

Analysis of Proposed Waste Management Strategies at XYZ Islamic Boarding School Using SWOT and Promethee

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ABSTRACT

As a country with a population of 261,115,456 people, Indonesia produces 65 million tons of waste per year. This large amount of waste is not matched by good waste management. Improving waste management must be done from the source, one of which is the XYZ boarding school. Thus, this study aims to determine the waste management strategy to improve waste management at the XYZ Islamic Boarding School. The determination of the process was carried out using the SWOT and Promethee methods. Based on the SWOT analysis results, alternative waste management strategies that can be implemented at the XYZ Islamic Boarding School are known. Furthermore, these alternatives are analyzed again to determine which options will be prioritized using the Promethee method. The results show that XYZ Islamic Boarding School can implement the SO strategy with a value of 4,830, and the priority strategies are conducting waste management training by trainers or teachers to employees of the boarding school, building waste management facilities in the boarding school area, and building good cooperation with waste management institutions.

Keywords: SWOT, Promethee, Waste Management, Islamic Boarding School, Strategy

Introduction

A report by the United Nations Environmental Program (UNEP) explains that Indonesia is ranked as the 8th largest emitter of CO₂e or greenhouse gases such as CO₂ and CH₄, with 7.5 tons CO₂e[1]. These greenhouse gases can cause an increase in the Earth's surface temperature[2], leading to prolonged dry seasons or flooding[3]. These greenhouse gases can be generated from waste, where open waste burning can produce CO₂ gas, while the decomposition process of organic waste in landfills produces CH₄ gas.

Waste is one of Indonesia's most significant contributors to greenhouse gas emissions; with a population of 261,115,456 people, Indonesia contributes 65 million tons of waste per year[4]. The amount of waste generation will continue to increase along with the increase in

population and the level of public consumption. This increase in waste generation is not matched by good waste management. However, this increase in waste generation is not matched by good waste management. Good waste management can be seen from cultural, economic, and social factors[5]. Therefore, it is necessary to improve waste management, starting from upstream, one of which is the boarding school. Pondok Pesantren XYZ manages waste by collecting waste from its sources, such as student dormitories and kitchens. The waste is put together at the TPS to be burned or buried. The waste collected is not sorted first, causing the waste burning time to be longer. This combustion process can cause air pollution and trigger the growth of cancer cells due to burning plastic waste[6]. Therefore, Pondok

Pesantren XYZ needs to improve its waste management strategy using SWOT analysis.

SWOT analysis is a tool applied to systematically identify factors to develop organizational strategies to maximize strengths and opportunities and minimize weaknesses and threats[7]. SWOT analysis is based on internal and external factors; internal factors are strengths and weaknesses, while external factors are opportunities and threats[8]. SWOT analysis is also used to formulate strategies that can be implemented by organizations; these strategies are S-O strategies, W-O strategies, S-T strategies, and W-T strategies[9].

Studies related to waste management strategy using SWOT analysis conducted by Alfiani, et al. showed that waste management strategies that can be applied at the al Munawwir Islamic boarding school are increasing community knowledge through mentoring, arranging waste disposal routes, picket schedules, and garbage collection, procuring waste bin facilities according to their type, as well as forming waste management organizations and policies[10].

Another study that discusses waste management strategies using SWOT analysis conducted by Rimantho and Tamba at Burangkeng landfill shows that Burangkeng landfill needs to make improvements to methods and technology in waste management, procurement of facilities and infrastructure for waste management tools, and human resource planning at Burangkeng landfill[11].

Research conducted by Rubiyannor, et al stated that the results of the SWOT analysis that had been carried out obtained the results of strengths in the form of being able to reduce waste in the community, weaknesses in the form of waste management is very dependent on the activeness and knowledge of waste bank administrators in managing waste, opportunities in the state of being able to reduce the amount of waste entering the landfill, and threats in the form of lack of public interest in becoming waste bank customers[12].

The study conducted by Winahyu et al shows that the scenarios that can be used in waste management at the Bantargebang landfill have five priority scales, namely increasing the budget and improving the technology system in the waste sector, optimizing the availability

of transportation facilities, expediting waste transportation facilities, optimizing the recycling business, and strengthening law enforcement to realize spatial planning[13].

