

## **Analysis of the Business Model of Waste Bank in Indonesia: A Preliminary Study**

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### **ABSTRACT**

The waste generation growth in Indonesia has reached 64 million tons in 2015 and shown increasing trend overtime. This issue occurs because of the people's habits in handling waste by disposing it into open sewage or disposal without sorting organic and inorganic waste with no further processing. To overcome this issue, a waste management initiative, namely "Waste Bank", has been implemented recently in Indonesia. As one of the community-driven initiatives, the waste bank existence can influence patterns of behavior and economy of the society. This study aims to explore the implementation of waste bank in Indonesia. To achieve the objective, the business model of waste banks in Indonesia are analyzed by synthesizing secondary data related to the waste bank's strategy and its impact in Indonesia. Waste banks that exist in Indonesia in terms of business model are classified into four groups: savings, health, community entrepreneurship, and energy.

*JEL Classifications: K32, L26, L31, I18*

*Keywords: waste management; waste bank; business model, Indonesia*

## I. INTRODUCTION

The rapid changes on urbanization, industrialization, and economic development have caused the increase of waste generation. Waste is defined as leftover material that is not considered directly used because of human activity. There are two types of waste, namely organic and inorganic waste, which are then sub-classified into two groups: household and non-household waste. Yudoko (2000) underlined that the growth in household consumption is proportional to the increasing amount of household waste. In developing countries such as Indonesia, the main source of non-household solid waste comes from commercial establishments, markets, institutions, street cleanings, hospitals, and manufacturing businesses (Yudoko, 2000). Every country has concentrated on addressing waste management issues. Issues such as lack of proper disposal, long-term planning policies, scavenging, the growth of population in urban centers, the use of inappropriate technology and equipment, and the insufficient knowledge of the basic principles are some of the problems faced by developing countries in dealing with Solid Waste Management issues (Diaz, 2011).

In the context of waste management, open dumping and burning waste become common practices in Indonesian community. More than 90% of districts/cities in Indonesia implement these practices. The amount of waste generation in Indonesia has reached 175,000 tons/day or equivalent to 64 million tons in 2015 (Kementrian Lingkungan Hidup, 2015). Data in 2012 showed as much as 69% waste was transported to final disposal area, 10% was buried, 7% was composted and recycled, 5% was burned, and the rest (7 %) was not managed. With this pattern, land requirement for the final disposal is expected to increase to 1,610 ha in 2020 (Kementrian Lingkungan Hidup, 2015). On the other hand, although only providing minor contributions, waste pickers or scavengers hold an important role in the waste management. Non-household solid waste that has a sale value is collected by them to be recycled or sold to junk collectors (Moreno-Sanchez and Maldonado, 2006).

Waste Bank is one of the waste management initiatives that have just been implemented in Indonesia following the Law No. 18 of 2008 on Waste Management and the Government Regulation No 81 of 2012 on Household Waste Management. The regulation has mandated the need for a fundamental paradigm shift in waste management, from a paradigm of collect-transport-dispose into a paradigm of processing that relies on waste reduction and handling (Kementrian Lingkungan Hidup, 2013). Waste bank is a social innovation to educate people to sort waste and raise public awareness in the processing of garbage transported to a waste disposal. Waste bank is established to improve the lack of awareness of the public on waste segregation and waste reduction by using the 3R approach (Reduce, Reuse, and Recycle). The development of waste bank in urban and rural areas showed a positive trend on the level of public interest in terms of waste management (Kementrian Lingkungan Hidup, 2013). Further, some waste banks in Indonesia implement creative policies to attract the attention of the community to participate in 3R actions.

The purpose of this paper is to analyze the business model of waste bank implemented in several regions in Indonesia and to observe the key issues and analysis of internal and external policies of the waste bank. To achieve the objective of this paper, the business models of waste banks in Indonesia are analyzed by synthesizing secondary data related to waste bank to see the level of effectiveness and efficiency of its

implementation. Moreover, the analyzed data is used to formulate a strategy that is effective and efficient for improving the quality and the role of a community-based development.

