Institutional capacity building of Bina Hang Tuah youth organization and Tambaan Indah waste bank in the context of plastic waste management in Tambaan Urban Village, Pasuruan City, East Java Province, Indonesia

Rudianto¹, E Yudaningtyas², R D Kasitowati³

¹ Marine Science Study Program, Faculty of Fisheries and Marine Science, University of Brawijaya, Malang, Indonesia
² Department of Electrical Engineering, Faculty of Engineering, Universitas Brawijaya, Malang, Indonesia
³ Marine Science Study Program, Faculty of Fisheries and Marine Science, Universitas Brawijaya, Malang, Indonesia

Email: rudiantoita@gmail.com

Abstract. Plastic waste in Indonesia has reached 64 million tons per year of which 3.2 million tons per year is discharged into the sea. Because of this condition, Indonesian coastal waters experience degradation. Plastic waste on the coast can be utilized to add value in the form of premium fuel, diesel and kerosene, using a destilator machine. The study was carried out on the coast of Tambaan Village, Pasuruan, East Java. The results indicate that the beach is clean and the processing results are in line with the community expectations. However, the beach has become dirty again and plastic waste has accumulated. The purpose of this study is to examine the relationship between youth organizations which are responsible for processing plastic waste, and waste banks that currently receive waste from the community. The methods used are analytical Hierarchy Process (AHP) and Partial Least Square (PLS). The two methods are used in the analysis of organizational capacity building and cooperative relations between Bina Hangtuah Youth organization and waste banks. The results of the analysis indicate that operating agreements and revenue sharing based on a "win-win" solution including increasing human resources are an important basis for increasing institutional capacity.

1. Introduction
The ocean is the largest place on earth to collect solar energy. The ability of sea water to absorb large amount of heat without temperature increase is extraordinary. The ability of the oceans to store and release heat over long periods gives the ocean a central role in stabilizing the Earth’s climate system [1]. Therefore, the sea must be seen as the front yard and not a backyard. However, the oceans are already filled with waste due to anthropogenic factors. Plastic waste, which is considered comfortable for carrying luggage or for various human needs considered lightweight, durable, strong, flexible with low manufacturing cost has become tiny monsters that increase the global ocean pollution. It is estimated that around 300 million tons of plastic are produced annually and disposed to the sea [2].
Five countries in the world are responsible for more than 50% total plastic waste in the ocean [3]. Countries from East Asia, namely China, Indonesia, Vietnam, the Philippines and Thailand, throw the largest amount of plastic waste into the ocean [4]. The more plastic waste in the sea, the lower the ocean's ability to absorb heat. Therefore, cleaning up plastic waste in the ocean becomes an important prerequisite that people must do together.

2. Materials and methods
This research was conducted at Tambaan beach, Tambaan village, Panggungrejo sub-district, Pasuruan city. Prior to this research, community service was conducted in 2019 by giving the community a set of destilator machines to convert plastic waste into fuel oil (diesel, premium, and kerosene). The destilator machines were granted to youth organization Bina Hang Tuah through the Doctoral Service program of the University of Brawijaya Malang. At first, the youth organization along with the community cleaned plastic waste on Tambaan beach and the results were quite satisfying because the beach became clean from plastic waste. However, 3 (three) months after that, the beach was full of plastic waste again. The problem is that the collaboration between youth organization and the community cannot be carried out continuously, because each youth organization member was busy with their work assignments.

2.1 Materials
The research area is located on the coast of Tambaan, Tambaan sub-district, Panggungrejo district, Pasuruan city, East Java province, Indonesia.

![map of Indonesia](image)

**Figure 1.** Location of research area

2.1.1 The condition of plastic piles.
It is estimated that every day, the amount of plastic waste in Tambaan increases + 2.5 tons/day. Various types of plastic waste on Tambaan beach consist of Polypropylene, for example plastic bags, dry food plastic bags, plastic cups, aqua bottles, plastic bags, straws, and high density polyethylene, such as detergent bottles, and plastic pipes.

2.1.2 Destilator engine capacity.
The 10 kg plastic cracker waste machine with an average operation of 5 hours can produce 5 liters of diesel, 2 liters of premium, and 1.5 liters of kerosene. For the type of plastic waste, the type
polypropylene / polyethylene produces 6 liters of diesel, 2.5 liters of premium and 1.5 liters of kerosene. The fuel needed is 3 kg gas.

