IMPROVING COMMUNITY PARTICIPATION OF LOCAL TRASH BANK THROUGH A DEVELOPMENT STRATEGY AND INFORMATION TECHNOLOGY BASED MANAGEMENT SYSTEM (CASE STUDY: SIMOJAWAR TRASH BANK, INDONESIA)

Erlinda Ningsih[1)], Anindya Rachma Dwicahyani[2)], Arlini Dyah Radityaningrum[3)], Eky Novianarenti[4)]

[1)] Department of Chemical Engineering, Adhi Tama Institute of Technology Surabaya, erlindaningsih84@itats.ac.id

[2)] Department of Industrial Engineering, Adhi Tama Institute of Technology Surabaya, anindya.dwicahyani@itats.ac.id

[3)] Department of Environmental Engineering, Adhi Tama Institute of Technology Surabaya, dyah@itats.ac.id

[4)] Department of Marine Engineering, Politeknik Perkapalan Negeri Surabaya, ekynovianarenti@ppns.ac.id

Introduction

Solid waste generation is a complex environmental problem. The volume of solid waste generation increases to the raise of population. This needs a community concern to the environment. The concern is influenced by the way of thinking, behaviour, and self-awareness. Community awareness can be improved through the education on the environmental sustainability and the health impact (Selomo et al., 2016). This kind of education could be conducted from an early age, through fun activities such as crafting(Novianarenti & Ningsih, 2018b). Solid waste reduction should be supported by active community participation.

In order to reduce waste problems in the environment, active participation from society is needed. This can be initiated from individuals and families, only then can it be escalated to a larger scale such as society. Community trash bank is an alternative means to reduce the household waste in society (Singhirunnusorn et al., 2017). Proper household waste management will lead to the healthy environment. However, this requires an active community participation from stakeholders, starting from the community, government, NGOs, and up to the private sector.

Household waste management is regulated in the Law Number 18 Year 2008 concerning The Waste Management. This regulation is used as a guideline to conduct solid waste management. The community mindset should be changed to manage the solid waste. The conventional paradigm on solid waste management (Figure 1), including collection, transportation, and disposal, should be altered to the strategy of Reduce, Reuse, and Recycle (3R) (Puji et al., 2018). The solid waste is transferred to be the goods with the economic values (Asteria & Heruman, 2016). However, this strategy has an obstacle regarding community awareness in the waste sortation activities(Saputro et al., 2015).

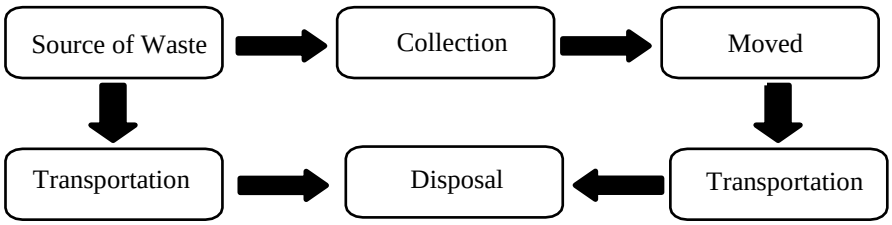

Figure 1. The flow of waste disposal (Sekarningrum et al., 2017).

Trash bank is a means for the community to manage waste with economic value. Trash bank has become a new paradigm for the community to be more concerned about the environment. Principally, trash bank management system adopts a simple banking management system. In a trash bank, customers deposit trash, then converted into a balance according to the economic sales value of the deposits. The trash bank manager then receive the waste which is sorted and weighted. The price of waste depends on the waste type. The customer balance in the savings is recorded according to the waste weight which is converted into the price (Dhokhikah et al., 2015). The sustainability of trash waste could be achieved by the creative and innovative manager (Suryani, 2014).

In Surabaya, many regions have initiated and developed trash banks in various scales. The project is strongly supported by the local government. The waste management in Surabaya is controlled by The Regional Regulation of the City of Surabaya Number 5 Year 2014 concerning Waste Management and Cleanliness in The City of Surabaya and The Regulation of The Mayor of Surabaya Number 64 Year 2018 concerning The Strategic Policies for Household Waste Management and Waste Similar Types of Household Waste. This regulation states that waste sorting must be carried out by (1) the solid waste producer at the source; (2) the manager of residential commercial industrial and specific areas, also the manager of public social and other facilities; and (3) local government (Andina, 2019).

