that needs to be utilized (UU.No.18, 2008). Waste management is a systematic, comprehensive and sustainable activity that includes waste reduction and management. The definition of management does not only concern technical aspects, but also includes non-technical aspects, such as how to regulate, how to finance and how to involve the waste producing community who are actively or passively involved in handling activities. (Damanhuri, 2010).

The community in waste management still relies on the end-of-pipe approach, namely waste is collected, transported and disposed of at the Final Processing Site (TPA). It is time for the waste management paradigm that relies on the final approach to be abandoned and replaced with a new waste management paradigm.

The new paradigm sees waste as a resource that has economic value and can be utilized, for example for energy, compost or fertilizer for industrial raw materials. Waste management is carried out with a comprehensive approach from upstream, because before a product that has the potential to become waste is produced, then downstream, the product stage has been used so that it becomes waste, which is then returned to the environment safely.

Willingness to pay

Environmental services are basically assessed on the basis of willingness to pay (WTP) and willingness to accept (WTA). Willingness to pay is the value of the willingness of community members to pay the cost of repairing a damaged environment. Meanwhile, willingness to accept (WTA) is how much people are willing to pay to prevent environmental damage (producers' willingness to accept compensation) in the event of a decline in environmental quality. Willingness to pay and willingness to receive are a reflection of community members' concern for their environment, as well as a measure of economic valuation in a region (Emalia and Huntari, 2016).

Factors Affecting Willingness to Pay

Gender. In Awunyo vitor's research, at.al (2013) it was explained that gender is one of the variables that influences the increase in waste. Differences in the individual characteristics of men and women affect waste management. Women are concluded to have a stronger character to live cleanly, clean the house and dispose of trash in its place. So that hygiene awareness is related to women's willingness to pay for cleaning fees. Age. A person's age level affects the level of maturity and sense of responsibility in making decisions. The older a person is, the wiser and more mature they are in taking action, including their willingness to pay fees for managing waste (Indrawan, 2014). Level of education. Education greatly influences the understanding and assessment of a clean environment. The better a person's level of education, the better the insights and views on how to manage waste because of awareness of the need for a healthy and clean life (Awunyo-vitor at.al, 2013). Number of Family Members. As the number of family members increases, the amount of waste generated every day increases. Thus forcing family members to clean the environment regularly, therefore the opportunity for a higher willingness to pay. (Indramawan, 2014). Work. This variable also affects the willingness to pay, because working people have income certainty and are very likely to pay higher. (Indramawan, 2014). Income. This variable is an important basis in the household, because it affects the level of welfare and their view of a clean environment. Families with sufficient income have a tendency to pay waste fees regularly and have a need to improve the quality of the surrounding environment. (Indramawan, 2014). The factors that can affect the willingness to pay in this study are limited to only three factors, namely education, income and employment.

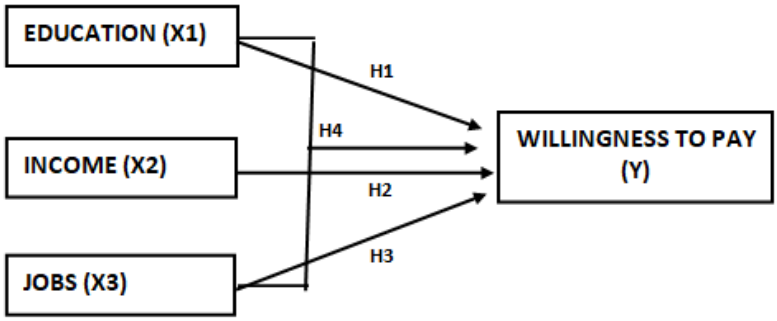
hypothesis

According to Yam and Taufik (2021: 97) a hypothesis is a temporary statement based on norms related to a phenomenon or research case and will be tested with an appropriate method or statistics. Then the hypothesis is proven by scientific research by collecting data and then analyzing it. Based on the research problem, previous research and related references, the temporary research assumptions are formulated as follows:

1. It is suspected that the level of education partially influences the willingness to pay waste management fees in the Tuah Madani sub-district, Pekanbaru City.
2. It is suspected that the level of income partially influences the willingness to pay waste management fees in the Tuah Madani sub-district, Pekanbaru City.
3. It is suspected that work has partially influenced the willingness to pay waste management fees in the Tuah Madani sub-district, Pekanbaru City.
4. It is suspected that the factors of education, income and employment simultaneously influence the willingness to pay waste management fees in the Tuah Madani sub-district, Pekanbaru City.

