Social reengineering of rubbish management (a case study on Jebres rubbish bank in Solo City, Indonesia)

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Abstract. This research aimed to build a rubbish-conscious community movement and to utilize the rubbish to obtain an economic advantage. This study was an action research using participatory rural appraisal (PRA) approach. The subject of research was people living in Jebres, Solo City. Data were collected through interview, focus group discussion, participatory observation, and documentation. Education of People Consciousness and Skill for rubbish management was conducted using reduce, reuse, recycle and replant (4R) principles. The activity stage involved socialization on rubbish bank revitalization, reinforcement of institution capacity, and stakeholder network expansion. The expansion of customers involved people surrounding the rubbish bank (general society and those living in the boarding house) and campus of Sebelas Maret University. Institution network involved kresek community, Solo City Government (Kelurahan Jebres, Living Environment Office), Perusahaan Umum Pegadaian (General Pawnshop Company), and mass media. The result of action research showed that people’s consciousness of utilizing rubbish improved thereby the effect of environmental pollution was reduced. Consciousness grew among the people to save the rubbish economically by converting wastes into precious metal (gold), and they motivated to benefit from the rubbish which so far considered as waste only.

1. Introduction
Climate change affects temperature change and environmental humidity that highly affects rubbish recycling process. The increase of rubbish volume along with the increase in population number should be reengineered socially in the attempt of reducing the increased rubbish production. Rubbish, based on the Law Number 18 of 2008 about Rubbish Management, is the residues of human daily activities and/or natural process in solid form. Government Regulation No.81 of 2012 about domestic waste management and domestic waste-like rubbish explains again that domestic waste is the one coming from domestic daily activity excluding feces and specific rubbish. Domestic waste-like rubbish is domestic waste coming from commercial, industrial, specific areas, social facility, public facility, and/or other facilities.

Rubbish is one of very complex environmental problems. Rubbish problem has been a national issue and an important issue in urban environment problem. Rubbish pile will not be reduced or used up but even it will keep increasing with the growth of human population and the higher and the more complex human activities. The ever-increasing rubbish pile over times will reduce space and harm human activities, so that the human beings’ objective to improve their quality of life instead makes their quality of life lowered due to rubbish pile [1]
Indonesia has on guidelines about the implementation of reduce, reuse, and recycle through rubbish bank [2, 3]. The existence of rubbish bank is expected to help the government deal with rubbish and improve the community economy [4] Citizen Consciousness Education and rubbish managing Skill with the application of reduce, reuse, recycle and replen (4R) principles are important to solve the rubbish problem through rubbish management from its source [5].

Social reengineering of rubbish management is a community empowerment program through rubbish bank administrators aiming to have the capacities of: (1) communicating and innovating in the attempt of promoting the rubbish bank program, (2) improving the customers of rubbish bank’s participation, thereby increasing the volume of rubbish supply and the income of rubbish bank, and (3) synergizing with stakeholders to support the sustainability of rubbish bank activity. Sustainability of rubbish bank can be characterized with the achievement of economic, social, and environmental values [6].

2. Method
Social reengineering is a community empowerment program implemented in Sawah Karang, Kelurahan Jebres of Surakarta City for 3 months (April – June 2019). The subject of activity included Sawah Karang people, administrators of rubbish bank, and related stakeholders involving Government of Kelurahan Jebres, Living Environment Office, Perum Pegadaian (Pawshop), Green Campus UNS team, and DPRD (Local Legislative Assembly) of Solo City. The activity was conducted using participatory rural appraisal (PRA) approach method emphasizing on the partner community to share each other, to improve, and to analyze the knowledge they have on their condition and life, and to make plan and to take real action [7]. The activity was organized by involving partner group’s participation with the activity structure determined through focus group discussion. The structure of activity involves preparation, program implementation, monitoring, and evaluation. The measurement of program’s success was conducted in knowledge and behavior aspects measured using questionnaire and observation. Meanwhile, the successful achievement of program was measured by comparing the condition of people or community before and after the program implementation. Table 1 shows problem identification and method employed to solve the problem in the program partner.

