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Determinant Factors for Managing Sustainable Waste Bank in Bantul Urban Areas

Bambang Suwerda*, Su Rito Handoyo*, Andri Kurniawan*

*Environmental Science Program, Post-Graduate School of Gadjah Mada University,
Jl. Teknika Utara, Pogung Kidul, Sinduadi, Mlati, Sleman, DIY, 55281
email: suwerda2006@yahoo.co.id

Intisari

Pengelolaan bank sampah di perkotaan Kabupaten Bantul sudah sepuluh tahun berjalan, dan saat ini banyak yang tidak aktif. Penelitian ini meneliti tentang intensi mengelola bank sampah yang berkelanjutan di wilayah perkotaan Bantul. Tujuan penelitian ini adalah untuk mengetahui faktor-faktor yang berhubungan dengan intensi pengelolaan bank sampah yang berkelanjutan di wilayah perkotaan Kabupaten Bantul. Sampel penelitian adalah penabung sampah di bank sampah wilayah perkotaan Kabupaten Bantul. Data dianalisis menggunakan análisis jalur. Hasil penelitian menunjukkan terdapat hubungan yang signifikan antara peran pemerintah dan penggiat sampah yang tergabung dalam Jejaring Pengelolaan Sampah Mandiri (JPSM) dengan partisipasi masyarakat di bank sampah. Pengetahuan, partisipasi, peran pemerintah dan JPSM memiliki hubungan signifikan dengan intensi masyarakat di bank sampah. Studi ini membantu memahami kekuatan hubungan relatif dari faktor determinan intensi mengelola bank sampah berkelanjutan. Kekuatan hubungan paling besar adalah antara peran pemerintah dan JPSM dengan intensi, diikuti hubungan peran dengan partisipasi, kemudian antara partisipasi dengan intensi, dan yang paling lemah adalah hubungan antara pengetahuan dengan intensi.

***Kata Kunci** : pengelolaan bank sampah sampah berkelanjutan, faktor determinan*

Abstract

The management of waste bank in urban areas of Bantul has been running for ten years, and many are currently inactive. This study examines the intention of managing a sustainable waste bank in the urban area of Bantul. The aim of this study is to determine the factors associated with intention sustainable management of waste banks in the urban area of Bantul Regency. The research sample was a waste saver in the waste bank of the urban area of Bantul Regency. The data were analyzed by path analysis. The results of the study show that there is a significant relationship between the role of the government and the Independent Waste Management Network (JPSM) with the participation of community in waste bank. Knowledge, participation, the role of the government and JPSM have a significant relationship with the intention of the community in the waste bank. This study helps understand the strength of the relative relationship of the determinants of intention to manage a sustainable waste bank. The strength of the biggest relationship is between the role of government and JPSM with intentions, followed by role relationships with participation, then between participation and intention, and the weakest is the relationship between knowledge and intention.

***Keywords** : management of sustainable waste bank, determinant factors*

BACKGROUND

The increase of the waste amount has caused problems in the urban area of Bantul Regency. The amount of waste in 2016 in Bantul Regency is 229.929 m^3/day with an average of 0,0025 m^3/day [1)]. The amount of solid waste continues to grow. Waste reduction efforts are one of the strategies by building a waste bank. A waste bank is a household waste management system by sorting it out and saving it in a waste bank as evidenced by a waste savings account book [2)].

The number of waste bank in Bantul Regency in 2016 was 127. There are 25 waste banks that are active and 102 that are inactive/suspended [3)]. The management of a sustainable waste bank confirms the need for a paradigm shift from waste collection to management that relies on reducing and handling waste. Waste management with a waste bank basically changes the behavior of disposing and burning garbage to sort and

save garbage. According to Ajzen [4], someone's intention towards the behavior of sustainable waste management is measured through three determinants, namely: individual's attitude, perceived social pressure to apply behavior, and one's perception of the control they have regarding that behavior.

The sustainable management of waste banks must be of concern to all parties, both the government and the community in Bantul Regency. The formation of sustainable waste management behavior in waste banks in a community oriented to sustainable development that can be a role of model for community behavior in managing waste in waste banks, especially urban areas. The relationship between knowledge, participation, and the role of managing the sustainable waste bank is the problem that the answers to this research want to obtain.

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Picture 1.
Gemah Ripah waste bank in Badegan Bantul

METHOD

This type of research includes survey research with a cross sectional approach in which the data on all research variables are collected at the same time. The resulting data were analyzed descriptively and analytically using path analysis.