Based on the literature study, it can be seen that the SWOT method has not been able to provide the best alternative for each waste management strategy, so a multicriteria decision-making method is needed. One of the multicriteria decision-making methods that can be used is the Promethee (Preference Ranking Organization Method for Enrichment Evaluation) method. The Promethee method can be used flexibly to determine the order (priority) in the multicriteria analysis [14]. The advantage of this Promethee method is the ability of this method to take into account the characteristics of the data because data is not always bigger better, or smaller better. Still, the optimal one is better[15]. In addition, promethee can also produce better rankings obtained by using quantitative and qualitative data[16].

Studies related to using the Promethee method in waste management conducted by Garcia show that the MCDM method is beneficial in studying solid waste management systems with several different criteria. However, unfortunately, in the MCDM method, the weight given to each criterion is subjective. Therefore cooperation is needed between all stakeholders in decision-making[17].

Another study conducted by Panagiotidou et al. showed that the purpose of developing a decision support system is convenience so that non-specialists in waste management can participate in designing and assessing various waste management schemes. In addition, in the actual world, decision making generally does not have in-depth knowledge related to comparative assessment of alternative options. Decision support systems aim to automate this process by providing default values for qualitative criteria weights and evaluation. Promethee II was chosen due to its simplicity and non-complexity[18].

Research conducted by Torkayesh, et al. states that there are several criteria in decision-making in waste management, namely environmental, social, and economic. The Life Cycle Assessment method focuses on environmental criteria but cannot provide holistic decision-making. Therefore, it is necessary to integrate the LCA method with

the MCDM method to evaluate the waste management system [19] comprehensively.

Research conducted by Hendrik, et al. related to the use of the Promethee method in environmental management states that it is tough to give weight to criteria that reflect investor decision criteria, weighting criteria from the stakeholder's point of view needs to be considered for more complex decision making in the future[20].

Based on the background that has been conveyed, the desired final result of this research is to identify external and internal factors that become alternative strategies in waste management at XYZ Islamic Boarding School and determine the priority of the proposed strategy in managing waste at XYZ Islamic Boarding School.

Methods

Data was collected by distributing two questionnaires to three respondents.

SWOT

The first questionnaire was used to determine external and internal factors which were then analyzed using the SWOT method. Based on the data that has been obtained, it is then processed using the SWOT method with the following stages:

1. Identifying each external and internal factor obtained from the questionnaire data.
2. Analyzing external and internal factors using the EFAS and IFAS matrix and weighting calculations.
3. Calculated EFAS and IFAS ratings.
4. To obtain the weighting value, the multiplication calculation between the weight and the rating is carried out.
5. A SWOT matrix is created to determine the SWOT strategy.
6. The SWOT diagram is used to determine the position of the strategy in the SWOT quadrant.

PROMETHEE

The second questionnaire was used to prioritize waste management alternatives. This alternative waste management is based on the results of the SWOT analysis. Prioritization of waste management alternatives is carried out using the Promethee method through the following stages:

1. Define each criterion used, then give weight to each criterion.
2. Calculating the sum of the values of each predetermined weight.
3. Calculating the preference value of each criterion.
4. Calculating the multicriteria preference index
5. Calculating leaving flow, entering flow, and net flow.

In order to solve problems in achieving the objectives in this article, a flow diagram has been prepared as depicted in Figure 1.

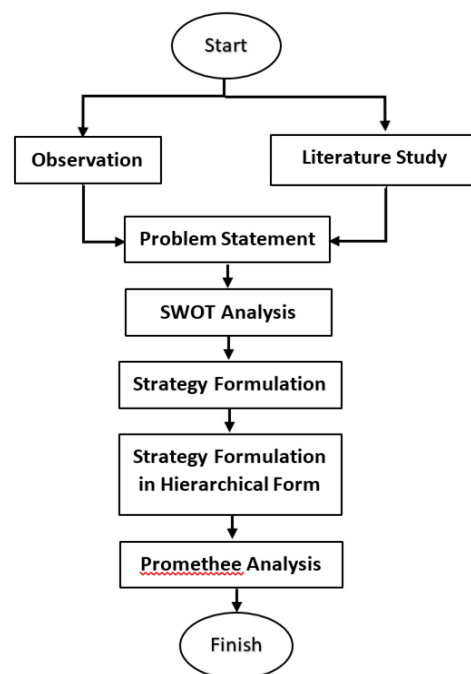


Figure 1. Method flow diagram

Results and Discussions

Based on the calculation of IFAS (Internal Factor Analysis Strategy) and EFAS (External Factor Analysis Strategy) weights, several alternatives can be implemented in waste management at XYZ Islamic Boarding School. Based on data collection, information is obtained related to the identification of internal factors, namely having employees with abilities in the field of waste management, the existence of a leader trainer, a competent teacher to teach how to manage waste, adequate land facilities for waste management, the boarding school has cooperation and a

pretty good relationship with fellow industry players, the existence of sorting organic waste, the number of workers is sufficient, the boarding school has waste management technology, the development of waste management technology in the boarding school environment, the lack of funding for the procurement of waste management technology, the management of waste management in the boarding school environment is carried out properly, the boarding school has adequate tools and materials for waste management, the existence of waste management process activities to be converted into products that have economic value for sale, and the results of waste management produce effects that can be sold or provide benefits to boarding school residents.

