

ANALYSIS OF DETERMINING FACTORS FOR COMMUNITY BEHAVIOR IN DOMESTIC WASTE MANAGEMENT

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Abstract

Awareness through the empowerment process is important and urgent as an effort to transform community behaviour in domestic waste management. The objectives of this research are (1) to analyze community behavior in domestic waste management, (2) to analyze the determinants of community behavior in domestic waste management, and (3) to formulate a model for changing community behavior in domestic waste management. This research uses quantitative methods supported by qualitative data. Quantitative data was obtained using a questionnaire, while qualitative data was obtained using an interview guide. This research was conducted in eight villages in West Java and one village in East Java. The research locations were purposively selected with the consideration that the research locations were the locations of the company's CSR assistance program, particularly the waste management program. Respondents were selected using the census method, totaling 245 people. The unit of analysis is the individual. The research was conducted from October 2023 to March 2024. The results showed that, in general, the community in the research location had implemented good practices in household waste management. The factors influencing community behavior in domestic waste management include social support, community empowerment, and perceptions of domestic waste management innovation. The model of community behavior change in domestic waste management is built on the process of community empowerment, strengthening social support, and improving community perceptions of domestic waste management innovations.

Keywords: Change Behavior, Community Empowerment, Social Support, Social Media, Waste Management.

INTRODUCTION

Household waste management is an important issue in many countries, including Indonesia. According to data from the Ministry of Environment and Forestry, Indonesia produces 19.3 million tons of waste per year, 38.4 percent of which is sourced from household waste (KLHK 2024). The amount of waste is predicted to continue to increase along with the increase in population. Household waste, especially when poorly managed, can pollute water, soil, air, and damage the overall ecosystem (Ferdinan et al. 2022). The high amount of waste generated poses ongoing social problems, including health issues, environmental cleanliness and aesthetics disturbance, and even social conflicts (Sumardjo et al. 2022).

The cause of the high level of household waste is mainly due to lack of public awareness and participation in managing the waste Tanjung et al. (2021). The lack of public awareness in managing household waste is reflected in various indicators, such as littering habits, lack of waste sorting practices, and lack of participation in recycling programs. This poses a major challenge in efforts to achieve the Sustainable Development Goals (SDGs), especially in the context of resource management and environmental protection. To address these challenges,

the transformation of community behavior in household waste management is crucial. However, changing behavior is not easy as it involves complex social, psychological, and cultural factors (Ao et al., 2022; Ma et al., 2023). One important approach to address this is community empowerment, which emphasizes dialogue and multi-stakeholder engagement (Firmansyah et al. 2023; Sumardjo et al. 2023; Sumardjo, Firmansyah, Dharmawan, et al. 2023).

The government has issued various policies on waste management, including: Law Number 18 of 2008 concerning Waste Management, Presidential Regulation Number 97 of 2017 concerning National Policies and Strategies for Management of Household Waste and Similar Household Waste, and Government Regulation Number 81 of 2012 concerning Management of Household Waste and Similar Waste of Household Waste. Various efforts to implement policies and programs to improve waste management, including campaigns, recycling programs, and waste management infrastructure development have been implemented. However, the success of such policies is often limited due to low community participation and lack of awareness about the importance of waste management.

The waste problem cannot be separated from the behavior of the community as a waste producer itself. Therefore, community empowerment in waste management is aimed at providing awareness and changing people's behavior to want to manage waste in their respective homes by implementing various waste management innovations. According to Sumardjo et al. (2022), the empowerment process for behavior change needs to apply a convergent, participatory, inclusive communication approach, prioritizing dialogue, material suitability, building social relations and utilizing various media, both conventional and digital. According to Ajzen (1991), a person's behavior is influenced by attitudes, subjective norms, and behavioral control. Behavior change is also influenced by social support (Amalia, 2020), perceptions of waste management innovations (Arkorful et al., 2022) and the use of digital media (Rapada et al. 2021).

Based on the above background, research on the determinants of community behavior in domestic waste management is very important and urgent. Understanding these factors can be the basis for developing more effective strategies and interventions to increase awareness, participation, and sustainable waste management practices. The importance of this research is not only related to environmental issues, but also has far-reaching implications for social, economic, and public health well-being. Therefore, this study aims to: (1) Analyze community behavior in domestic waste management; (2) Analyze the determinants of community behavior in domestic waste management; (3) Formulate a model of community behavior change in domestic waste management.