Or with the Conceptual Framework as follows:

Figure 1



METHODS

This research was conducted on all people living in Tuah Madani District, Pekanbaru City. Data analysis techniques using quantitative. The results of the study were analyzed using the multiple linear regression method, which is a statistical method used to determine the effect of the independent variables, namely education (X1), income (X2), and Jobs (X3) on the dependent variable, namely willingness to pay (Y). Then to more clearly describe the willingness to pay of the community, this research also uses a contingency assessment method to obtain the value of the willingness to pay of the community. In applying the Contingent Valuation method using a direct measurement approach includes building a market hypothesis, obtaining a willingness to pay value,

The population in this study were all heads of families in the Tuah Madani sub-district in 2022 with a total of 38,842 heads of families. With a sample of 100 people with a sampling method based on purposive sampling. According to Sugiyono (2013) Purposive Sampling is a sampling technique with certain considerations. The considerations are families who live in this sub-district, both in housing complexes, village houses and families who live in luxury housing complexes.Data collection methods used in this study include questionnaires, interviews and observations. In accordance with the type and nature of this research, all data to be collected is arranged systematically and descriptively. The data analysis method used in this study is the Likert scale used to measure attitudes, opinions, and social perceptions. Respondents' answer scores in the study.

To assist in processing the data, the SPSS (Statistical Package For Social Science) program is used. While the test equipment used to test the regression equation and the coefficient of determination and standard error and to see the effect of the independent (independent) variable on the variable bound (dependent).

RESULTS AND DISCUSSION

Respondent Description

After distributing the questionnaires, an overview of the research respondents was obtained from the level of education, employment and willingness to pay of the community as follows:

Table 2: General Description of Respondents

Description	Number of Respondents	%
Education		
Junior High School	7	7%
Senior High School	45	45%
3-year diploma	27	27%
Bachelor (S1 and S2)	21	21%
Work		
Trader	27	27%
Private sector employee	31	31%
civil servants and state-owned enterprises	19	19%
Self-employed	23	23%
Amount of Willingness to Pay		
Rp. 7,000 – IDR 14,000	32	32%
Rp. 15,000-Rp. 22,000	38	38%
IDR 23,000 – IDR 30,000	19	19%
> IDR 30.00	11	11%
Amount	**100**	**100%**

Source: Processed Data, 2023

Based on table 2 above, the data shows that 45% of respondents have a high school education level, then 27% of respondents have a Diploma 3 education level, then 21% of respondents have an undergraduate education level and only 7% have a junior high school education level. Furthermore, it is also illustrated that 31% of respondents are private employees, then 27% of respondents work as traders, 23% of respondents are self-employed and the rest are civil servants. Then table 2 above also obtained data that 38% of respondents had a willingness to pay waste fees between Rp. 15,000 to Rp. 22,000, then 32% of respondents who were willing to pay between Rp. 7,000-Rp. 14,000, then 19% had a willingness to pay between Rp. 23,000-Rp. 30,000 and there were 11% of respondents who had a willingness to pay more than Rp. 30,000. Especially respondents who live in luxury housing.

Validity test

The validity test aims to find out which items or questions are valid in determining a variable. Testing is done by comparing the correlation value (r) calculated with r table. Where is the testing criteria if the value of r count > r table then it is said that the question item is valid and if the value of r count <r table then it is said that the question item is invalid and the question is declared invalid. The validity test will test each variable used in this study, where all variables are obtained by calculating the value of all statements > r table (0.1966). Based on

the results of the calculation of the validity test of the Education variable (X1) as many as 4 statements, Income (X2) as many as 4 statements, Jobs as many as 4 statements and Willingness to Pay as many as 4 statements all declared valid.

Reliability Test

The Cronbach alpha coefficient which is more than 0.60 indicates the reliability of the instrument. In addition, the closer to 1 indicates the higher the internal consistency of the reliability.