While information related to external factors in waste management at Pondok Pesantren XYZ is as follows: There is support from other institutions for human resource training (e.g. universities, the Environmental Agency, etc.), there is support from the Department of Hygiene and Environment for the development of waste management, existing technology can still be developed, there is institutional support related to capital in waste management technology, BSF maggot cultivation technology is increasingly popular, there is an independent container in integrated waste management (waste bank), government policies on waste management standards encourage pesantren management to carry out waste management, increasing waste management costs, changes in weather that affect waste management, the potential risk of closing the Leuwiliang landfill, the effect of poor waste management on the health of pesantren residents and the surrounding community triggers the desire of pesantren

residents to manage waste properly, and the decline in environmental quality encourages pesantren management to handle the waste produced.

After the internal and external factors are identified, the IFAS and EFAS weightings are carried out, as shown in Table 1 and Table 2.

From the SWOT analysis results, it is known that waste management at XYZ Islamic Boarding School is in quadrant I, which means that the boarding school can take advantage of existing strengths to maximize existing opportunities. The strategy that is suitable for implementation at XYZ Islamic Boarding School is the Strength-Opportunity (SO) strategy, based on the IE matrix, several strategies can be applied, namely:

1. The boarding school can have employees with waste management skills through training provided by DLH or universities.
2. Good cooperation between boarding schools and industry players or related institutions can provide capital support related to waste management technology for boarding schools.
3. The current waste management technology owned by the boarding school can be developed further.
4. The selection of organic waste from boarding schools can be used for BSF maggot development technology.
5. Land facilities owned by the boarding school can be used as an integrated waste management location.

Alternative strategies that have been formulated previously may not all be implemented, so prioritization is needed to implement these alternatives if carried out simultaneously and do not experience resource limitations.

Table 1. IFAS Matrix

NO	QUESTIONS	WEIGHT	RATING	WEIGHT X RATING
STRENGTH				
1	Have employees with skills in waste management	0,0933	4	0,342
2	There is a lead trainer, a competent teacher to teach how to manage waste	0,0858	4	0,315

3	Adequate facilities for waste management	0,0858	3	0,286
4	The boarding school has good cooperation and relationships with fellow industry players	0,0784	3	0,261
5	Selection of organic waste	0,0784	4	0,313
6	Sufficient number of workers	0,0672	3	0,224
7	The boarding school has waste management technology	0,0709	3	0,213
8	The development of waste management technology in the boarding school environment	0,0821	3	0,246
TOTAL STRENGTH				2,200
WEAKNESS				
9	Lack of funding for the procurement of waste management technology	0,0522	3	0,157
10	Waste management in the boarding school environment is well done	0,0746	4	0,274
11	The boarding school has adequate tools and materials for waste management	0,0746	3	0,249
12	The existence of waste management process activities to be converted into products that have economic value for sale	0,0784	4	0,287
13	The results of waste management produce products or results that can be sold or provide benefits to the residents of the cottage	0,0784	4	0,287
TOTAL WEAKNESS				1,254

Table 2. EFAS Matrix

NO	QUESTIONS	WEIGHT	RATING	WEIGHT X RATING
OPPORTUNITY				
1	Support from other institutions for HR training (e.g. universities, Environmental Agency, etc.)	0,099	4	0,362
2	Support from the Department of Hygiene and Environment for waste management development	0,079	3	0,211
3	Current technology can still be developed	0,071	3	0,213
4	Institutional support related to funding in waste management technology	0,083	3	0,249