METHOD

This research was designed as a quantitative study supported by qualitative data. Qualitative data was used to explain the quantitative data in more detail and depth. This research was conducted in eight villages in West Java and one village in East Java. The villages in West Java are Kalibaru (Bekasi City), Kebalen, Pantai Makmur (Bekasi Regency), Kroya and

Karanganyar (Indramayu), Muktijaya (Karawang), Campaka Mulya (Bandung), Bongas Wetan (Majalengka) and in East Java is Doudo (Gresik). The research location and respondents were deliberately selected considering that the research site is the location of Corporate Social Responsibility waste management assistance program. The collection of respondents was carried out by census, totaling 245 people. A census was conducted on all members of the company's CSR program target group at the research site. The unit of analysis is individual. Previous questionnaires have been tested for validity and reliability. All questions in the questionnaire are valid and reliable. The study was conducted from October 2023 to March 2024. The data used in this research are primary data and secondary data. Primary data was collected through field observations, in-depth interviews, and structured interviews using questionnaires. The analysis used descriptive and inferential statistical analysis. The statistical test of the structural relationship between several variables used Structural Equation Model (SEM) analysis with Smart PLS software.

RESULT AND DISCUSSION

Characteristics of Respondents

Characteristics reflect inherent aspects of an individual and influence their behavior in various situations, including work and other contexts (Feriadi et al., 2022). In terms of age range, the majority of respondents are within the 30-50 age range. The size of the respondents' yards varies significantly, ranging from 0 to 280 m², with an average yard size of 28,61 m². The number of family members among the respondents ranges from 2 to 12 people, with an average of around 4 people. In terms of experience in managing domestic waste, the respondents in this study have diverse experiences, ranging from 0 to 11 years, with an average experience of about 2 years.

Based on their occupation, the majority of respondents are housewives (40,4%). Additionally, there are respondents who work as private employees (15,5%), farmers (15,1%), and trade entrepreneurs (11,4%). Respondents with other occupations such as civil servants (2,0%), teachers/lecturers (8,2%), military/police personnel (0,4%), retirees (0,8%) and have other occupations (6,1%) provided variations in the types of occupations observed. In terms of the respondents' educational background, the majority of respondents have completed high school education (41,6%), followed by respondents who have completed diploma and bachelor's degree education (22,9%), 17,6% graduated from junior high school and 16,3% had basic education.

In addition, it turned out that there were also respondents who did not graduate from elementary school as much as 0,8%. Based on respondents' average monthly income, 42,9% had incomes of less than 1 million rupiah, 15,5% between 1 to 2 million rupiah, 15,5% between 2 to 3 million rupiah, 10,6% between 3 to 4 million rupiah per month, and 15,5% had relatively higher incomes (above 4 million rupiah). This data reflects variations in income classes present in the sample.

Test Measurement Model (Outer Model) and Structural Model (Inner Model)

The model in this study depicts a path model to estimate the relationship between community empowerment, social support, perceptions of waste management innovation, social media use, and community behavior in managing domestic waste. A path model is a diagram used to illustrate hypotheses and relationships between variables measured using SEM (Hair et al. 2014). Factors influencing community behavior in managing domestic waste were determined through inferential statistical tests using SmartPLS software with Partial Least Square (PLS) analysis. The inferential statistical testing stages in this study include the outer model test, the inner model test, and the model fit test.

The instrument test for assessing the measurement model (outer model) was conducted through the Partial Least Square algorithm. According to (Hair et al. 2014), to perform testing on SEM-PLS, several testing parameters must be fulfilled, including loading factor > 0,7, Cronbach's alpha > 0,7, composite reliability > 0,7, and AVE > 0,5. Based on the results of the outer model test, all requirements have been met, as presented in Table 1.

The inner model analysis is conducted through bootstrapping tests to determine the presence and significance of causal relationships between variables. The significance of the relationships between latent variables can be observed from the obtained path coefficient values. These path coefficient values provide an indication of the strength of the relationships between latent variables. The second criteria for evaluating the structural models (inner model) is the measurement of significance level. Independent variables are considered to have an impact on dependent variables if the t-value is greater than the tabulated t-value (1,96) with a significance level of 5%.