This study uses interviews with respondents with the following target goals as follows:

| No | Types of respondents      | Number of respondents (persons) |
|----|---------------------------|--------------------------------|
| 1  | Local Government          | 15                             |
| 2  | Youth organization        | 10                             |
| 3  | Garbage Bank              | 10                             |
| 4  | Village unit              | 10                             |
| 5  | Public figures            | 10                             |
| 6  | Religious Leaders         | 10                             |

2.1.3 Before and after using destilator engine.
Comparison of the garbage pile before and after using a destilator machine. This can be seen in the image below.

![Image: Condition of research area before and after using destilator machine](image)

2.1.4 Capacity building.
The condition of the garbage pile returned after three months the destilator machine was not running. The problem is that youth organization members do not have the energy and time because of their busy schedule. Meanwhile, people who usually work together to clean plastic waste do not show the action. This is because no one was willing to work together. To overcome these problems, a collaboration between youth organization and the waste bank in Tambaan is needed.

2.2 Method
The method used to increase capacity building between youth organization and waste banks is using the AHP and PLS methods. AHP method was used to find out what variables are the main priority by having the highest coefficient, while PLS was used to find out which hypothesis is significant and it is used to formulate an institutional capacity building policy between youth organization and the waste
2.2. Variables in structural model

Variable institutional arrangements (IA) covers:
- IA1: Policy Formulation
- IA2: Policy Implementation
- IA3: Credibility
- IA4: System (SOP)
- IA5: Information Technology
- IA6: Operating Agreement

Variables in leadership (LD):
- LD1: Influence
- LD2: Inspire
- LD3: Motivation
- LD4: Anticipation
- LD5: Respond
- LD6: Delegation of authority

Variables in knowledge (KL):
- KL1: Education
- KL2: On the Job Training
- KL3: Life Experience
- KL4: Intellectual Capital
- KL5: Increasing Human Resources

Variables in accountability (AC):
- AC1: Willingness
- AC2: Ability
- AC3: Capacities
- AC4: Revenue Sharing

Variables in capacity building (CB):
- CB1: Activity in forming quality
- CB2: Intellectual capital
- CB3: Strengthen capacity
- CB4: Maintain capability

3. Result and discussion

Using AHP and PLS as well as strategy formulation for capacity building, the following results are obtained:

3.1 AHP calculation
Based on the results of the AHP analysis, the variables that require attention are Operating Agreement, Delegation of authority, Increasing Human Resources, and revenue sharing.

3.2 PLS calculation
Table 2. The results of hypothesis testing are presented as follows:

| No | Results of Hypothesis | Remarks          |
|----|------------------------|------------------|
| 1. | H1: Leadership (LD) influences Knowledge (KL) | Accepted Hypothesis |
|    | H1: the higher Leadership (LD), the higher Knowledge (KL) is. |
| 2. | H2: Leadership (LD) influences Institutional Arrangement (IA). | Accepted Hypothesis |
|    | H2: the higher Leadership (LD), the higher Institutional Arrangement (IA) is. |
| 3. | H3: Leadership (LD) affects Accountability (AC): the higher Leadership (LD), the lower Accountability (AC) is. | Accepted Hypothesis |
| 4. | H4: Leadership (LD) influences Capacity Building (CB): the higher Leadership (LD) will not affect the higher Capacity Building (CB) | Rejected Hypothesis |
| 5. | H5: Knowledge (KL) influences Institutional Arrangement (IA): the higher Knowledge (KL), the lower Institutional Arrangement (IA) is. | Accepted Hypothesis |
| 6. | H6: Knowledge (KL) influences Accountability (AC): the higher Knowledge (KL) will not affect the lower Accountability (AC). | Rejected Hypothesis |
| 7. | H7: Knowledge (KL) influences Capacity Building (CB): the higher Knowledge (KL) will not affect the higher Capacity Building (CB). | Rejected Hypothesis |
| 8. | H8: Institutional Arrangement (IS) affects Accountability (AC): the higher Institutional Arrangement (IS), the higher Accountability (AC) is. | Accepted Hypothesis |
| 9. | H9: Institutional Arrangement (IA) affects Capacity Building (CB): the higher the Institutional Arrangement (IA), the higher Capacity Building (CB) is. | Accepted Hypothesis |
| 10. | H10: Accountability (AC) affects Capacity Building (CB): the higher the Accountability (AC), the lower Capacity Building (CB) is. | Accepted Hypothesis |

3.3 Formulation strategy for capacity building

The following strategies should be done to increase institutional capacity between youth organization and the waste bank:
a) Operating agreement. Understanding Operational Agreement is a contract where two or more parties agree to share costs and benefits for business development [6]. Operating agreement must be agreed by the two parties, so that the agreement can reach a common goal.

