Innovation in Municipal Waste Management in Malang, Indonesia

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ABSTRACT

This paper described explanation about innovation of waste management reflected in Waste Bank in Indonesia. Malang district was the suitable place due to the success of Malang Waste Bank (MWB) in initiating waste management innovation. Qualitative method was used in order to give clear understanding. The result showed that there are some innovations was created by waste bank like waste saving that can be used to finance daily needs such as education, groceries, health, and social activities. The bank also used information technology to record and report on customer savings. In order to maintain the sustainability, the waste bank cooperated with some stakeholders such as local government, National Electric Company, and some local waste businessman. There are several factors influencing the success of waste bank in managing waste, including: understanding of waste business networks and the ability to position itself in the business networks, supporting from local government and other agencies to conduct waste business, and involving environmental activists in the waste management.

INTISARI

Tulisan ini memberikan penjelasan secara eksklusif tentang inovasi pengelolaan sampah yang tercermin pada Bank Sampah di Indonesia. Kabupaten Malang adalah tempat yang paling cocok mengingat kesuksesannya dalam mengelola Bank Sampah. Metode kualitatif digunakan untuk memberikan gambaran yang jelas tentang fenomena tersebut. Hasil penelitian menunjukkan bahwa terdapat beberapa inovasi yang dilakukan oleh Bank Sampah seperti tabungan sampah yang dapat digunakan untuk membiayai kebutuhan sehari-hari seperti pendidikan, kesehatan, dan aktivitas sosial. Bank tersebut juga telah memanfaatkan teknologi informasi dalam proses pencatatan dan pelaporan tabungan anggota. Untuk menjaga keberlanjutannya, Bank Sampah bekerjasama dengan beberapa pihak terkait seperti pemerintah daerah, perusahaan listrik negara, dan beberapa pebisnis sampah lokal. Terdapat beberapa faktor yang mempengaruhi kesuksesan bank tersebut diantaranya pemahaman terhadap jaringan bisnis, kemampuan untuk memposisikan diri dalam bisnis, dukungan pemerintah daerah, dan keterlibatan aktivis lingkungan.

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1. Introduction

Municipal waste management (MWM) has always been an interesting and a core issues for discussion. Municipal waste became a serious problem which need to be tackled effectively around the world, particularly in developing countries (Potdar et al., 2016; Guerrero et al., 2013). It has directly or indirectly resulted various problems such as environmental pollution, soil degradation, health disturbances, and natural disaster.

The burgeoning population affected the increase of municipal waste (Potdar et al., 2016). The amount of waste cannot be separated with the population growth that occurs in each region. The higher the population leads to higher human activity and the amount of demand that will ultimately increase the volume of generated waste. Thomas Malthus in his paper in 1778 entitled "Essay on the Principle of Population" described the influence of burgeoning population to the availability of natural resources, specially food (Willis, 2005). Although he did not directly explain about waste, his arguments were quite important in describing the higher of the waste volume. The increase the population will affect the increase of the waste. Malthus stated that although the number of children of each family has remains the same, the population will grow geometrically because there will be more people who have children in each generation (Willis, 2005). It does not grow arithmetically. It shows that the population growth is going so fast. The higher the volume of waste is directly proportional to the need of waste management in which represents a significant proportion of the municipal budget (Lohri et al, 2014; Scheinberg et al., 2010).

MWM is also a major urban problem in Indonesia, particularly Malang. Its position as education and business center engender Malang as a city which has high population. It becomes a problem that should be solved immediately particularly related to the waste generation. Around 90% of the municipal waste are household waste (Hidayat, 2015). The number continues to increase along with the increase of population in Malang. Therefore, it is needed to be tackle by managing the municipal waste.

Waste management is an activity and action taken to manage waste from its source to final disposal. Therefore, it is not surprising that waste management is often understood as collecting, transporting, and disposing waste. Waste management is quite significant in order to minimize negative impacts that may be generated. However, this traditional waste management system that manage waste until final disposal was no longer suitable. It is due to:

- a) The increasingly narrow landfill area. It is due to the increasing number of population effecting on the reduction of land because of the change of land function to the settlement and the increase of waste in every period;
- b) In the developing countries, local government spend 20 – 50% of its budget to manage waste that serve less than 50% of population. (Henry et al., 2006; Memon, 2010);
- c) The process of collecting and transporting waste spend high cost. Proses pengumpulan dan pengangkutan sampah membutuhkan biaya yang besar. For developing countries an average of 80-90% of budget was spent on the collection and transportation process (Medina, 2008); and
- d) Globally, landfills are the third largest source of methane, responsible for 14% of estimated global methane emissions (Lino & Ismail, 2013).