**Table 1. Problems and Forms of Social Reengineering Program**

| No. | Identification of the Main Problem | Alternative Solution | Program (Solution) | Form of Activities |
|-----|----------------------------------|----------------------|--------------------|-------------------|
| 1.  | Communication skills and promotion of waste bank management | Increased manager capacity | Raika (Acquiring Skill) | Communication skills training and promotion of waste bank management |
| 2.  | Limited amount of waste supply | Increasing the number of garbage bank customers | Raisa (Collecting Rubbish) | a. FGD management  
b. Stakeholder FGD  
c. Promotion  
d. SAKA Expo |
| 3.  | No synergy between the garbage bank-RT-RW-Kos student-business place | Stakeholder synergy | Raina (Acquiring Interest) | a. Stakeholder FGD  
b. MoU  
c. Regulation  
d. Investment seminar |

Considering the problem identified, the structure of program is arranged as follows: (1) Raika (Raih Ketrampilan or acquiring skill) is the program to create the psychomotor behavior of rubbish bank administrators in order to have communicating skill and to promote bravely, (2) Raina (Raih Minat or acquiring interest) aims to answer the problem of no synergy between rubbish producer and rubbish bank. The form of activities includes focus group discussion (FGD), cooperation, SAKA Expo, and
investment seminar, (3) *Raïsa* (Raïh Sampah or collecting rubbish) aims to answer the problem of low number of partner or rubbish bank customers. The program was conducted in the form of FGD, promotion, and initiation of local government regulation. Any time the administrators of rubbish bank provide promotion activity, they distribute pretest questionnaire first to the participants (prospect customers of rubbish bank), (4) monitoring and evaluation to find out the effect of program implemented on the solution to the problem encountered by the administrators of rubbish bank.

3. Result and discussion

3.1. Rubbish bank-based social reengineering of rubbish management

The social reengineering activity of rubbish management in Jebres is conducted with programs that have been arranged to achieve the objective and to answer the problems formulated. The implementation of program is conducted in participative manner by involving target group (rubbish bank administrator, partner and prospect partner, and stakeholder).

3.1.1. *Raïka (Raïh Ketrampilan = Acquiring Skill)*. The Kreasi Sampah Ekonomis or Economic Rubbish Creation (thereafter called Kresek) community give ten administrators of rubbish bank the material about techniques of communicating, promoting, and utilizing rubbish. The activity conducted includes training for communicating technique and rubbish bank creation. Furthermore, the administrators of rubbish bank are challenged to promote the rubbish bank program to community group, students living in boarding house, and business units. The successful Raïka program is indicated with the rubbish bank administrators’ bravery in promoting the rubbish bank to prospect customers for 4 (four) times.

![Figure 1. Raïka activity along with Kresek Community and Members of FWP (Family Welfare Program)](image_url)

3.1.2. *Raïsa (Raïh Sampah = Collecting Rubbish)*. The program of increasing the number of rubbish bank customers is implemented in the form of FGD and promotion. The first FGD activity was conducted by inviting the administrators of rubbish bank, administrators of RT/RW (neighborhood association/citizens associations), Kelurahan Jebres, and Living Environment Office of Surakarta City producing mapping and mutual commitment between rubbish bank administrators and 3 related stakeholders (Kelurahan Jebres government, students living in boarding house, and business unit), so that the spirit of rubbish bank administrators and the local government’s commitment to support the rubbish bank improve. To reinforce the partner group (administrators and rubbish bank customer)’s behavior, the government of RT 03/RW 23 initiates to release RT regulation about rubbish commercialization requiring the people to sort and to deposit rubbish to rubbish bank.
The second FGD activity was conducted by inviting rubbish bank administrators, RT/RW administrators, Local Village Head (Lurah), Living Environment Office of Surakarta City, Pawnshop of Surakarta area, DPRD of Surakarta City, academician in ecopreneurship field, and Green Campus UNS team. The 2nd FGD yielded an agreement to establish cooperation in optimizing the existence of rubbish bank as included in the Memorandum of Understanding (MoU).

![Image](image_url)

**Figure 2.** Raisa activity along with administrators of Rubbish Bank

3.1.3. **Raina (Raih Minat = Acquiring Interest).** Raina activity aims to answer the problem of no synergy between rubbish producer and rubbish bank. Following up FGD that has been implemented, then the cooperation agreement between rubbish bank and pawnshop (Perum Pegadaian) is ratified in investment seminar program and Menabung Sampah Menjadi Emas (Depositing Rubbish to be Gold) program and SAKA Expo in order to attract the prospect customers’ interest.