Table 3: Reliability Test Results

Variable	*Alpha coefficient standard*	*Cronbach Alpha*	Information
Education (X1)	0.6	0.725	*reliable*
Income (X2)	0.6	0.732	*reliable*
Jobs (X3)	0.6	0867	*reliable*
Willingness to Pay (Y)	0.6	0.755	*reliable*

Source: Processed Data, 2023

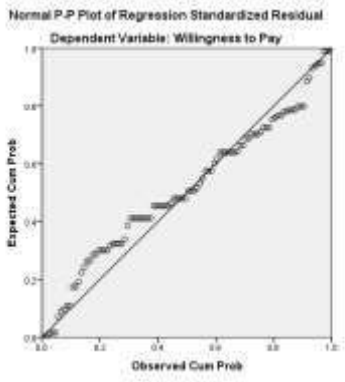
From table 5 above it can be seen that the reliability value of all variables is > 0.6, which means that the measuring instrument used in this study is reliable.

Data Normality Test

The normality test aims to test whether in the regression model, the dependent variable and independent variable have normal or close to normal data distribution. To see the normal probability plot that forms a straight diagonal line, and plotting the data to be compared with the diagonal line.

If the data spreads around the diagonal line and follows the direction of the diagonal line / histogram graph, then it shows a normal distribution pattern. If the data is far from the diagonal line and does not follow the direction of the diagonal line/histogram graph then it shows an abnormal distribution pattern. To see the results of the normality test can be seen in the table below the image below:

Figure 2
Normality test



In the picture above it can be seen that the data spreads around the diagonal and follows the direction of the diagonal line / histogram graph, so it can be concluded that this study shows a normal distribution pattern.

Coefficient of Determination (R2)

The coefficient of determination is one of the statistical values that can be used to determine the influence of the variables Education (X1), Income (X2) and Jobs (X3) on the variable Y (Willingness to Pay) where it can be seen how much the value of Adjusted R Square is done at 100%. In this study, the value of Adjusted R Square can be seen in the table below:

Table 4: Adjusted R Square Value

Summary modelb

Model	R	R Square	Adjusted R Square	std. Error of the Estimate
1	.583a	.340	.319	.70195

a. Predictors: (Constant), Jobs, Education, Income

b. Dependent Variable: Willingness to pay

Source: SPSS Processed Data, 2023

Based on table 6 above, the Adjusted R Square value is 0.319. Furthermore, the value is 0.319 multiplied by 100%, so this value can be interpreted that changes in the value of willingness to pay for waste are affected by changes in the values of the independent variables education, income and employment by 31.9% while 68.1% is determined by other variables that are not in this research model. For example, gender, number of family members, and age.

t test (partial hypothesis test)

The t-test is used to see the effect of the independent variables on the dependent variable partially/one by one. The following is the SPSS output for the t-test. Based on the results of calculations using SPSS assistance, the following data is obtained:

Table 5 Test Results t

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	std. Error	Betas	t	Sig.
1	(Constant)	.892	.366		2,438	.017
	Education	046	079	.050	.582	.562
	Income	.546	087	.540	6,247	.000
	Jobs	.123	079	.129	1,548	.125

a. Dependent Variable: : Willingness to pay

Source: SPSS Processed Data, 2023

From table 7 on the partial test results it can be said that the education variable (X1) and the job variable (X3) partially do not affect the willingness to pay in waste management, indicated by a significance value above 5%. It can be seen that the education variable (X1) has a value of ß = 0.046 and a probability of 0.562 > 0.05 while the job variable (X3) has a value of ß = 0.123 and a probability of 0.125 > 0.05

Meanwhile, the income variable (X2) partially influences the willingness to pay, which shows a significance value below 5%. It can be seen in the table above that the income variable (X2) has a value of ß = 0.546 and a probability of 0.000 <0.05.

F test (simultaneous hypothesis test)

The F test was conducted to see the effect of the independent variables simultaneously on the dependent variable. From the test results it is known that simultaneously the variables education (X1), income (X2) and Jobs (X3) significantly affect the willingness to pay. This can be seen in the F value of 16,464 or > 2.70, then Ho can be rejected at a 5% degree of confidence, or in other words that Ha can be accepted, namely simultaneously the independent variables affect the dependent variable. The test results can be seen in table 8 below:

Table 6: F Test Results

ANOVAa

Model		Sum of Squares	df	MeanSquare	F	Sig.
1	Regression	24,337	3	8.112	16,464	.000b
	residual	47,303	96	.493		
	Total	71,640	99			

a. Dependent Variable: Willingness to pay

b. Predictors: (Constant), Jobs, Education, Income

Source: Processed Data, 2023

DISCUSSION

Effect of Education (X1) on Willingness to Paywaste management fees in the Tuah Madani sub-district, Pekanbaru City

From the results of the partial test, it can be said that the education variable (X1) does not partially affect the willingness to pay for waste management, indicated by its significance value above 5%. It can be seen that the education variable (X1) has a value of ß = 0.046 and a probability of 0.562 > 0.05. Based on the results of hypothesis testing 1. **It is suspected that the level of education partially affects the willingness to pay** waste management fees in the Tuah Madani sub-district, Pekanbaru City, but has not proven to have a significant effect.Where the significance value (P Value) of education (X1) is 0.562 which is above 0.05.