Therefore, innovative approach is needed to optimize management process. Waste management can be directly conducted from source of waste. Central government formulated Act No. 8 year 2008 on waste management. In the Act regulates waste management from its source through 3R principle (Reduce, Reuse, Recycle).

In order to realize, an innovation of waste management emerged through establishment of Malang Waste Bank (MWB). Waste Bank is one of the alternative solutions that have been implemented to optimize waste management process. This alternative arises because there is a potential for economic value contained in the waste. It can be seen from the availability of waste network from the upstream to downstream levels that become the main and most potential livelihood for some people. Thus, with the Waste Bank, society can take advantage of the economic value of waste in order to improve their welfare and needs. The implementation of Waste Bank in Malang was considered successful in waste management. It can be seen from the number of customers (+24,000) with profit reach 50 – 60 million/ month with the total average transaction 8 million/ day. In addition, Malang Waste Bank (MWB) also managed to change the mindset and culture set of society in caring the environment.

This paper describes practice and implementation of Waste Bank in Malang City. There are many Waste Bank in Indonesia, but they have different management process and system depending on the innovation made by each Waste Bank. Therefore, this paper attempts to describe innovations conducted by MWB to manage waste in Malang. In addition, this paper also describes the main factors effecting the success of the MWB in waste management. It will give advantage for another

Waste Bank or society who want to create waste bank in managing waste.

2. Research Method

This paper used qualitative method to describe innovation conducted by MWB in managing waste in Malang district and increasing socio-economic welfare of society. Thus, data and information were generated from semi structured interview and documentary analysis. Researcher developed and used an interview guide that contain a list of questions for interviewing. The interview was conducted with the head of MWB and some related respondent interested with waste management in the amount of 10 persons. While documentary analysis, on one hand, related to waste management and its innovation in products and services, and the othe hand documents that indirectly related to the MWB such as company profile, savings book, product promotion, etc. In addition, Focus Group Discussion (FGD) was also conducted in order to get relevant and clear information. Information obtained through FDG cross check with the information obtained from the interview and research objectives. FGD was conducted with some stakeholders such as: head of MWB, society members, local government officer and environment activists.

3. Theory

3.1 Innovation Concept

In this very dynamic world era, the innovation will be quite significant for organization sustainability. The innovation could increase and give positive impact to the organizational performance (Suhag et al, 2015; Odumeru, 2013). Said (2007) described innovation as a planned change by introducing technology and the use of new equipment in the particular organization and/or improvements of method in order to achieve efficiency. It is mean that innovation was understood as technology utilization in the particular organization. Thus, most of organization translated innovation by using new technology – currently as information system technology – in order to achieve their goals. However, another perspective about innovation was provided by Hamel. He described innovation as the transition from principles, process, and practices of traditional management or the shift from an old form of organization that has significant influence on the way of management (Ancok, 2012). In his description, he tried to provide knowledge that in this globalization era, the innovation could not only be understood is technology change and improvement, but also the change of management system and strategy in running particular organization. However, the two opinion gave us

understanding that innovation is planned deliberate effort conducting by particular organization to make changes.

Furthermore, a more comprehensive explanation about innovation was described by Halila and Rundquist. They describe that the term innovation was generally divided into three types of innovation i.e. product innovation, process innovation, and organizational innovation (Halila and Rundquist, 2011). Similarly, Muluk (2008) was also described that there are five types of innovation, including:

- a) Product innovation, i.e. services coming from the change of product;
- b) Process innovation, i.e. sustainable changes in quality that relies on organizational and procedures changes as well as policy needed in the organization;
- c) Method innovation, i.e. there are new ways in service provision;
- d) Strategy innovation, i.e. relies on new vision, mission, and strategy according to the fact; and
- e) System innovation, i.e. changes in governance.