Table 1: Outer Model Test Results

Variables	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Social Support	0,930	0,944	0,705
Community Empowerment	0,960	0,966	0,781
Use of Social Media	0,819	0,891	0,735
Domestic Waste Management Behavior	0,922	0,937	0,682
Perception of Domestic Waste Management Innovation	0,949	0,961	0,831

Community Behavior in Managing Domestic Waste

The transformation of community behavior in this study refers to changes in attitudes, norms, values, and community actions related to waste management. This includes changes in daily habits, ways of treating waste, and participation in sustainable waste management practices. Waste management behavior includes waste reduction, waste sorting, reuse of suitable goods, waste recycling, waste processing, and waste utilization for planting (Pongpunpurt et al., 2022). Table 2 provides an overview of the extent to which communities have implemented waste management practices at the household level.

Waste reduction is an important initial step in efforts to mitigate the negative environmental impacts of waste disposal. Data indicates that the majority of respondents have exhibited high

(35,5%) to very high (32,2%) levels of behavior in waste reduction. This signifies a significant adoption of practices such as reducing the use of single-use packaging, utilizing cloth shopping bags, and selecting environmentally friendly packaging products. Waste segregation is also an important practice in household waste management. 38,4% of respondents have shown high to very high levels of behavior (37,6%) in waste segregation. This reflects an awareness of the importance of separating organic and non-organic waste to facilitate recycling processes and more efficient waste management. Reuse practices were also found to be quite common among respondents, with 42,4% of them exhibiting high to very high levels of behavior in this aspect. Reusing items such as used packaging, water bottles, and shopping bags can help reduce the amount of waste generated and alleviate pressure on natural resources.

Table 2: Domestic Waste Management Behavior

Domestic Waste Management Behavior	Very Low		Low		High		Very High	
	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)
Waste Reduction	12	4,9	67	27,3	87	35,5	79	32,2
Waste Sorting	8	3,3	51	20,8	94	38,4	92	37,6
Reuse	7	2,9	35	14,3	104	42,4	99	40,4
Recycle	25	10,2	87	35,5	58	23,7	75	30,6
Waste Processing	16	6,5	84	34,3	66	26,9	79	32,2
Application of Organic Waste Processing Innovation	61	24,9	113	46,1	20	8,2	51	20,8
Use of Waste for Yard Plants	18	7,3	63	25,7	75	30,6	89	36,3
Total	245	100	245	100	245	100	245	100

Recycling waste is a crucial step in household waste management. Although only a small percentage of respondents (30,6%) exhibit a very high level of behavior in this aspect, efforts to recycle paper, plastic, metal, and glass can greatly benefit the environment by reducing the need for new raw materials. Waste treatment and the implementation of organic waste treatment innovations also attract attention. Waste treatment can provide both economic and environmental benefits. However, based on the research findings, the majority of respondents (34,3%) still show low behavior in waste treatment, as well as low implementation of organic waste treatment innovations (46,1%). This reflects that respondents have not effectively made efforts to transform waste into valuable resources. The use of waste for backyard gardening is also a promising practice, with 36,3% of respondents exhibiting very high behavior. The use of organic waste as fertilizer can enhance soil fertility and reduce reliance on chemical fertilizers, which, in turn, reduces negative impacts on the environment.

Overall, the data from Table 2 show good manners towards sustainable household waste management practices. By using the transformation index formula, it is known that the index of community behavior in domestic waste management is 62,21% or categorized as good. This figure indicates that there has been awareness about domestic waste management in the community at the location of waste management program assistance played by private extension workers. This finding is in line with research from Sumardjo et al. (2022) dan Firmansyah et al. (2024) that private extension workers play a role in building public awareness.

Analysis of the Determining Factors of Community Behavior in Domestic Waste Management

Factors that influence the transformation of community behavior in domestic waste management, namely the empowerment process carried out by facilitators, social support, perceptions of household waste management innovations, and the use of social media. Using the transformation index, Table 3 presents an index of factors that influence community behavior in domestic waste management.

Table 3: Index of Factors Influencing Community Behavior in Domestic Waste Management

Variables	Index (%)	Category
Community Empowerment	61,96	Good
Social Support	63,46	Good
Perception of Domestic Waste Management Innovation	73,47	Good
Use of Social Media	52,52	Good

The empowerment process carried out by the facilitator received an index of 61,96%, which placed it in the good category. This indicates that the community empowerment process in the context of waste management has been implemented quite effectively, where the community has been empowered to take an active role in waste management. Furthermore, the social support received by the community is also relatively good, with the index reaching 63,46%. This good social support provides additional encouragement and motivation for communities to adopt more sustainable waste management practices. The perception of household waste management also showed satisfactory results, with the index reaching 73,47%, indicating that the public has a good perception of the importance of domestic waste management. The use of social media in the context of waste management obtained a slightly lower index, namely 52,52%, although it is still classified as good. Overall, the results show that the factors that influence the transformation of community behavior in domestic waste management are in the good category. This shows great potential to drive changes in community behavior towards more sustainable and environmentally friendly waste management practices.