## II. LITERATURE REVIEW

### A. Waste Bank

Waste Management is a systematic and continuous initiative covering waste reduction and handling. The current development of waste management in various countries aims to utilize waste and yield value for money. In addition to go “green”, waste management can contribute to boost business opportunities through the 3R approach (Reduce, Reuse, and Recycle) (Nahal, Lucas-Leclin, and Dollé, 2013). Waste management activities with profit schemes will invite Green Investment to engage in these activities, which involve social factors, environmental factors, decision-making factors, government factors, and financial analysis factors (Malletta and Michelson, 2010). The presence of the green investment phenomenon attracts investors to contribute in reducing global warming for sustainable growth in addition to profitability. This supports the principle of eco-preneurship, where they focus on profit that also brings good impact to the environment by solving problems in the community through the greening of the bottom line (gunawan and Dhewanto, 2012). Green business activities that occur indirectly involved the surrounding community. Therefore, it will create social innovations that can develop a mutually beneficial long-term relationship between stakeholders through community-based entrepreneurship (Ulfah and Dhewanto, 2014). Green business activities in waste management are also done in Nigeria. Although the Nigerian government has limitations in managing waste, and business opportunities from waste are actually utilized by large private companies. They manage and take advantage of the waste collected and offer a higher price in paying workers than the government (Nnaji, 2015). Unlike what happens in Darjeeling, West Bengal, India, waste management is done by selling inorganic waste that has value to the junk collector and they are recycling the product informally (Pradhan, 2009).

Waste has a selling value as it is affirmed by various countries that see waste has opportunities for business and in terms of environmental management. This is the same in Indonesia, where one of the interesting waste management practices to get involved in is known as waste bank. Waste Bank began to be known in Indonesia in 2008. In 2012, the Ministry of Environment implemented a policy for the development of waste bank in 250 cities in Indonesia (Kementrian Lingkungan Hidup, 2012b). Waste bank implementation adopts the banking system through the activities of saving and borrowing money equivalent to the value of waste deposited in the bank. Waste Bank will buy the waste deposited from the customers and then sell them to various partners (Salim, 2013). The 3R approach (Reduce, Reuse, and Recycle) is also adopted. In this case, deposited waste must be sorted properly and every customer will have a saving book, each containing a nominal value of money by selling waste to the waste bank. Improved sorting and waste collection system with salaries, conducted by informal recycle may motivate customers to work harder, and to reduce the impact of disease from waste that they get from the landfill (Singh *et al.*, 2014). Waste banks support local economic activities by involving the role of the community (as customers or managers of banks)

and the government, as well as providing incentives for communities to improve the local economy through a clean environment and community empowerment (wulandari, Utomo, and Narmaditya, 2017).

Furthermore, the World Bank defines that Community Driven Development approach has a control of the resource investment and planning decisions for community groups and local governments (Raj and Relton, 2013; Owen and Vercruysse, 2014). It operates on the values and norms of local empowerment, administrative, accountability, and local capacity building. The construction of Waste Bank in Indonesia is aligned with this approach. Judging from the characteristics of existing waste banks in Indonesia, the waste bank activity is another form of green entrepreneurship, where green entrepreneurship is about how to take advantage of niche business or limited target market by serving the community and contribute to preserve the environment (Harini and Meenakshi, 2012) which also supports green investment opportunities from investors (Malletta and Michelson, 2010).

#### **B. Waste Bank's Regulation in Indonesia**

Article 4 Law No. 18 of 2008 underlines that waste management aims to improve the quality of health and environment by involving waste as a resource (Kementrian Lingkungan Hidup, 2008). As one of the waste management initiatives, waste bank is creatively applied in various regions in Indonesia. Waste Bank is a merger of the banking concept with 'junk collectors' concept. The Ministry fully supports the manufacture of the waste bank as an alternative solution to the reduction of waste dumped into the final disposal. This is supported by the mandate of Law No. 18 of 2008 on Waste Management, and Government Regulation No. 81 of 2012 on Household Waste Management, on the need for a paradigm shift from a collect-transport-disposal paradigm into processing paradigm (Kementrian Lingkungan Hidup, 2012c). To support the activities of waste banks in Indonesia, the government, through Law no. 13 of 2012, also implements the waste bank's integration model with Extended Producer Responsibility; the objective is for manufacturers to take responsibility for recycling as appropriate. The models are also reflected in the activities and benefit from the presence of the waste bank for all stakeholders involved (Kementrian Lingkungan Hidup, 2012a). Their CSR through waste banks is a form of responsibility for the welfare and improvement of people's living standards (social responsibility) and responsibility to the environment because they have managed the natural resources for the benefit of the company (Nurjanah, Karsidi, Muktiyo, and Habsari, 2017).