Surabaya has a pilot community trash bank which is located in Jambangan District. This trash bank succeeded to change the community paradigm regarding the concern and awareness to the household waste management. This leads to the success of Jambangan District to achieve Kalpataru Awards and others awards both at the regional and national level. The success was mainly influenced by the active community participation, from both society and the trash bank management itself (Tanuwijaya, 2016). The attainments of The Jambangan trash bank has triggered the growth of many trash banks in Surabaya, as presented in Table 1(Rosawatiningsih, 2018). According to (Suryani, 2014), key drivers that influenced the success of a trash bank management are organizational, financial, regulation, community participation, operational, and technical factors. These factors become quite complex since these should be simultaneously applied in the operational and management of the trash bank as a whole.

Table 1. The Growth of Trash Banks in Surabaya (2010 – 2017)

Year	Number of Waste Banks
2010	15
2011	50
2012	135
2013	180
2014	200
2015	220
2016	260
2017	280

Source: (Rosawatiningsih, 2018)

Another trash bank in Surabaya which is established in the densely populated areas is Simojawar trash bank. It has been established since 2018. In the early stage of development, there were only 3 weighing points. The Simojawar residents was very enthusiastic to become part of the trash bank customers. The weighing process took place once a month at each point. However, the trash bank activities only lasted approximately for 2 years. Only 1 point of weighing still remains up until now. Due to several operational constraints, this trash bank becomes inactive and not productive. Moreover, many customers started to lose their enthusiasm and became less involved. In fact, without the participation of customers, who are also local residents, trash bank will be difficult to develop or even lead to collapse. Therefore, this research is carried out to identify the obstacles experienced by Simojawar Trash Bank and formulate a development strategy to increase productivity and community participation of the trash bank.

DISCUSSION

1. Methodology of Research

This research was conducted in Simojawar District, Surabaya, Indonesia. The trash bank's stakeholders involve trash bank officers, local government, and customers. This project was carried out to review the trash bank management process, identify the constraints and formulate the strategies to sustainable development of the trash bank. This research was conducted through the method as illustrated in Figure 2.

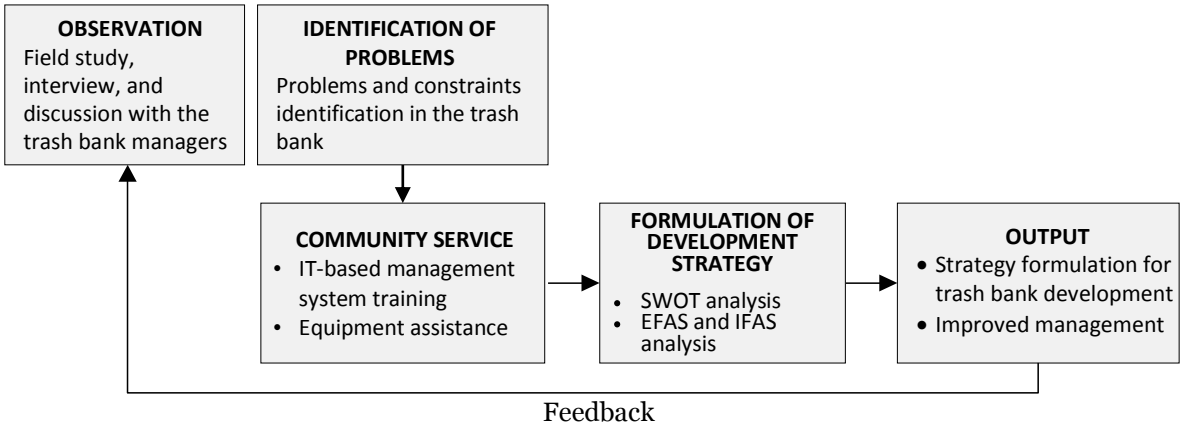

Figure 2. Research methodology.

First, the field observation, interviews (Figure 3) and discussion with the trash bank managers were conducted to identify the problems in the trash bank, particularly the existing management system. Then, the management training and equipment assistance was organized to improve the operational and technical skill of the manager and officers. Then, we formulate several development strategies using the SWOT analysis method, EFAS (External Factor Analysis Strategic), and IFAS (Internal Factor Analysis Strategic). The outputs of this project was development strategies to improve the trash bank performance, particularly the management system(Nisak, 2004).

Figure 3. Interview with the trash bank managers.