The research sample was 100 waste savers taken by multi stage random sampling technique. The first stage was to select four waste banks in four sub-districts of urban areas, i.e. urban area waste banks namely Gemah Ripah Waste Bank Bantul, Bersih Menuju Sehat Waste Bank Banguntapan, Sri Asih Waste Bank Kasihan, and Mekar Jaya Sewon Waste Bank. The second stage was to randomly select from each waste bank where sampling was proportional. The tools in this study are stationery, cameras, questionnaires, maps, GPS, computers, and software.

The research data consist of primary data and secondary data. The primary data are waste savers and waste bank managers. The secondary data are references, literature, and standardization of waste management with a bank waste system. The data collection techniques were doing interview, doing documentation, doing observation, and giving questionnaires. The research variables are knowledge, participation, the role of the government, and the role of JPSM on the sustainability of the waste bank. The scale for participation is the Likert scale. The analytical analysis was done using path analysis, which is intended to find the biggest determinant factor in the management of sustainable waste banks in the urban area of Bantul Regency.

RESULTS

The waste bank stands because of the initiative of the local residents, with the main movers as managers, are youth organizations and PKK. The average coverage of waste bank services in urban areas is RW scale and becomes a side activity for managers. The service time is about once a week with days and hours as agreed by the residents. There is an average of one waste collector/buyer as a waste bank partner, the types of waste received include paper, tin/bottle/metal, and some plastic waste. There is one leader in each waste bank in urban. The communication networks between waste banks in each urban area are starting.

The bank's sustainable waste indicators include: the level of knowledge of the community towards waste banks, the community participation in waste banks which is indicated by the amount and type of waste they save, the intentions of saving waste behaviour, the role of government both technical and non-technical, the role of waste management networks independent.

Figure 1.
Scree plot results of factors analysis of waste banks in urban areas of Bantul Regency

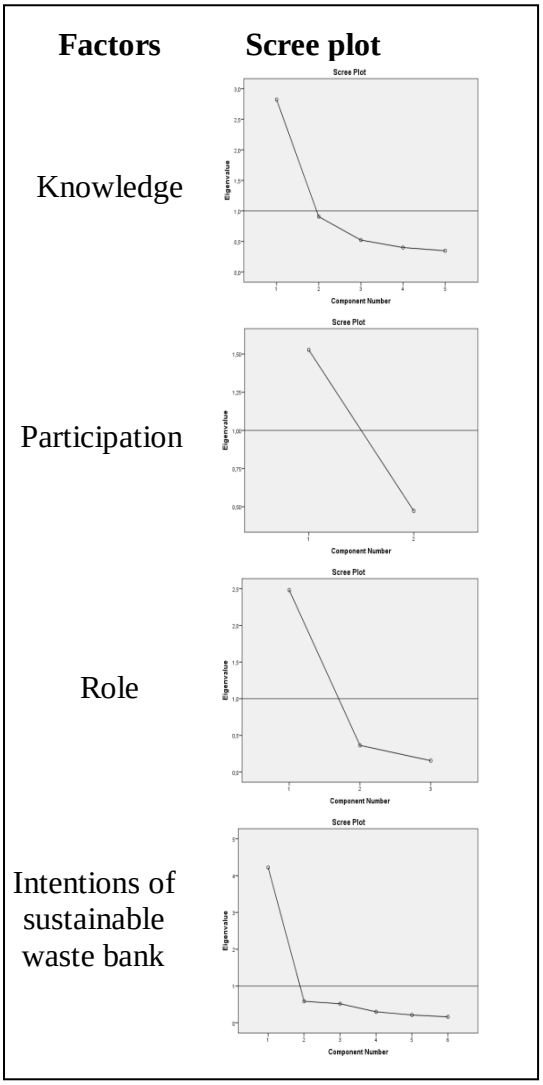

Figure 1 shows that the results of factor analysis for each factor in urban areas. In the scree plot a new variable is formed for each factor. A summary of the results of the analysis of the waste bank factor in the urban area of Bantul Regency, for knowledge, participation, role, each sustainable waste bank is formed by a new variable.