### **III. METHODOLOGY**

This study applies qualitative research methodology by exploring existing literature related to waste, waste management, waste bank, and its implementation in Indonesia. In general, it consists of two steps. Firstly, the textual analysis of the underlining social, environmental, and potentially economic issues drives the necessity of waste bank management. This textual analysis has been described in the previous section through exploring existing literatures related to waste bank.

Secondly, data collection and analysis on Indonesian waste bank are organized. As a preliminary study, this paper using secondary data for the analysis, which then

followed by business model analysis, SWOT analysis, strategy development, and recommendation. Business model analysis is a description of business activities that have value logic in how to create and capture customer value. These activities can be represented by the relevant elements such as meeting customer dimensions including customer expectations, the proportion of the value offered, forms of organization, and financial or economic conditions (Fieft, 2013). This aligns with (Dellyana, Simatupang, & Dhewanto, 2016), that business model is a business activity in meeting customer expectations.

SWOT analysis is a well-known tool that has advantages to provide qualitative information in an organized manner (Brooks, Heener, and Henderson, 2014). SWOT analysis (strengths, weaknesses, opportunities, and threats) is a strategy based on internal and external analyses. The output of the SWOT analysis is to optimize the company's resources with the environment, build strength, and adopt a strategy to avoid weaknesses, exploit opportunities, and resist threats. SWOT Analysis is used to locate and gain a sustainable competitive advantage (Friend and Zehle, 2004). SWOT can be an excellent tool in helping map out the strategy or to achieve the growth of the company or community (Brooks, Heener, and Henderson, 2014).

#### **IV. RESULTS AND DISCUSSION**

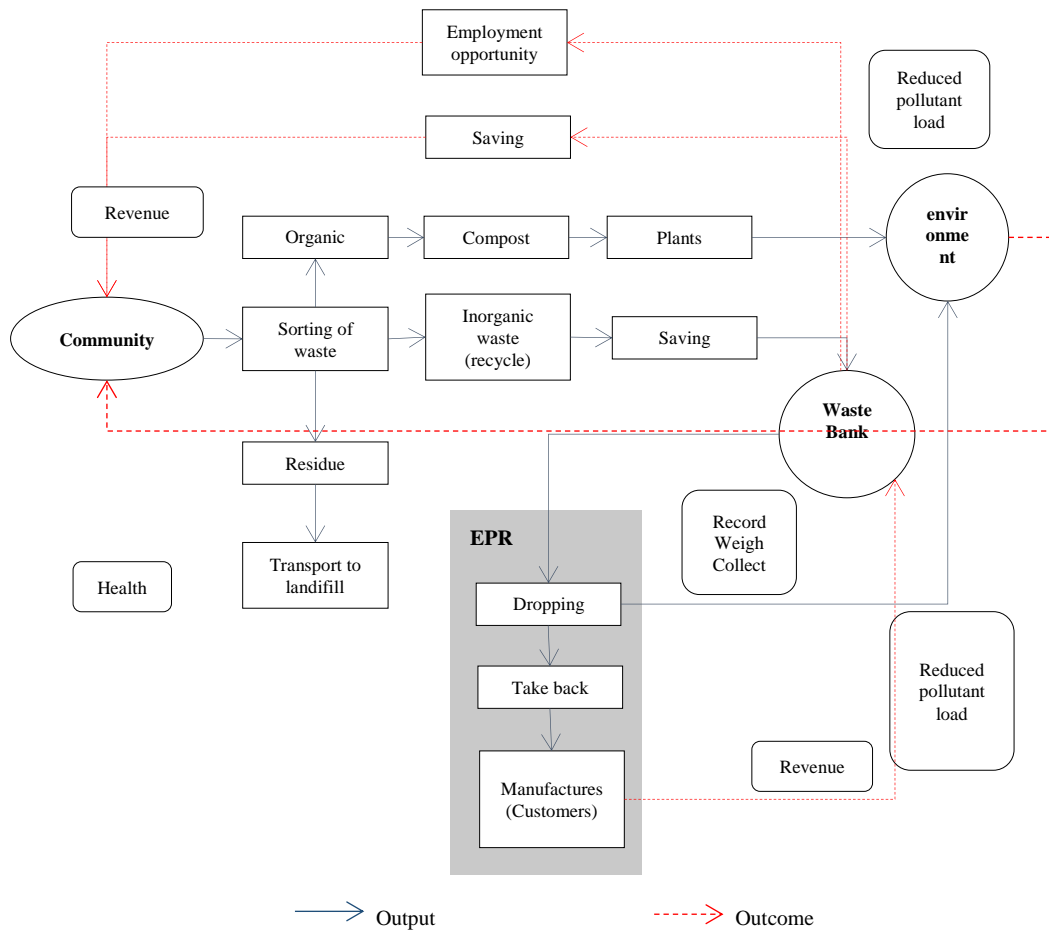
##### **A. Waste Bank Development in Indonesia**