3.2 Community-based Environment Governance

The increasingly dynamic development of the world results a high level of demand both in quantity and quality. It made government difficulties in providing optima services. Besides, the top-down approach is no longer suitable to be applied (Senyk, 2005). It initiated society to participate in the governance process. Morse (2004) stated that community always has awareness in building a better living by their own. Community has a power to build and manage on their own and create their own “governance” based on knowledge and value they have. In this concept, government can be facilitator for the society or citizens in planning, management, development, and policy making for a community as a whole.

4. Results and Discussion

4.1 Portraits and Partnerships of MWB

MWB is a cooperative institution focusing its activities on the creation of community welfare through waste management (Hidayat, 2015). The institution was established on November 15, 2011 initiated by the City Government of Malang through Department of Hygiene and Gardening of Malang. In the establishment process, the City Government embraced group of environment activists and cooperated with National Electric Company (NEC) through the utilization of Costumer Service Responsibility (CSR) of the NEC.

Although initially the institution was initiated by City Government, but in its development MWB become

partner of the City Government in supervising, training, and assisting community in waste management according to 3R principles (Reduce, Reuse, dan Recycle). For the City Government and NEC its role remains as supervisor and fulfilment of facilities and infrastructure. In order to support the MWB activities, the City Government assigned its agent namely Department of Hygiene and Gardening to be member administrators of MWB. In order to optimize the process, the City Government also placed its employee as Head of Technical Service Unit of Waste Management and Wastewater in Hygiene and Gardening Department. This will certainly be more effective because the employee can do work in two institutions with relatively similar job duties. It was also supported by his profile as a waste activist.

Figure 1 Involving Actors in Waste Bank development
Sumber: Analytical result, 2018

In its progress, MWB also expanded its partnership with other institutions, both government and non-government institutions. Partnership with other government institution was conducted with provincial government through Ministry of Environment. While partnership with non-government institution was reached with NGOs, mass media (like Kompas), and local waste businessman.

MWB uses economic approach in managing the institution. It also included in its jargon of "Turning Waste into Blessing". Therefore, MWB's initial approach is changing people mindset on waste, from waste to economic value. This approach is then able to attract people to join with MWB because of economic benefits will be taken from the goods they usually throw away.

MWB costumers consist of individual and group. Each costumers must be registered by meeting the specific requirements. Individual customers are costumers who come directly to MWB by bringing disaggregated waste. While group costumers consist of group of people consisting of at least 20 persons, schools with teacher involvement, and students with at least 5 classes or 40 students as well as office and market. The group costumers should not carry their own waste but can be picked up at locations with a minimum

weigh of 50 kg. Every registered costumers (individual and group) will get training on sorting, crafting, and managing organic waste.

The main products of MWB include 70 types of household waste sorting through empowerment, recycling manufacture, production and sales of plastic counters, composers, cultivation of worms and biogas. The costumers as the main supplier of waste will get benefits in the form of savings, savings and loan services, buying and selling basic needs, electricity payment services, and health services. All services can be gotten by waste utilization. For example, in order to buy foodstuffs and pay electricity, the costumers must not have to pay by using their money, but they can pay by waste they collect from their daily activities. In other word, using community waste can be helpful to meet basic daily needs, improve economic well-being, and improve health quality.

With those activities, MWB was able to develop and change the mindset and culture set of society. Total transaction per day is considered large that on average about 8 million/day. It means that the average of total of MWB transaction is almost 3 billion in a year. It is linear with the number of customers owned. The number of MWB customers currently reaches +24.000 including 500 community group, 195 school units, 175 agencies/companies/ hotel, 1200 individuals, and 30 unit of stalls and collectors. In addition, MWB can also change mindset and culture of society toward environmentally friendly. MWB has been able to change the habits of people who once dispose waste to river and other open places toward sorting and depositing directly to MWB. Coaching and training conducted by MWB has also had a positive impact on community awareness to the environment.

4.2 Innovation of Waste Management in MWB

Waste Banks have spread around Indonesia. The banks have same goals namely to reduce waste from the source of the waste. In addition, the existence of the Waste Banks is also expected to improve society welfare and their awareness toward environment. Most of waste banks have similar management in which through waste recycling.