3.2. **The effect of Social Reengineering on Rubbish Management**

Social reengineering of rubbish management through developing public participation and support from related stakeholders gives the satisfactory output such as the achieved objective. The sustainability of public participation improvement in rubbish management through rubbish bank provides (1) economic benefit in the form of deposit and money from the result of rubbish sale, (2) social benefit in the form of public participation in rubbish care-consciousness movement for environment conservation, and (3) environmental benefit in the form of environmental esthetic because the rubbish produced by people is managed well. It is in line with [6] mentioning that the sustainability of rubbish bank business occurs when economic, social, and environmental benefits.

Figure 3 shows the prospect rubbish customers’ changing knowledge aspect related to the importance of rubbish management and commercialization. Education and promotion program conducted by rubbish bank administrators to prospect rubbish bank customer group shows the posttest value higher than to pretest value, meaning that there is an increase in the test value.

![Image](image_url)

**Figure 3.** Result of prospect customers’ improved cognitive aspect

Source: Questionnaire Analysis, 2019
The analysis on the questionnaire about knowledge on rubbish, e.g. rubbish effect, rubbish production, importance of rubbish sorting, importance of rubbish bank, form of rubbish bank activity, constraints with rubbish sorting, and the advantage of joining the bank rubbish as customers shows the increase of value. It indicates that education and promotion conducted by administrators of rubbish bank are very effective.

Based on the result of questionnaire, evaluation on behavior aspect shows that there is an improvement toward the expected behavior. The change of behavior is indeed not easy to do with intervention program for several months only. Nevertheless, the apparent change of behavior is expected to be sustainable along with the attainment of economic, social, and environmental benefits. As suggested by [6], rubbish bank that has benefited the three aspects will be sustainable.

![Evaluation on Prospect Customers' Behavior](image)

**Figure 4.** Evaluation on prospect customers of rubbish bank’s behavior

Source: Questionnaire Analysis, 2019

Considering the result of pretest and posttest on behavior aspect, a description of behavior improvement is obtained before and after the Rubbish Bank program. It includes: (1) the behavior of reducing the use of product potentially resulting in rubbish (*reduce*) increases from 2.6 (rare) to 3.6 (often), (2) the behavior of reusing the still usable product (*reuse*) increases from 2.8 (occasional) to 3.8 (often), (3) the behavior of recycling the used material (*recycle*) increases from 1.9 (rare) to 2.9 (occasional), (4) the behavior of utilizing organic rubbish to be fertilizer (*replant*) increases from 1.8 (never) to 2.6 (rare), (5) the habituation of disposing rubbish in its place increases from 3.5 (often) to 4.5 (always), (6) the habituation of sorting rubbish increases from 2.4 (rare) to 3.4 (occasional), and (7) the behavior of depositing rubbish to rubbish bank increases from 1.4 (never) to 1.8 (never).

The behavior of depositing rubbish to rubbish bank has not shown significant improvement yet because customers just arrive at the process of collecting rubbish and have not deposited it to rubbish bank (only a few of them have deposited it to rubbish bank).

Considering the social reengineering program that has been implemented, a social reengineering model of the improved community participation in rubbish management program can be developed, as illustrated in Figure 5.

Considering the model developed, there should be reinforcement in reward aspect of usefulness value. It can be accomplished, for example, by giving the customers the option on behalf of group that has not been accommodated in rubbish saving program so far. It is because the individual customer takes longer time to collect rubbish in certain volume. Group attempts to create situation in such a way that makes all group members feeling participating actively in every developmental stage. Thus, every individual in group is expected to feel being responsible fully for the achievement of broader objective [8].

Exchange theory mentions that a social interaction process will result in a relationship leading to reward (benefit) or punishment over the sacrifice action done. If reward obtained is more than the sacrifice made, an individual will tend to repeat the behavior. Reward is not always in the form of...
extrinsic motive like money, but it can be intrinsic motive such as the satisfaction with attending the group activity, the pleasure of assembling with others and the recognition of self-existence [9].

![Diagram of community participation development in rubbish management through rubbish bank]

4. Conclusion

People participating in rubbish management program through rubbish bank can be reinforced individually using group approach. Through synergizing collective behavioral concept and exchange concept, the customer can be developed in the form of community group.

Through group customer approach (e.g. at RT level, dasawisma, or recital group), an individual’s rubbish combined with other individuals’ in the group can be accumulated in a large volume. Customer-on-behalf-group model tend to have an ability of pressing its individual members to do the same action. Thus, from this model, another form of reward can be developed including social fund from rubbish or individual rubbish donation for group customer. Through this model, the sustainability of participation will be guaranteed more due to the presence of community’s willingness, ability, and opportunity of participating in the program [10].

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