The concept of waste bank was firstly introduced in Indonesia in 2008, and began its popularity in 2012. One of the Waste Bank pioneers in Indonesia is Waste Bank Gemah Ripah in Bantul, Yogyakarta (Bank Sampah Gemah Ripah, 2008). In 2012, the Ministry of Environment of Republic Indonesia began to give considerable attention to the development of waste banks in various cities in Indonesia. It aims to reduce the growth rate of waste in Indonesia, since the increasing waste generation in Indonesia has reached 175,000 tons/day or equivalent to 64 million tons/year in 2015. The biggest challenge is the handling inorganic waste that is not environmentally friendly. Starting in February 2012, as much as 471 waste banks were established and able to manage waste up to 755,600 kg/month, with the number of customer around 47,125 people. This number has been increasing over time. In May 2012, it even showed an increase nearly to 100% on a number of waste banks and the amount of waste managed. The number of waste bank in May 2012 had reached 886 waste banks, and able to manage the waste up to 2,001,788 kg/month with the number of customers up to 84,623 people and the turnover value reached Rp. 3,182,281 billion/month (Kementrian Lingkungan Hidup, 2012b). In 2015, the 2.861 waste bank in Indonesia is able to manage the waste up to 5,551 tons/month, and able to increase up to Rp34.3 billion rupiah transactions/month, with the total number of customers reaching 175,413 people (PPID Kementrian Lingkungan Hidup, 2015). From the 64 million tons of waste generation in Indonesia in 2015, the waste bank is only able to manage the waste up to 66,612 million kg or being able to contribute to the handling of waste by 0.1% nationally. Despite the small number, the existence of waste banks is able to influence patterns of behavior and society's economy around. In general, there are three ways of establishing a waste bank, which is established by a local government, established by a large company through CSR funds, and independently established on personal initiative.

**B. The Mechanism of Waste Bank**

Regulation of the Ministry of Environment No 13/2012 underlines that waste bank has an important role as a collection/dropping point, and holds the Extended Producer Responsibility (EPR). EPR requires all manufacturers (factories, importers, distributors, and retailers) to be responsible for the product life cycle. With product recall, customers will receive nominal cash as a form of appreciation for the waste that has been sorted. Each type of waste deposited will be valued according to the prevailing price of waste, which will then be recorded in the saving book. Subsequently, waste deposited will be purchased by the manufacturer or fellow junk collectors for further processes.

**Figure 1**  
The integration of waste bank application with extended producer responsibility (EPR)



Source: Ministry of Environment Regulation No 13/2012 (Kementrian Lingkungan Hidup, 2012a)

Figure 1 shows the EPR (Extended Producer Responsibility) scheme implemented by the government in waste management through waste bank. The core of EPR on waste bank is a drop point of inorganic waste from the community to be taken back by the manufacturer with a green activity-based management business. There is a mutually beneficial activity that is generating revenue for customers who sell the waste to the waste bank and the waste bank that sells waste collected to needy producers. The surrounding neighborhood also feels the impact directly and indirectly, such as the reduction of environmental pollution, employment opportunities and as a means of sharpening skills in managing and providing added value to the inorganic and organic waste. This green entrepreneurship activity also plays an important role for socio-economic development where it improves the efficiency in waste management that provides benefits and answers any problems related to waste in Indonesia.

One of the waste banks applying the EPR scheme is the Waste Bank Malang (Bank Sampah Malang, 2013). Waste Bank Malang implements a centralized waste bank system and waste bank units, where the waste bank units are managed by schools and other community groups. The function of the waste bank unit is to collect the waste (inorganic and organic) that has been deposited by the customer that will then be sent to the central of waste bank in Malang (Waste Bank Malang). The waste bank unit (branch of waste bank) is helping customers to get fast service with strategic location, and provides customer transactions (weighing, recording, and saving money withdrawal transactions). The common types of inorganic waste deposited are plastic, paper, zinc and iron, aluminum, bottle and glass, and brass and copper. The function of waste bank unit is not only as a place to deposit the waste that is close to reach, but also as a means to train the skill in making recycled creations product from inorganic waste and as media of counseling and socialization of the benefit of joining the waste bank program to the surrounding community. The activities in the central waste bank are similar to the activities in the waste bank units, the addition activities in the central waste bank is waste processing activity. Therefore, the waste sold to the producer has a higher selling value.