Nevertheless, every waste bank will make innovations to ensure the sustainability of activities and realize the goals of the organization. Innovation can be reached both in the process of waste management and the management of organization itself. It will be the main point differentiated a particular waste bank with the others. The success of each Waste Bank to create innovation will affect the success of the Waste Bank in realizing its objectives.

When viewed from the establishment process, at first glance, there is nothing special, especially in term of initiator. The establishment of MWB was initiated by City Government through Hygiene and Gardening Department. With the government initiation usually, the activities will be easier to run. There is legal framework that be able to guarantees every activity. In addition, the legal framework represents funding support of the government itself. However, if we look forward, there is differentiator which then plays big role on the MWB journey in waste management. It can be seen from the strategy of City Government in forming MWB. In the establishment, City Government embrace the environmental activists, especially waste activists to get involve in it. With the government support, the activists will be more flexible and have a legal guarantee in running waste management activities. The government also gave alternative strategies (like utilization of Mata gas) to the activists in running their activities. Some innovation also derived from community such as cultivation of worm, composting, ethanol manufacture, and the establishment of MWB itself.

Innovation can also be seen form the services offered by MWB. There are 70 types of waste that can be purchased by MWB from customers (individual or group). The 70 types of waste will be sorted into 100 types of waste in accordance to market demand. The process of buying and selling can be done with the system of direct payment or in the form of savings. The customers can use it to buy basic needs, pay electricity, pay health insurance, recreation, etc. The price of goods with savings system is more expensive comparing with direct payment process. There are seven types of savings offered by MWB, namely:

- a) Regular savings, ie savings that can be taken at any time;
- b) Education savings, ie savings taken at the time of the new school year or if there is a need to fund the children's school;
- c) Eid savings, ie savings that can be taken at the time of Eid to meet the needs of Eid;
- d) Basic needs savings, ie savings taken in the form of staple goods according to customer demands in a certain time in accordance with the egreement and amount of savings;
- e) Social savings, ie savings intended to provide scholarship, help orphans, mosque establishment, etc;
- f) Savings for environment, ie savings aimed at financing the environmental management such as plant purchase, provision of garbage, carts, composers, recycling mechines, etc of supervised group in accordance with customer demand and savings; and

- g) Health insurance savings, ie savings intended to pay health insurance. Customers sell the waste in accorndance with the formulated price that can be used to pay the insurance. Thus, the customers will get free health services.

In order to ensure the development and sustainability of its activities, MWB conducted cooperation with various partners. Cooperation was not only conducted with government actors, but also with private, schools, and mass media. For example, in order to maintain the sustainability of waste prices, MWB cooperated with many partners, stalls, and factories. With its ability to maintain price stability, MWB is able to control the price of waste. Currently, MWB's price become the benchmark of the collectors and stalls in the city of Malang. Even, some types of plastic waste have a higher price because there is a process of plastic casing digs.

In addition, the innovation can also be seen from the utilization of electronic information management system in providing customer services. MWB has utilized an electronic-based Management Information System (MIS) to record and report customer deposits. With the MIS, customers can see the list of waste traded by MWB and the list of account to see the total balance of customers in MWB. In addition, managers can also see the amount of waste bough every day and the total amount of waste that enters each period.

4.3 The Supporting Factors Determining Waste Management of MWB

The waste management of MWB was determining by several supporting factors. First, an understanding toward waste business network and the ability to take place its position in the business. The first thing that managers do was to survey the waste business network (stalls/ collectors, home industries, grinders, and factories). Then, they determined the type of waste marked based on the survey that was on the local, regional, and national market. The last was to set the type and price of the purchased waste and sales plan in the local, regional, or national market. The understanding of the waste business opened the mindset of the managers about the economic value of waste. In addition, it also determined the sustainability of the waste business because the managers understood where the waste will be sold and what the selling price is.

Therefore, positioning in the waste business network also gave a major impact to the success of MWB. The positioning could be seen from MWB's ability to provide was and possible profitability in each position. In addition, this position was also influenced by the presence of competitors in the business network. It determined the MWB to decide where the MWB want

to compete with such as small business (scavengers and rags), business people (small and medium stalls), or big businessmen (grinders or factories). The success in determining the position of MWB in the waste business network greatly affected the optimization of profit and sustainability of MWB in running waste business.