5	Maggot BSF cultivation technology is gaining popularity	0,091	3	0,303
6	The existence of an independent container in integrated waste management (waste bank)	0,107	4	0,391
7	Government policy on waste management standards encourages pesantren management to carry out waste management.	0,079	3	0,237
8	Potential risk of Leuwiliang landfill closure	0,071	3	0,213
9	The effect of poor waste management on the health of pesantren residents and the surrounding community triggers the desire of pesantren residents to manage waste properly.	0,075	3	0,200
10	The declining quality of the environment encourages pesantren management to manage the waste generated.	0,083	3	0,249
TOTAL OPPORTUNITY				2,630
THREAT				
11	Waste management costs are increasing	0,079	3	0,237
12	Weather changes that affect waste management	0,083	3	0,277
TOTAL THREAT				0,514

Table 3. Strategy Value Weight

No	Strategy	Weight
1	Strength (S)	2,200
2	Weakness (W)	1,254
3	Opportunity (O)	2,630
4	Threat (T)	0,514

Table 4. SWOT Strategy Value Weight

No	Strategy	Value Weight
1	<i>Strength – Opportunity (SO)</i>	$2,200 + 2,630 = 4,830$
2	<i>Strength – Threat (ST)</i>	$2,200 + 0,514 = 2,714$
3	<i>Weakness – Opportunity (WO)</i>	$1,524 + 2,630 = 3,884$
4	<i>Weakness – Threat (WT)</i>	$1,524 + 0,514 = 1,768$

Based on the calculation results shown in Table 5, an illustration was then created depicting the position of Islamic boarding

schools in waste management as depicted in Figure 2.

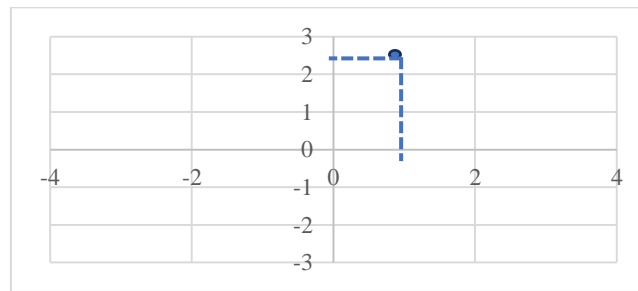


Figure 2. SWOT Diagram

Table 5. SWOT Matrix

	STRENGTH	THREAT
	Having employees with skills in waste management	Lack of funding for procurement of waste management technology
	Competent leaders, trainers, and teachers to teach waste management	Waste management in the boarding school environment is carried out well
	Adequate facilities for waste management	The boarding school has adequate tools and materials for waste management.
	The boarding school has good cooperation and relationships with fellow industry players.	The existence of waste management process activities to be converted into products that have economic value for sale
	Segregation of organic waste	The results of waste management produce products or results that can be sold or benefit the residents of the boarding school.
	Sufficient number of workers	
	The boarding school has waste management technology.	
	The development of waste management technology in the boarding school environment	
	Weight = 2,200	Weight = 1,254
OPPORTUNITIES	STRATEGY S-O	STRATEGY W-O
Support from other institutions for HR training (e.g. universities, Environmental Agency, etc.)	Pondok pesantren can have employees with waste management skills through training provided by DLH or universities.	Institutions related to waste management provide capital to Islamic boarding schools to procure waste management technology.
Support from the Department of Hygiene and Environment for waste management development	Good cooperation between boarding schools and industry players or related institutions can provide capital support related to waste management technology for boarding schools.	Using BSF maggot cultivation technology, the boarding school can produce products that can be sold to benefit the boarding school.
Current technology can still be developed.	The current waste management technology owned by pesantren can be further developed.	
Institutional support related to capitalization in waste management technology	The sorting of organic waste carried out by the boarding school can be used for BSF maggot development technology.	

Maggot BSF cultivation technology is gaining popularity	The land facilities owned by the boarding school can be used as an integrated waste management platform.	
The existence of an independent container in integrated waste management (waste bank)		
Government policy on waste management standards encourages pesantren management to carry out waste management.		
Potential risk of Leuwiliang landfill closure		
The effect of poor waste management on the health of pesantren residents and the surrounding community triggers the desire of pesantren residents to manage waste properly.		
The declining quality of the environment encourages pesantren management to manage the waste generated.		
Weight = 2,630		
THREATS	STRATEGY S-T	STRATEGY W-T
Waste management costs are increasing	Good cooperation owned by the boarding school can help the boarding school capitalize waste management.	The boarding school can sell waste management products to help finance waste management.
Weather changes that affect waste management		
Weight = 0,514		