2. The Existing Condition of the Simojawar Trash Bank

Simojawar is a densely populated area in West Surabaya, Indonesia. There was a potential high waste generation in Simojawar due to the dense population. Simojawar owned The Simojawar Trash Bank which was established earlier in 2018(Novianarenti & Ningsih, 2018a). However, the trash bank faced some problems since nearly 50% of the residents worked as the trash collectors. Moreover, the low education level of the society cause the low willingness to be the customers of The Simojawar Trash Bank. Another problem was the inconsistency of the periodic weighing schedule. There was because of the lack of supports from the stakeholders, including the collecting partners and customers. This condition became a problem since the trash bank had no weighing point itself. Currently, the Simojawar Trash Bank occupied a public security post as the weighting points (Figure 5). Therefore, the weighed trash should be transported as soon as possible by the collecting partner. This aimed to avoid the existence of trash pile in the security post. In addition, insufficient support from the neighbourhood became the challenges in the trash bank management.

The establishment of Simojawar trash bank has altered the mindset of the Simojawar residents into the solid waste. Initially, Simojawar residents viewed waste as non-economic value of goods. However, since the existence of The Simojawar Trash Bank, residents have gradually begun to collect and to convert the solid waste to the economic value of goods. The trash bank management process in The Simojawar Trash Bank is illustrated in Figure 4. The customer participation of the trash bank played an important role to succeed the trash bank management.

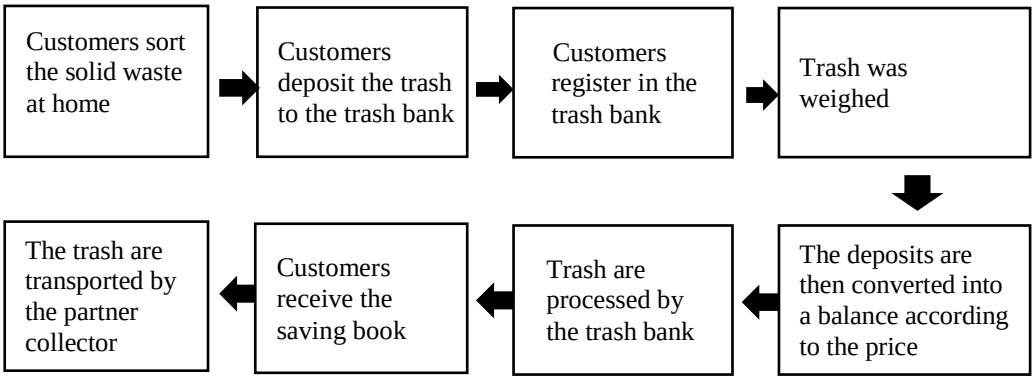

Figure 4. Workflow of the trash bank (Suryani, 2014).

3. Identification of Obstacles in the Simojawar Trash Bank

Based on to the field study and interviews, several problems and obstacles facing the Simojawar Trash Bank can be classified into the following aspects

a. Organizational Aspect

The Simojawar Trash Bank was established with the lacking official support from the government around the neighbourhood and the urban local government. Thus, the organizational structure of the trash bank becomes limited. This led to many unclear job descriptions and tasks amongst the officers. However, the officers of the Simojawar Trash Bank, are still motivated to develop and increase the productivity of the trash bank.

b. Financial Aspect

Simojawar Trash Bank has a relatively low profit due to the small number of customers. Many customers prefer to sell their household trash to the other collectors around Simojawar, since they offer a higher price. Another obstacle was the long delayed payment from the trash bank collector partner, even up to one month or even longer. This caused the financial problem within the trash bank, because the trash bank has not yet attained any cash to pay the customer trash. The trash bank also experienced insufficient finance since there was no financial support from the government or other private companies. Thus, this was difficult for the trash bank to achieve the development program, such as the provision of space and inventory procurements. The profit of the trash bank was only able to cover the operational costs. Besides, the trash bank managers and officers are voluntary workers because it has no other profits to pay the officers.

c. Community Participation Aspect

The Simojawar Trash Bank still lack of community participation. Moreover, the community motivation and willingness to be the customers are very low. Generally, people who decided to be the trash bank customers were still based on economic motivation. In addition, there was also lacking interest of community to be the trash bank officers. At Simojawar, there were only two officers who managed the trash bank.

Figure 5. Weighing activity in the security post

d. Operational and Technical Aspect

This aspect is very important and play a role for the sustainability of the trash bank. The Simojawar trash bank has inadequate facilities and infrastructure, including weighing point. So far, the process of weighing and storing the trash was conducted at the security post (Figure 5). Apart from the facilities, the trash bank also experienced the problems of inconsistent partner collectors who was not able to standby during the weighing process. The trash price from the collectors was also very low. This caused many customers to

suspend their trash to be collected at the trash bank. Therefore, the trash bank only earned the minimum profit from customers. This caused the inventory procurement of trash bank could not budgeted during the operation of the trash bank. Conclusively, the Simojawar Trash Bank experiences several technical aspects as identified below:

- Contained system, the large volume of trash obtained from customers required a sufficient container so that the storage and transportation were tidier.
- Collection system, the inconsistency of customers to deposits the trash caused the trash could not handed over directly to the partner collector. This became the problem since the weighing point was expected to be cleaned up as soon as possible.
- Transportation system, there was only one partner collector who were difficult to contact due to the business of the collector (Raharjo et al., 2016)

4. SWOT Analysis of the Simojawar Trash Bank

The strategies to develop the trash bank was formulated based on the SWOT analysis which included strength, weakness, opportunity and threat. SWOT analysis is a tool or method that can clearly describes how internal factors (IFAS) can be used to deal with external factors (EFAS). The SWOT matrix from The Simojawar Trash Bank is shown in Table 2.

Table 2. The Simojawar Trash Bank SWOT Matrix.

Internal Factor	
Strength	**Weakness**
- The amount of household waste was quite a lot - The number of waste bank customers was quite a lot - The trash bank officers had high motivation - Waste bank officers have the skills to process the trash into creative products - The manual administration system was well operated	- There was limited trash bank cash - The number of officers was only 3 persons - There was no good organizational system yet - The facilities and infrastructure were inadequate - There was no trash bank management training - There was no standard for pricing for trash
EFAS	
Opportunity	**Threat**
- There was rapid development of science and technology - The supports from local government and campus academics were available - The chance of cooperation with other trash banks in Surabaya were available - The cooperation with environmental NGOs in Surabaya were enabled - Surabaya City Government provided the programs related to trash banks and waste processing	- The trash price from the partner collector was not competitive - The major residents were scavengers - The residents had the low motivation to develop the trash banks - The technological skill of the trash bank officers was quite low, therefore it was difficult to adapt to the science and technology development

5. Strategy Formulation for the Development and Management of the Trash Bank in Simojawar

Based on the SWOT analysis for the Simojawar Trash Bank, the strategies for the development and improvement of the trash bank management system were formulated as follows:

1. Enhancing the support from the local government, the community of the empowerment of family welfare (PKK), environmental cadres, and the neighbourhood communities of residents (RW or RT) (Sujiyanto, 2016). The neighbourhood community support, at least from RW level, enabled to encourage the residents to participate as trash bank customers. Besides, the residents could be encouraged to involve in problem solving in the trash bank.
2. Organizing the management trainings or workshops both for the officers and customers. The trainings for the officers that urgently carried out in The SImojawar trash bank were the training on trash bank administration, the training on converting trash into creative and economical products, the training on database-based online trash bank management systems. In addition, a benchmarking activity to the_successful trash bank was needed to learn the lessons from both the management and operational system. The socialization for the customers was important to routinely conducted to give the insight of the trash bank benefit. Besides, the building skill activities such as reuse and recycle activities were required to increase the customer interest.

3. Expanding the networking with all trash bank stakeholders such as other trash banks, collectors, and environmental NGOs in Surabaya. This could develop the trash bank productivity

6. Simojawar Trash Bank Management Assistance

The initial assistance to the trash bank was the webinar on the introduction of an easy and practical information technology-based management system (Abror et al., 2019). In this activity, there was a sharing session from one succeed trash bank management in Surabaya to upgrade the motivation and capability of trash bank officers in Simojawar (Santoso, 2020; Utami et al., 2019).

The webinar was carried out online with around 4.0 attendees which were the trash bank officers in Surabaya (Figure 6). The webinar theme was "Tips for Developing a Trash Bank and Introduction to a Trash Bank Management System with The Smash.id Application". The webinar activity aimed to increase the digital knowledge and skills of the trash bank managers in The Surabaya area. The trash bank management was expected to be well managed using the application of digital media.

Figure 6. Training by the founder of smash.id application (left), and Seminar by webinar by Heni Lestari on tips to become a successful trash bank (right).

Figure 7. All Participants of the trash bank management webinar.

This webinar was expected to enhance the management and administration activities of trash banks in Surabaya, especially in The New Normal (Figure 7). In the future, the trash bank in Surabaya was also expected to develop and greatly contribute in the manifestation of clean environment and healthy people.

Conclusion

This research activity resulted in the strategies for the development of the trash bank management according to the SWOT analysis. Besides, the enhancement skills of trash bank officers was expected as the main result. Thus, the existence of The Simojawar Trash Bank could sustain and develop. The low support from local government, insufficient facilities and infrastructure, also the low participation of residents were the major challenges for The Simojawar Trash Bank. The development of The Simojawar Trash Bank management was suggested through the application of science and technology in administrative management system, the training on creative products from trash, and the support development from the local government.

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