### **C. The Business Model of Waste Bank**

The focal point of waste bank is the local needs and characteristic, through a community-driven development. The waste bank implementation in Indonesia can be classified into four business model groups, consisting of savings, health, community entrepreneurship, and energy. Table 1 describes the profile of waste bank for each business model group.

**Table 1**  
Profile of Waste Bank

<b>Business model of waste bank</b>	<b>Name of waste bank</b>	<b>Work area / service</b>	<b>Key Activities</b>
<b>Saving</b>	Waste Bank Malang, Established since 2011	The entire area of Malang City (57 urban villages)	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, saving money, cash withdrawal)</li> <li>2. Counseling about waste</li> <li>3. Cleaning the waste collected</li> <li>4. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>
	Waste Bank Cimahi, Established since 2014	The entire area of Cimahi City	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, saving money, cash withdrawal)</li> <li>2. Counseling about waste</li> <li>3. Cleaning the waste collected</li> <li>4. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>
<b>Health</b>	Garbage Clinical Insurance (GCI) Managed by Indonesia Medika Company, Established since 2010	Gadang District, Malang City	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, health insurance)</li> <li>2. Counseling about waste</li> <li>3. Treatment service</li> <li>4. Counseling about health in clinic</li> <li>5. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>
	Waste Bank Resik Established since 2012	Kendal Regency, Central Java	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, health insurance)</li> <li>2. Counseling about waste</li> <li>3. Treatment service</li> <li>4. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>



**Table 1**  
Profile of Waste Bank (continued)

<b>Business model of waste bank</b>	<b>Name of waste bank</b>	<b>Work area / service</b>	<b>Key Activities</b>
<b>Community entrepreneur-ship</b>	Waste Bank Rosella Established since 2010	The entire area of south Jakarta	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, saving money, cash withdrawal)</li> <li>2. Counseling about waste</li> <li>3. Adding value to the waste that has been collected</li> <li>4. Creating and selling recycled products (inorganic waste) by empowering housewives around the Waste Bank Rosella</li> <li>5. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>
	Waste Bank Butik Daur Ulang, Established since: 2010	The entire area of Yogyakarta	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, saving money, cash withdrawal)</li> <li>2. Counseling about waste</li> <li>3. Adding value to the waste that has been collected</li> <li>4. Creating and selling recycled products (inorganic waste) by empowering community around the Waste Bank Butik Daur Ulang</li> <li>5. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>
	Waste Bank Campurejo, Established since 2016	Campurejo Village, Bojonegore Residents	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, saving money, cash withdrawal)</li> <li>2. Counseling about waste</li> <li>3. Adding value to the waste that has been collected</li> <li>4. Creating and selling recycled products (inorganic waste) by empowering community around the Campurejo Waste Bank</li> <li>5. Making plastic pellets from plastic waste</li> <li>6. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>

**Table 1 (continued)**  
Profile of Waste Bank

<b>Business model of waste bank</b>	<b>Name of waste bank</b>	<b>Work area / service</b>	<b>Key Activities</b>
<b>Energy</b>	Waste Bank Posko Hijau Managed by Posko Hijau Foundation Established since: 2010	Bandung City	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, saving money, cash withdrawal)</li> <li>2. Counseling about waste</li> <li>3. Adding value to the waste that has been collected</li> <li>4. Making biogas and compost (organic waste) for community around the Waste Bank Posko Hijau</li> <li>5. Low quality fuel oil (mixed plastic waste)</li> <li>6. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>
	Waste Bank My Darling	Bandung City	<ol style="list-style-type: none"> <li>1. Waste transaction activities (weighing, recording, saving money, cash withdrawal)</li> <li>2. Counseling about waste</li> <li>3. Adding value to the waste that has been collected</li> <li>4. Making biogas and compost (organic waste) for community around the Waste Bank My Darling</li> <li>5. Selling the inorganic waste collected to junk collector or manufacturer</li> </ol>

Each business model of waste bank is described below.