Table 6. Promethee Criteria

NO.	CRITERIA	CODE
1	Pondok pesantren can have employees with waste management skills through training provided by DLH or universities.	K(1)
2	Good cooperation between boarding schools and industry players or related institutions can provide capital support related to waste management technology for boarding schools.	K(2)
3	The current waste management technology owned by pesantren can be further developed.	K(3)
4	The sorting of organic waste carried out by the boarding school can be used for BSF maggot development technology.	K(4)
5	The land facilities owned by the boarding school can be used as an integrated waste management platform.	K(5)

Table 7. Alternative Strategy

No	ALTERNATIVE	CODE
1	Organize training on waste management for boarding school employees	F(1)
2	Build waste management facilities	F(2)
3	Establish good cooperation with institutions related to waste management	F(3)

No	ALTERNATIVE	CODE
4	Developing waste management methods that the boarding school has used	F(4)
5	Utilizing BSF maggots as a means of organic waste management	F(5)
6	Implementing government policies related to waste management	F(6)
7	The boarding school's waste management area is well-managed, neat, and clean.	F(7)

Table 8. Respondent Data Recapitulation

No	Criteria	Value (Respondents)		
		1	2	3
1	F (1)	5	5	5
2	F (2)	5	5	4
3	F (3)	5	5	4
4	F (4)	4	5	5
5	F (5)	4	4	4
6	F (6)	4	3	5
7	F (7)	4	3	4

After obtaining respondent data related to the Promethee questionnaire, the calculation of the upper limit and lower limit for the seven criteria is then carried out to determine the value of H (d) or the function value of the difference between criteria between alternatives with the provisions that if $d \leq 0$

then the value of H (d) is 0, while if $d > 0$ then the value of H (d) is, where d is the difference between alternatives.

Table 9. Organize training on waste management for boarding school employees

F1 (1,2)		F1 (2,1)	
$d = F1 (1) - F1 (2)$		$d = F1 (2) - F1 (1)$	
$d =$	5 -5	$d =$	5 -5
$d =$	0	$d =$	0
$d \leq$	0	$d \leq$	0
H(d) =	0	H(d) =	0
F1 (1,3)		F1 (3,1)	
$d = F1 (1) - F1 (3)$		$d = F1 (3) - F1 (1)$	
$d =$	5 -5	$d =$	5-5
$d =$	0	$d =$	0
$d \leq$	0	$d \leq$	0
H(d) =	0	H(d) =	0
F1 (2,3)		F1 (3,2)	
$d = F1 (2) - F1 (3)$		$d = F1 (3) - F1 (2)$	
$d =$	5 -5	$d =$	5-5
$d =$	0	$d =$	0
$d \leq$	0	$d \leq$	0
H(d) =	0	H(d) =	0

After calculating the upper and lower limits, the multicriteria preference index is carried out based on the results of H (d), which have been obtained previously in the computation of the upper and lower limits. The preference index calculation is done in the way:

$$(1,2) = \frac{1}{7} (0 + 0 + 0 + 0 + 0 + 1 + 1) = 0,2857$$

Table 10 Multicriteria Preference Index

	1	2	3
1	-	0,2857	0,2857
2	0,1429	-	0,2857
3	0,2857	0,2857	-

The multicriteria preference index calculation results are used to calculate leaving flow, entering flow, and net flow. The calculation of leaving flow, entering flow, and net flow is done as follows:

Leaving Flow

$$1 = \frac{1}{3-1} (0,2857 + 0,2857) = 0,2857$$

$$2 = \frac{1}{3-1} (0,1429 + 0,2857) = 0,2143$$

$$3 = \frac{1}{3-1} (0,2857 + 0,2857) = 0,2857$$

Entering Flow

$$1 = \frac{1}{3-1} (0,1429 + 0,2857) = 0,2143$$

$$2 = \frac{1}{3-1} (0,2857 + 0,2857) = 0,2857$$

$$3 = \frac{1}{3-1} (0,2857 + 0,2857) = 0,2857$$

Net Flow

$$1 = 0,2857 - 0,2143 = 0,0714$$

$$2 = 0,2143 - 0,2857 = -0,0714$$

$$3 = 0,2857 - 0,2857 = 0$$

Table 11 Promethee Method Preference Ranking

Alternative	Leaving Flow	Entering Flow	Net Flow	Ranking
1	0,2857	0,2143	0,0714	1
2	0,2143	0,2857	-0,0714	3
3	0,2857	0,2857	0,0000	2

Based on the results of the net flow calculation above, each alternative's ranking can be seen. Alternative 1 has the highest net flow of 0.0714, so in conducting waste management at XYZ Islamic Boarding School, it is recommended to run waste management training by trainers or teachers to employees of the boarding school, build waste management facilities in the boarding school area, and build good cooperation with waste management institutions. Alternative 2 and 3 were not chosen because if an alternative is minus, the entering flow value is greater than the leaving flow, so some alternative criteria are not better than other alternatives.