The results of statistical tests of determinants of community behavior in domestic waste management show some significant findings as presented in Table 4. Based on Table 4, it can be seen that the community empowerment process also influences community behavior in domestic waste management. The path coefficient between empowerment and community

behavior is 0,221, with a statistical t value of 1,785, and a p value of 0,037. This finding confirms that community empowerment has a positive and significant impact on community behavior in household waste management, and this is in line with several previous research findings (Astera & Haryanto, 2021; Brotosusilo, 2020). Furthermore, social support has a path coefficient of 0,262 with a statistical t value of 2,165 and a p value of 0,015. These results show a positive and significant relationship between social support (from families, groups, neighbors, groups, governments, companies, universities and local cadres) with community behavior in domestic waste management. This finding is in line with the findings of Amalia (2020) dan Sun et al. (2022) which show that social support influences community behavior in waste management.

Table 4: T-Statistics Test of the SEM-PLS Model of Community Behavior in Domestic Waste Management

Latent Variables	Path Coefficient	T Statistics	P Values
Social Support -> Domestic Waste Management Behavior	0,262	2,165	0,015*
Community Empowerment -> Domestic Waste Management Behavior	0,221	1,785	0,037*
Use of Social Media -> Domestic Waste Management Behavior	0,044	0,564	0,287
Perception of Domestic Waste Management Innovation -> Domestic Waste Management Behavior	0,362	4,264	0,000*

Description: *significant at $\alpha = 0.05$

The use of social media had a positive path coefficient (0,044), but not significant ($p = 0,287$), indicating that in the case of this study, the use of social media had no real effect on people's behavior in domestic waste management. Nevertheless, social media can still be an effective means of disseminating information and garnering community support in household waste management activities (Rapada et al. 2021; Teh et al. 2022). Finally, the perception of domestic waste management innovation with a path coefficient of 0,362, a statistical t of 4,264, and a p value of < 0.001 . This shows that the more positive people's perception of domestic waste management innovations, the more likely they are to change their behavior. This is in line with previous research that perceptions of domestic waste management innovations influence community behavior in waste management (Arkorful et al., 2022; Han et al., 2018).

Model of Community Behavior Transformation in Domestic Waste Management

The model of transformation of community behavior in domestic waste management in this study is presented in Figure 1. This model has been tested for goodness of fit with the Standardized Root Mean Square Residual (SRMR) indicator (Hooper et al., 2008) and predictive relevance value with the Q-square indicator (Chin, 1998). A model is said to be fit with data if the SRMR value is less than 0,05. As for the Q-Square value greater than 0 (zero) indicates that the model has a predictive relevance value. The SRMR value in this study was 0,05 and the Q2 value was 0,419. Both values have met the model match requirements, thus the model is fit and has a predictive relevance value.

Based on the model in Figure 1, the structural model equation of factors that influence community behavior in domestic waste management can be formulated as follows:

$$\begin{aligned} & \textit{Community Behavior in Waste Management} \\ & = 0.221\textit{Empowerment} + 0,262\textit{Social Support} \\ & + 0.362\textit{Perception of Innovation} + 0.044\textit{Use of Social Media} + \textit{error} \end{aligned}$$

From the data analysis, it was found that the R^2 value is 0,627. This indicates that 62,7% of the community's behavior in waste management at the research site is influenced by the factors included in this study, while 37,3% is influenced by other factors outside of this study.