This study has results that are consistent with the research of Handayani, Chalid and Iyan (2015), namely that the education variable has no effect on the willingness to pay for waste in the West Labuhbaru Village.

Effect of Income (X2) on Willingness to Paywaste management fees in the Tuah Madani sub-district, Pekanbaru City

From the results of the partial test it can be said that the income variable (X2) partially influences the willingness to pay in waste management, indicated by its significance value below 5%. It can be seen that the income variable (X2) has a value of ß = 0.546 and a probability of 0.000 > 0.05. Based on the results of hypothesis testing 2. **It is suspected that income partially influences the willingness to pay waste management fees in the Tuah Madani sub-district, Pekanbaru City, which is proven to have a significant effect.**

This means that this research is in line with previous research by Chalid and Iyan (2015) which results that the income variable influences the willingness to pay cleaning fees by the community in the West Labuhbaru Village. It also has the same results as the research by Timang, Tjoli and Wambrauw (2017) showing that income levels significantly affect the willingness to pay waste management fees in West Manokwari District, Papua.

Effect of Jobs (X3) on Willingness to Paywaste management fees in the Tuah Madani sub-district, Pekanbaru City

From the partial test results it can be said that the jobs variable (X3) does not partially affect the willingness to pay in waste management, indicated by its significance value above 5%. It can be seen that the job variable (X3) has a value of ß = 0.123 and a probability of 0.125 > 0.05. Based on the results of hypothesis testing 3. **It is suspected that Jobs partially affects the willingness to pay waste management fees in the Tuah Madani sub-district of Pekanbaru City, which is not proven to have a significant effect.**

This means that this research is in line with previous research by Pratiwi (2017) showing that the variable number of family members, work and income does not affect the willingness to pay for the community in managing waste in Indralaya Ogan Ilir, South Sumatra.

The Influence of Education (X1), Income (X2) and Jobs (X3) on the Willingness to Pay Waste Management Fees in Tuah Madani District, Pekanbaru City.

The F test was conducted to see the effect of the independent variables simultaneously on the dependent variable. From the test results it is known that simultaneously the variables education (X1), income (X2) and jobs (X3) significantly affect the willingness to pay. This can be seen in the F value of 16,464 or > 2.70, then Ho can be rejected at a 5% degree of confidence, or in other words that Ha can be accepted, namely simultaneously the independent variables affect the dependent variable. Means the first hypothesis (H4) is proven. This study corroborates previous research by Handayani, Chalid and Iyan (2015) where together the variables of education, income and waste weight affect willingness to pay.

CONCLUSION

Conclusion

This study has four research results; First, the income variable (X2) is proven to have a significant effect on the willingness to pay waste management fees in the Tuah Madani sub-district, Pekanbaru City. Second, the education variable (X1) as well as the jobs variable (X3) proved to have no significant effect on the willingness to pay waste management fees in the Tuah Madani sub-district, Pekanbaru City. Third, based on the results of the F test (simultaneous test) that simultaneously/simultaneously the variables education (X1), income (X2) and Jobs (X3) affect willingness to pay (Y). Fourth, the contribution value of changes in willingness to pay for waste or the coefficient of determination (Adjusted R Square) is 31.9% while 68.1% is determined by other variables that are not in this research model. For example, gender

Suggestion

Based on the research results, three suggestions can be given in the form of recommendations, namely:*First*; gave suggestions that garbage fees in Pekanbaru City need to be increased by overseeing the effectiveness of withdrawals from the community as an additional Regional Original Income (PAD) for Pekanbaru City.

Second, it is suggested that the Government of Pekanbaru City really needs to involve the community in waste management by making official Garbage Disposal Sites and carrying out supervision of people who litter. Third, this research only examines the variables of education, income and jobs which affect the willingness to pay waste fees. Meanwhile, in subsequent research, the variables can be expanded, including; number of family members, gender and age.

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