Second, there is support from government and other institutions in conducting waste management. Government support is quite important with regard to give formal legal aspects. Government support through government policy made MWB become a legal organization that more freely to do its activities. In addition, government support was also provided by providing financial support in order to support the sustainability and develop MWB's business. The support was not only give benefit to the MWB, but also the government in accordance to create a clean and health environment. In addition, the support also provided by other organization like mass media and NGOs. There is wide role of mass media and NGOs specially to explore the existence of MWB and its role in social development. It gave impact to the acceptance and utilization of MWB by society. Thus, MWB's activities can be more effective and efficient with the support of various organization.

Third is the community involvement especially waste activists in the process of establishment and implementation of MWB's activities. The activist's involvement made the MWB's activities can be conducted more effective and efficient. Many innovations generated by the activists mainly relate to waste utilization such as cultivation of worm, composting, utilization of methane gas for electricity, passion fruit cultivation, and ethanol manufacture. In addition, the involvement also greatly affected the resilience of MWB in conducting its business.

From the description above can be understood that there are several important aspects affecting the success of the bank in carrying out its activities, namely institutional aspects, regulatory aspects, financial aspects, community participation, and understanding toward waste business network. The idea of managing waste from the source was quite difficult to be realized without forming a particular institution as MWB cooperative. In addition, government support through formulated policy was useful if ensuring the MWB's activities. Financial support was also significant and influential in improving MWB's productivity. The involvement of surrounding community especially waste activists was also significant in giving innovation of waste management that led MWB's activity can run smoothly and ensure the sustainability of the activities. The last was the market determination. It can be seen from the understanding of managers to the waste

business network. The last two aspects are the most significant in the process of waste management in the form of waste bank and giving differentiate with other waste management.

4.4 What should the Government do to Develop MWB?

Although the government played an important role in the formulation and development of MWB, the increase support from the government is still needed. The increase support will increase MWB productivity which will ultimately improve the welfare of community. In addition, it will also make it easier for government itself to realize its objectives especially related to realization of a clean, health, and beautiful environment. As explained before, government plays a big role in developing institutional aspects through guidance, regulation, and financial provision. Those aspects are very important to ensure the sustainability of MWB.

However, on the other hand, - in the waste business network – MWB will always be faced with various competitors in small, medium, and large scale who always try to expand their market day to day in order to maximize their profits. If the MWB does not expand its market, it will not impossible that the competitors will dominate the market and give effect to the sustainability of MWB. Government support to expand market can accelerate MWB's effort to expand its market. Market expansion efforts can be done by the City Government by identifying market outside the area of Malang city and cooperating with the relevant government.

In addition, there is lack of community participation on waste management. There are still many people who have not focused on the waste. Most of the community did not think yet that waste is a serious problem. In can be seen that many people in Malang city garbage in any place such as river, roads, trenches, and other public place.

Therefore, community participation in waste management needs to be improved. It can be realized by promoting waste utilization. In addition, government can also promote the existence of MWB and the benefit that can be obtained by joining MWB. This promotion should be focused on people who have not joined MWB.

Those alternatives will increase MWB productivity in waste management and expand the its market as a place for selling and processing waste. It, of course, will accelerate the activities of MWB and improve the welfare of community, particularly those who participate in waste management.

5. Conclusion

MWB was born because of the initiation of city government of Malang through Department of Hygiene and Gardening in order to create clean and comfortable environment. However, in its progress, MWB become partner of the city government in developing, training, and assisting the community in waste management according to the 3R principles (Reduce, Reuse, and Recycle). In order to maintain its sustainability of its activities, MWB cooperated with NEC by utilization of NEC's CSR mainly to improve the availability of facilities and infrastructure. MWB also cooperated with other agencies such as provincial government, NGOs, mass media, etc.

Innovation was conducted to build MWB by embracing waste activists in Malang. From the activists then came up some ideas such as cultivation of worm, composting, utilization of meta gas for electricity, passion fruit cultivation, ethanol manufacture, and establishment of MWB itself. Innovation can also be seen in the service provided by MWB. There are seven type of savings that can meet with basic needs of the society. The success of the MWB was determined by the manager's understanding toward waste business network, and the financial and institutional support of government.

However, there are several things that need attention and support from local governments to improve MWB productivity and business. That is related to the level of community participation in waste management and market expansion. Participation level can be established by increasing awareness toward waste.

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