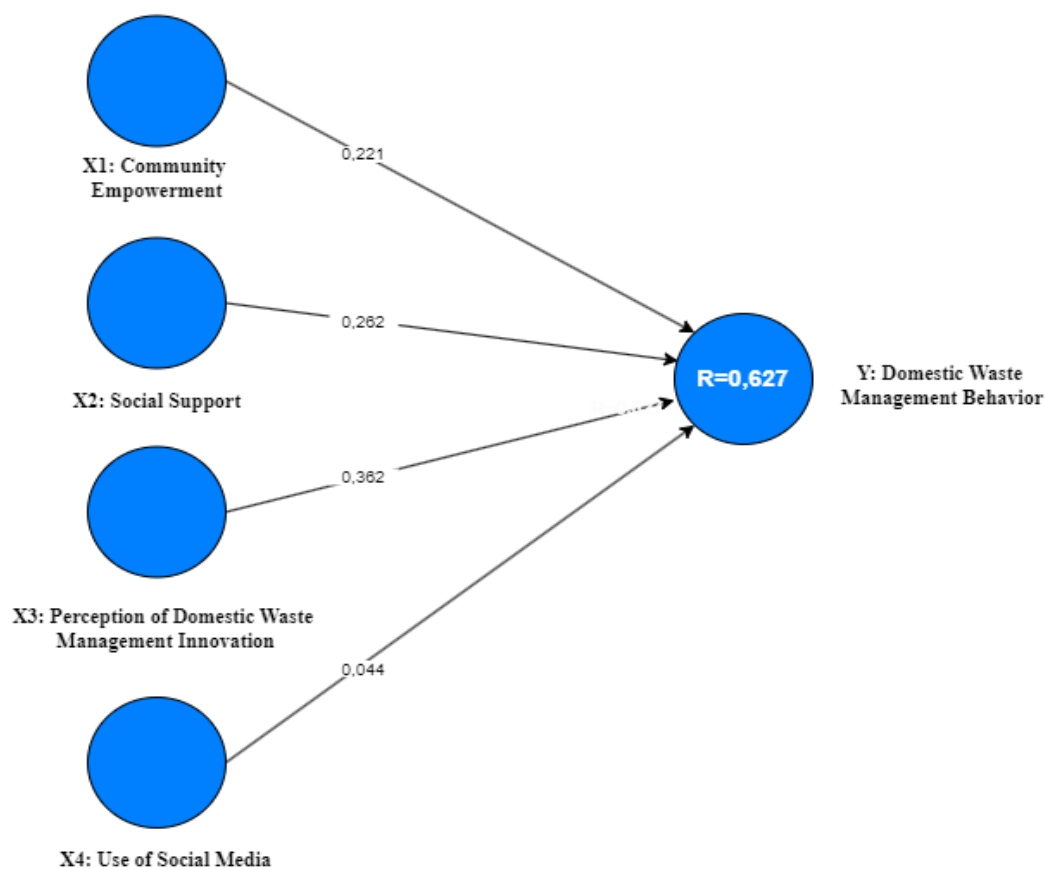


Figure 1: Structural Model of Community Behavior Transformation in Domestic Waste Management

Based on Figure 1, the model of community behavior change in domestic waste management is built by four main variables, namely: community empowerment process, social support, perception of waste management innovation and use of social media. The process of community empowerment plays a key role in empowering individuals to take an active role in waste management. Through a participatory and inclusive approach, communities are involved in decision-making and implementation of waste management programs, so they feel

responsible for their environment. Social support from the surrounding environment is an important foundation in encouraging individuals to adopt new behaviors in waste management. This support creates a conducive environment, where individuals feel supported and encouraged to make positive changes. Perceptions of domestic waste management innovations also make an important contribution in formulating community behavior. If communities see innovation as an effective solution to the waste problem, they are more likely to adopt and implement those new practices. The use of social media is also an important part as a means of learning and sharing information about waste management.

CONCLUSION

Community behavior in domestic waste management in general has implemented good practices in domestic waste management including waste reduction, waste sorting, reuse, waste recycling, waste processing, application of organic waste processing innovations, and the use of waste for yard plants. The waste management behavior index of all indicators is categorized as good. Determinants that significantly influence community behavior in domestic waste management include community empowerment, social support, and public perception of domestic waste management innovations. The model of changing community behavior in domestic management is built through the process of community empowerment, social support, and public perception of domestic waste management innovations and the use of social media.

SUGGESTION

To overcome the domestic waste problem, it is necessary to implement a holistic and integrated strategy. First, the community empowerment process needs to apply a participatory, inclusive approach, promote dialogue and involve various stakeholders actively at every stage. Second, social media can be used as a tool to disseminate information, build communities that care about the environment, and garner community support. Third, efforts need to be made to increase awareness and understanding of innovations in waste management, both through direct counseling and educational campaigns through mass media. By implementing these strategies, it is hoped that there will be a change in community behavior in sustainable domestic waste management.

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