### **1. Savings**

As the intermediary between the customer and the junk collector, the waste bank will record the nominal amount of money equivalent to the price and the amount of waste deposited by the customers. Furthermore, the waste that had accumulated in the waste bank will be sold directly to collectors or business partners without any added value creation. Waste bank also clean up the waste collected to increase the selling price than the waste that had not been cleaned. This typical business model is most developed primarily at the newly established waste bank. The price offered is more competitive than local junk collectors. Waste bank Cimahi (Official Net News, 2014) and Waste bank Malang (Bank Sampah Malang, 2013) are the examples of successful waste banks with various innovations offered to entice communities. Money savings in both waste banks can be used to pay for household expenses, such as electricity, water, phone credits, telephone, and taxes. Another innovation launched by Waste bank Cimahi is the Waste Bank ATM (Automatic Teller Machine) card to facilitate the withdrawal of cash on the balance of the results of the waste they deposited (Kompas, 2015).

While the Waste bank Malang, also offers a wide range of savings programs to meet the needs of their customers, including the following: regular savings, education, food, feast day, social care, and the environment to serve loans. Even some of the waste banks in Indonesia have been using online-based technology to minimize the human error (Purnama, 2015; Putra, 2016; Smash, 2016) that can be integrated between the units or between waste banks throughout Indonesia. Savings activities through the waste bank, has now turned into a lifestyle as a wide variety of innovations take public's attention, so that the result of the savings derived from waste can be used for various needs of the customer. Another activity undertaken in the waste bank with the saving business model is the empowerment of surrounding communities through training on recycled handicraft products and compost making. Although it is not the main activity, these trainings also support education on waste management to the community in practice, in addition to provide counseling on waste through seminars.

### **2. Health**

The pioneer of waste-based health insurance was Garbage Clinical Insurance (GCI) (Manido, 2014; Indonesiamedika.com, 2014) which is the first clinic based on waste insurance in Indonesia. The waste deposited by members is used as health insurance. The members will not pay in the form of money, and instead they have health insurance coverage from waste that has been deposited. This waste bank's business model is capable on solving two problems at once, namely health care and waste management. The waste collected in the waste bank is then sold directly to junk collectors or manufacturers. The profit from the sale is to cover operating costs and provide health services to customers. The main activity in the health program of this waste bank is to provide free medical treatment and free health consultation. Other activities include promoting, preventive, and rehabilitative health programs provided to customers and the environment. This business model was adapted by other waste banks, such as Waste Bank Resik Becik, in Kendal, Central Java (Official Net News, 2016) although the health

program is not as complete as GCI. This waste bank also undertakes other activities such as empowering the surrounding community in making recycled handicraft products that have selling points; because the majority of garbage that is sold to this garbage bank is inorganic waste. Those are two examples of waste banks that change the paradigm on valuable waste for health. As for lower economic class community, visiting the health institution becomes quite burdensome due to its high cost, thus the existence of waste-based health insurance provides benefit for them.

### **3. Community Entrepreneurship**

In this business model of waste banks, the waste bank managers empower local communities to be able to earn extra income from recycling waste. Two examples of the waste bank considered successful in empowering the community are Waste Bank Rosella in South Jakarta that recycles plastic waste into wedding decorations (Monalisa, 2015) and provides innovation of gold investment programs from waste (Kamilah, 2015), and Waste Bank Butik Daur Ulang that recycles various solid waste into a creation that has a sale value, also empowers women of local households to create various handicrafts (Chandra, 2016). For organic waste, it can be used for the cultivation of earthworms and compost (Bank Sampah Malang, 2013). On the other hand, to transform the plastic waste into plastic pellets that are ready for sale is also community entrepreneurship activity, creating new/added value. Plastic conversion into plastic pellets can provide additional income for the waste bank as implemented by Waste Bank Campurejo (Roqib, 2016). The economic benefit is derived from waste transformation into valuable products, job opportunities, including in the provision of counseling, and trainings related to waste management. The revenue from the business model applied is derived from profits sales of waste to junk collectors or manufacturers and sales of recycled handicraft products.