Figure 2.
Pathway model for waste banks in urban areas Bantul Regency

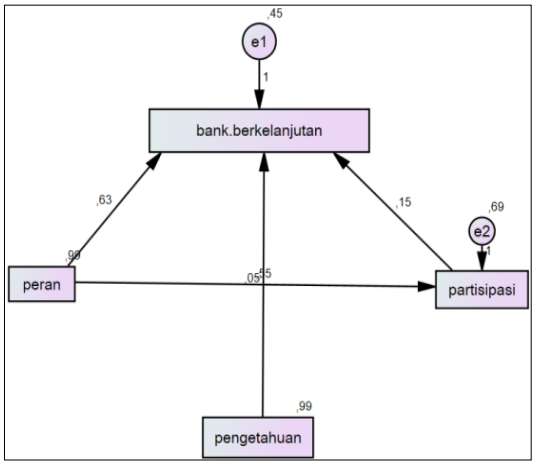

Figure 2 shows the model of the waste bank pathway in urban areas. Path analysis results, after testing the hypothesis whether the model formed as shown in Figure 2, has been fit or not. It has been obtained that the chi-square value is 5.049 with 2 degrees of freedom and p-value of 0.08. The initial hypothesis used is the fit model and the alternative hypothesis is that the model is not fit. The p-value (0,08) is more than alpha (0,05) so that the initial hypothesis is accepted. It can be concluded that the model is fit. The fit model in the sense that the model formed has matched the data and can be used.

Table 1 shows the parameter estimates along with the standard error (SE) values, construct reliability (CR), and p-value (p). The interpretations in Table 1 are explained as follows: the estimate column shows the value of the loading factor. The greater the value of loading factor shows the greater the influence. The role variables have a factor loading of 0,632 compared to knowledge in influencing sustainable waste banks so that the role gives the greatest influence on sustainable waste banks. The standard error column shows an error value in an exogenous variable that affects endogenous variables. The construct reliability column shows consistency. The

construct reliability value is greater than 0,7 and it indicates that the variable is consistent. In the column, it can be seen that all values of construct reliability are >0,7 so that it is consistent. The p-value column can be used to see whether the exogenous variables significantly influence endogenous variables or not. The smaller the p-value value the more significant it is in influencing. The *** sign indicates that the p-value is very small near zero.

Table 1.
Estimated parameters of urban path models

Endogen		Exogen	Estimate	SE	CR	p
Participation	←	Role	,550	,084	6,557	***
Sustainable waste bank	←	Participation	,150	,081	1,852	,064
Sustainable waste bank	←	Role	,632	,081	7,779	***
Sustainable waste bank	←	Knowledge	,050	,068	,735	,463

Feasibility analysis of the goodness of fit for waste banks in the urban areas of Bantul Regency: AGFI (0,879), CFI (0,973), RMSEA (0,124). The feasibility and goodness of a model to use can be assessed from several criteria. The criteria used in this study are AGFI, CFI, and RMSEA. Adjusted goodness of fit index (AGFI) with the condition that the AGFI value is equal to or greater than 0,9. If the value is greater than 0.9, then the model has a good overall model suitability.

In the urban model, the AGFI value is almost close to 0,9. Comparative fit index (CFI) with a value between 0-1, provided that the value is close to 1 then the model that is made has a very high moderate match if the value approaches 0, the model does not have a good match. It can be seen that the CFI value for the urban model has a value close to 1 so that the model has a good match. Error squared root average (root mean square error of approximation, RMSEA), also called RMS or RMSE and also the difference of degree of freedom. Based on the convention, there is a good model match if the RMSEA is smaller or equal to 0,05. There is a sufficient model match if the RMSEA is less than or equal to 0,08. In the recent findings, Hu and Bentler suggest that the magnitude of RMSEA ≤ 0.06 is the cut-off point for a good model match. Urban models still cannot be said to have a good model match because the RMSEA value of 0,124 is still greater than 0.06.

DISCUSSION

The rationale of this research is to identify and observe the determinant factors of the behaviour intention of sustainable waste bank management and also to ensure the relative strength of each determinant factor which consists of knowledge, community participation, the role of the government and JPSM. This study also discusses the relationship between community knowledge about waste banks and participation in saving waste in waste banks, the relationship between the role of the government and JPSM with community participation in saving waste in garbage banks. The results obtained from the structural model show a good of fit based on the value of goodness of fit produced both in urban areas.

Based on the results of the research in the estimate column, it shows the value of loading factors. The greater the value of loading factor shows the greater the influence. Role variables have a higher loading factor than knowledge and participation in influencing sustainable waste banks in urban areas so that the role of the government and JPSM has the greatest influence on the sustainability of waste banks in urban areas, Bantul district.

The results of this study state that public knowledge about waste banks is related and contributes positively to community participation in urban areas. This result is suitable with findings obtained by Gusti et.al. [5)], which states that know-

ledge of sustainable waste management is positively related and contributes to attitudes towards sustainable waste management. Knowledge of respondents about waste banks is important variables to maintain the sustainability of waste banks. The community has only known about waste bins as a place to dispose of waste mixed, while public knowledge about waste banks needs to be continuously improved to increase their participation.