b) Delegation of authority. According to [7] there are 5 processes that must be agreed by the two parties namely 1) that a process occurs in stages; 2) results will contribute to greater organizational benefits; 3) the selection of the right and ideal person to complete the task is very important; 4) transferable authority, specificity of duties and trust are very important; and 5) good communication between the delegator and the "delegate" is very important.

c) Increasing human resources. According to [8], increasing human resources refers to policies, processes, and practices that govern employee behavior and results. The HR function includes, among others, recruitment, selection, compensation, organizational change, training, career development, performance management, management succession and leadership development.

d) Revenue sharing, related to the production sharing contract between expenses and generated income based on a "win-win" principle. Production sharing contracts are aimed at improving operational performance and equitable mechanisms for the entire chain of activities from the initial implementation to the final results. [9]

e) Karangtaruna and the waste bank must prioritize the selection of leadership that is acceptable to all parties. Leadership must have sufficient knowledge to be able to improve the performance of plastic waste cleaning on Tambaan beach and increase adequate income. Besides that, leadership is expected to be able to prepare for cooperation between two NGO institutions in accordance with the expectations of the community and, most importantly, trustworthy and accountable leadership.

f) Knowledge to improve institutional arrangement is needed and this research shows that knowledge will influence knowledge that is not yet capable. For this reason, knowledge related to mutually beneficial cooperation is important.

g) To strengthen the collaboration between Karangtaruna and the waste bank, strong institutional arrangement is needed to increase institutional accountability. Besides that, good preparation regarding institutional arrangement will influence the strengthened capacity building that is built together, and accountability will affect the capacity building performance.

4. Conclusions
The results of this study indicate that the strengthening of capacity building will be influenced by leadership factors that understand the character of operational cooperation between youth organization and the waste bank. Leadership is strongly influenced by the acceptance of all parties involved is always preparing human resources that are reliable, accountable, have sufficient knowledge to improve institutional performance, and are always goal-oriented. A leader consistently implements operating agreements, delegation authorities, and revenue sharing as stated in the MoU.

References
[1] Dahlman L and Lindsey R 2020 Climate Change: Ocean Heat Content. Bulletin of NOAA Climate Government. https://www.climate.gov/news-features/understanding-climate/climate-change-ocean-heat-content.
[2] Butler K, Mitchell L, Latuheru J, Asquf H, Pratomo I S Y, Idrus R M, Pangermanan P, Khirlan, Pratamasari I, Noor I, Prasetyawati A, Sarah M, Utomo K P 2018 Indonesia Marine Debris Hotspot-Rapid Assessment, Synthesis Report. World Bank Group, Kementrian Koordinator Bidang kemaritiman, DANIDA, Royal Norwegian Embassy
[3] Jambeck 2015a Plastic waste inputs from land into the ocean, Science, 13 February 2015 Volume 347, Issue 6223.
[4] Jambeck 2015b Supplementary Materials for: Plastic waste inputs from land into the ocean, Science, 13 February 2015, VOL 347 Issue 6223. www.sciencemag.org/content/347/6223/768/suppl/DC1
[5] UNDP 2009 Capacity Development: A UNDP Primer. *United Nations Development Programme Bureau for Development Policy Capacity Development Group*. 304 East 45th Street, FF-6th Floor New York, NY 10017 Fax: +1 212-906-6057. Website: www.undp.org/capacity

[6] Abright and Harlan 1978 Preferential Right Provisions and Their Applicability to Oil and Gas Instruments. *Heinonline*. 32 Sw. L.J. 803 (1978-1979)

[7] Bell, Reginald, Bodie N D 2012 Delegation, Authority and Responsibility: Removing the Rhetorical Obstructions in the Way of an Old Paradigm. *Journal of Leadership, Accountability and Ethics* vol. 9(2) 2012

[8] Friedmen and Bary A 2005 Demand More from the Human Resource Function Barry A. Friedman, SUNY-Oswego. *Proceedings of the 13th Annual International Conference 2005* ISBN 1-878583-64-6

[9] Ruo-zhen Q and Xiao-yuan H 2006 The Random Expected Value Model of Revenue-Sharing Contract Coordination in Supply Chain. *Chinese journal of Management Science*. School of Business Administration, Northeastern University, Shenyang 110004, China

**Acknowledgements**

The author would like to acknowledge the support of Dean of Faculty of Fisheries and Marine Science, Prof Dr. Ir. Happy Nursyam and some lecturers in the Department whom he cannot mention one by one.