### **4. Energy**

As mentioned earlier, there are two types of waste—organic and non-organic. In this business model of waste banks, the waste bank converts waste into energy. One of the waste banks called *Posko Hijau* applies technology to manage waste into energy sources (Posko Hijau, 2014). Organic waste is converted into biogas, while the inorganic waste (mixed plastics) is converted into low quality fuel oil to run a thrasher. Turning waste into biogas energy is a phenomenon that is rife in Indonesia. Some waste banks in Indonesia begin to promote biogas program for the reduction of organic waste. It is also done by the waste bank called *My Darling* in Bandung. The result of the biogas is used by locals as a substitute for LPG (Wulan, 2014). Turning waste into energy source requires large funding to purchase the machineries. In average, the energy waste banks in Indonesia get their funding from Corporate Social Responsibility of big companies or direct assistance from the government.

### **D. Problem and Constraints**

Some technical barriers and social issues exist in the waste bank implementation. Based on the external and internal analyses, internal factors (strength-weakness) barriers are: (1) the lack of understanding of the public regarding waste bank program. There are

several aspects that can hinder the understanding of society items, namely: cultural barriers, motivation, attitude towards new things, and administrative development. (2) Human Resources—a limited number of professional with interest in waste management, due to lack of understanding on economic benefit of the waste bank. Moreover, factors that can influence the external factor (opportunity-threat) are budgeting and the regional coordination among stakeholders. A common issue appears that is caused by the inconsistency of program providers in preparing the budget required, and lack of good communication between stakeholders, such as local authorities, customers/public, waste bank management, and partners.

### E. SWOT Analysis

Based on the previous discussion, waste bank policies in Indonesia can be analyzed in terms of internal and external aspects to observe the impact of waste banks. The main strength, weakness, opportunity, and threat analysis of Indonesian Waste Bank are presented at Table 2.

**Table 2**  
SWOT analysis of waste bank in Indonesia

INTERNAL ANALYSIS	
Strength	Weakness
1. Adaptable to the environment conditions	1. Socialization is not optimal
2. Beneficial for earning additional income	2. Difficult to accept new things/ low flexibility
3. Modern system (well organized)	3. Behavior to dispose the waste in open dumping
4. Waste price is competitive	4. Human error
5. Good service from the waste bank manager and workers	5. A limited number of professionals (only as second job)
6. The strategic location of the waste Bank	6. A limited number of waste transportation
EXTERNAL ANALYSIS	
Opportunity	Threat
1. The potential market is not optimal	1. The existence of waste bank
2. Technological development	2. The rejection of the society due to the interest of some people
3. Increase the creativity	3. Vulnerable to corruption or fraud
4. Support from government and company	4. The high cost of machine (thrasher, biogas)
5. Education of a healthy lifestyle and hygiene to the communities	
6. The growth of waste generation	

## V. CONCLUSION AND RECOMMENDATION

### A. Conclusion

Waste generation has become a latent problem in Indonesia. With low awareness and

concern on healthy lifestyle and hygiene, it has caused the waste problem increased. The development of waste banks in Indonesia is becoming the innovative breakthroughs in waste management. It has fulfilled the needs of various communities, created new jobs, provided extra incomes, increased creativities, and provided health insurances for free. In practice, there are four business models of waste banks implementation in Indonesia; savings, health, community entrepreneurship, and energy. Each business model of these waste banks has its own innovation by following the community's habit around the waste bank and adjusting the waste bank program with what they need. This creates an interesting Business Model Innovation between one and the other. Supports on internal and external factors will increase the effectiveness and efficiency of the waste bank implementation. The internal factors (strengths and weaknesses) are the factors that affect the formation of the waste bank establishment. While the external factors (opportunities and threats) are the factors that shape the regulatory system and waste bank services to the community. Based on the SWOT analysis of the waste bank in Indonesia, the application and operation of the waste banks are flexibly adapted to the needs of the community and it has been made as considerable attention in community.

## B. Recommendation

Some recommendations derived from the SWOT analysis are proposed to improve the efficiency and effectiveness of waste bank: (i) Socialization to improve the effectiveness of information dissemination on waste banks in the region through door to door approach; (ii) Collaboration with junk collector is critical to avoid a conflict with the local junk collectors and also to facilitate the distribution of inorganic waste (re-sell); (iii) Standard Operating Procedure (SOP) creation as the guidance to organize and operate the waste bank; (iv) Offering a competitive smart pricing; (v) Unique programs creation as the diversification of the existing programs; (vi) Cooperation with local and central government to obtain financial assistance, marketing, training, sales, promotions and others; (vii) Technology adoption such as using online system in banking system and e-commerce.

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