Community participation is important in managing waste through a waste bank. Communities can participate in various forms of activities. The forms of community participation in waste banks include participation as a waste bank manager can make strategic decisions with other managers, participation in the implementation of waste bank activities ranging from customer service, administration, sorting, and selling waste, or as waste savers, participation in the utilization of results from waste banks such as getting money from the savings they have saved, and participating in monitoring the evaluation of waste banks by providing input related to the progress of the waste bank. This is suitable with the Ogbonna et.al. [6)], that urban communities can help overcome the problems caused by waste through the provision of solid waste infrastructure and social services. Waste bank is one of the social activities in the community to increase community participation in managing waste.

Community knowledge about waste banks can be obtained from various sources such as socialization by DLH Bantul and JPSM Bantul, as well as those obtained through print, radio and television media which have a major influence in forming opinions and beliefs about waste banks. New information about something provides a cognitive foundation for increasing knowledge [7)]. Communication and education efforts to increase knowledge about waste management through waste banks have been effective in encouraging community participation in managing waste. Community involvement in managing waste banks provides optimism to increase community participation in managing waste [8)]. Knowledge of waste banks is measured by five indicators consisting of knowledge about reducing waste, sorting waste, utilizing waste, recycling waste, and saving waste.

The findings of this study state that the better people's knowledge about waste banks, the higher the community participation in the management of sustainable waste banks. An intensive and continuous effort is needed from the government and JPSM Managers to increase public knowledge about sustainable waste banks by including them as the subject matter in the socialization of waste management that is often carried out by the DLH of Bantul Regency.

The socialization to increase knowledge about waste banks can be done by visiting community activities such as the social gathering activities of PKK, youth meetings, recitation, or inviting community representatives to attend the waste bank socialization activities carried out by village or sub-district government. Efforts to increase knowledge can also be carried out by optimizing the role of print and electronic media such as radio television, newspapers, magazines, distributing waste bank leaflets.

The socialization activities are not only once, but are regularly carried out, so that the community will increase their knowledge about waste banks. The material that is minimally known by the public about waste banks is the definition of waste bank, the basic concepts of waste bank, waste bank component and instruments/facilities, how to set up waste bank, the benefits of waste bank, knowledge of types of waste, knowledge of how to recycle waste plastic, knowledge about how to manage organic waste, obstacles in managing waste bank, how to overcome problems in waste bank.

The results of this study state that knowledge of waste banks is related and contributes positively to the intention of the behavior of management of sustainable waste bank. This finding is suitable with the theoretical assumptions in the theory of planning behavior developed by Ajzen in Gusti et.al [5)], which explains

behavioral intention which is the closest antecedent of behavior, that a person's intention/behavioral intention determines whether a person will do or not perform a certain behavior.

There are three determinants for measuring the intention of a person's behavior towards the behavior of sustainable waste management: Individual attitudes towards the behavior of sustainable waste management, How much social pressure is felt to apply these behaviors (subjective norms), and perceptions of the control they have in relation to these behaviors perceived behavioral control (PBC).

Waste bank is a medium for learning to sort waste. This is a media to familiarize people in sorting out waste, because the brand mixes the waste they produce in the trash can, and this is similar with Kumar's research [9], where the reason is that people are busy every-day, they mix waste to dispose in trash bin. In addition to efforts to familiarize and save waste, waste bank also have economic value mainly from the results of waste savings, and this is suitable with the opinion of UNEP [10], where waste management needs to emphasize the importance of circulair economy to maintain added value in the production process.

The results of this study state that the role of the government and JPSM relate and contribute positively to community participation in waste banks. According to an interview from Mr. Wahid, the Head of the DLH Waste Sector in Bantul Regency, many waste banks in Bantul have been suspended because so far the waste bank has not yet emerged economic value, and there is no relationship between customers and servants so that the PNS is expected to save waste and to return the waste bank. The role of waste buyers will be actively involved in waste bank socialization in each village.

The DLH efforts of Bantul Regency to increase knowledge that influence community participation in waste bank by conducting socialization in each village in the Bantul Regency area. This continues to build awareness of the importance of managing waste because public awareness is a key factor in waste banks. In addition to socializing, the government in this case DLH and the village government must provide waste management facilities, and need to synchronize the APBDES with the APBD where there are items that list waste management.

It should be emphasized that waste is everyone's responsibility. The approach can be done through social organizations, mosques, and churches. Gropyok Sampah program in the liquefied landfill is carried out by the DLH Bantul in collaboration with the Village Government, and the AMOR JPSM in Bantul Regency is intended to build community awareness not to dump waste carelessly, to create a clean and waste-free environment, and after monitoring location monitoring is the responsibility local village for the management of wild landfill.

The study results state that the role of the Government and JPSM relates and contributes positively to community participation and intention of sustainable behavior of waste management in waste banks. This result is suitable with the findings of previous research from Mc Allister [11], who stated that awareness efforts were needed for the community in sustainable waste management in developing countries. Results of a research in India conducted by Muhammad [12] stated that there was an increase in awareness in waste management.

Overall, the model that uses a planning behavior theory framework is able to explain the intention of the behavior of sustainable waste management with a good approach in a simple and adequate way. This is suitable with the research of Saxena et.al. [13], that stated there are several approaches that influence the sustainability of waste management, i.e.: technology approach, institutional approach, and financial/budget approach, where one of the efforts to minimize sustainable waste management is to encourage community participation in managing waste.

The intention of behavior or intentions of a sustainable waste bank has six

variables, namely: the intention to live healthy, clean environmental intentions, intention to earn income, religious teachings, regulations/punishments, and culture/habits. The score on the largest variable or in other words has the largest variable average value.

Table 2.
Intension of waste bank management in Bantul urban area

Variables	Average
The intention of living a healthy life	7.78
The intention of clean environmental	8.37
The intention to get income	7.84
Education of religious	7.58
the existence of regulations/laws	8.18
culture/habits	8.48

Based on research data on the level of knowledge, participation, the role of JPSM and the government, and the intention of the behavior of sustainable waste bank that is positively correlated in urban areas. This is an important thing for developing a waste management model with a sustainable waste bank. The desire to live healthily, clean environment, get income, because of religious education, and the existence of regulations/laws, as well as culture/habits to waste and save waste are the intention factors for the behavior of waste bank sustainability, and factors to change habits/culture are the factors with the greatest value. This is suitable with the results of Elsaid and Houssaine's research [14] that the waste management model, to achieve sustainability the waste management system needs three main factors, namely: economic, social and environmental, which are efficiently integrated and managed. Changing the habits of the community in managing waste from burning and mixing and disposing into sorting and saving waste is part of the social aspect in waste management.

Based on the results of observations and interviews with waste bank managers in the urban area of Bantul, the waste bank activities carried out are still a side/secondary activity, the average waste savings service is once a week, the limited number of serving personnel, the managed waste is still focused on inorganic waste and not all anorganic waste such as styrofoam, aluminum foil plastic, and mica plastic are accepted by waste buyers, as well as the difficulty in finding locations for trash sorting sites.

The limited budget available at DLH Bantul in the procurement of waste bank facilities and infrastructure developed by the community is a separate problem. This is also experienced by the Nigerian city of Nasaru Karu. According to Anyanwu & Adefila [15], some obstacles for managing waste there include limited equipment, lack of funding, limited personal, low attitudes/perceptions from the community about waste management.

The model that uses the overall planning behavior theory framework is able to explain the intention of sustainable waste bank management with a good, and simple, and adequate approach to be developed in the urban area of Bantul Regency.

CONCLUSION

The conclusions that can be conveyed from the results of this study are as follows: there is a significant relationship between knowledge and community participation in the waste bank in the urban area of Bantul Regency. There is a significant relationship between knowledge and intention of community behavior in the waste bank of the urban area of Bantul Regency.

In developing sustainable waste bank in urban areas of Bantul, the role of the government and JPSM is highest in increasing community participation. The development model of a sustainable waste bank in the urban area of Bantul Regency is carried out by continuing to increase knowledge, participation, intention to conduct the community to save waste and to increase the role of JPSM and the Government.

The recommendations of this study for the Bantul Regency Government is

immediately compiled a development plan for the waste bank in the urban area of Bantul Regency by increasing the role of JPSM and the government. The Regent of Bantul Regency is expected to immediately issue a decree regarding the establishment of a waste bank in the urban area of Bantul by increasing the role of JPSM and the local Government.

Allocating a budget for the establishment of waste bank in urban areas, procuring human resources, building infrastructure are needed by waste bank. For managers of JPSM AMOR, Bantul Regency, socializing the formation of urban area based waste bank and coordinating with the government in the technical implementation of urban waste bank and accompanying community in forming an urban waste bank are necessary to do.

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