Conclusions

Based on the results and discussion, conclusions can be drawn regarding external and internal factors that become alternatives to waste management at the XYZ Islamic Boarding School namely, the boarding school can have employees with waste management skills through training provided by DLH or universities, good cooperation between the boarding school and industry players or related institutions can provide capital support related to waste management technology for the boarding school, the current waste management technology owned by the boarding school can be developed again, the selection of organic waste carried out by the boarding school can be used for BSF maggot development technology, and the land facilities owned by the boarding school can be used as an integrated waste management location. The selection of waste management priorities at XYZ Islamic Boarding School was carried out using the Promethee method, the results of alternative priority waste management strategies in the form of Islamic boarding schools can hold waste management training in the Islamic boarding school area, Islamic boarding schools can build waste management facilities in the Islamic boarding school area, and Islamic boarding schools can build good cooperation with waste management institutions.

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Author Contributions

Dino Rimantho: Conceptualization, method, investigation, writing, editing, supervision, review. Defi Milenia Putri Wesha: Conceptualization, Method investigation, data investigation, Writing.

Conflicts of Interest

The authors have no declare under financial, general, and institutional competing interests

References

- [1] United Nations, *Emissions Gap Emissions Gap Report 2020*. 2020. [Online]. Available: <https://www.unenvironment.org/interactive/emissions-gap-report/2019/>
- [2] R. Pratama and K.-K. Kunci, "Efek Rumah Kaca Terhadap Bumi," *Cetak Bul. Utama Tek.*, vol. 14, no. 2, pp. 1410–4520, 2019.
- [3] N. Febrianti, "Hubungan Pemanasan Global dengan Kondisi Suhu Udara," *J. Penelit.*, no. March, pp. 299–305, 2009, [Online]. Available: https://www.researchgate.net/profile/Nur-Febrianti/publication/323784168_HUBUNGAN_PEMANASAN_GLOBAL_DENGAN_KONDISI_SUHU_UDARA_DAN_CURAH_HUJAN_DI_INDONESIA/links/5aaad42e45851517881b466a
- [4] K. K. A. Sholihah, "Kajian Tentang Pengelolaan Sampah Di Indonesia," *Swara Bhumi*, vol. 03, no. 03, pp. 1–9, 2020.
- [5] N. Y. Hidayah, A. Herzanita, and D. Rimantho, "Sampah Berkelanjutan Mahasiswa Fakultas Teknik," *Tingkat Pengetahuan, Sikap, dan Prakt. Pengelolaan Sampah Berkelanjutan Mhs. Fak. Tek. Univ. Pancasila, Jakarta, Indones.*, vol. 13, no. 2, pp. 171–178, 2021.
- [6] N. Karuniastuti, "Bahaya Plastik terhadap Kesehatan dan Lingkungan," *Swara Patra Maj. Pusdiklat Migas*, vol. 3, no. 1, pp. 6–14, 2013, [Online]. Available: <http://ejurnal.ppsdmmigas.esdm.go.id/sip/index.php/swarapatra/article/view/43/65>
- [7] A. M. I. Astuti and S. Ratnawati, "Analisis SWOT Dalam Menentukan Strategi Pemasaran (Studi Kasus di Kantor Pos Kota Magelang 56100)," *J. Ilmu Manaj.*, vol. 17, no. 2, pp. 58–70, 2020.
- [8] W. G. A. Luntungan and H. N. Tawas, "Strategi Pemasaran Bambuden Boulevard Manado: Analisis SWOT," *J. EMBA J. Ris. Ekon. Manajemen, Bisnis dan Akunt.*, vol. 7, no. 4, pp. 5495–5504, 2019.
- [9] D. P. Sari and A. Oktafianto, "Penentuan Strategi Bisnis Menggunakan Analisis SWOT dan Matriks IFAS-EFAS Pada CV. Dynasty," pp. 238–245, 2017.
- [10] O. D. Alfiani, T. T. Anasstasia, A. S. Nikita, and ..., "Strategi Peningkatan Pengelolaan Sampah Padat Di Pondok Pesantren Al Munawwir," *Pros. Semin. ...*, pp. 375–386, 2021, [Online]. Available: <http://jurnal.upnyk.ac.id/index.php/prosidingLPPM/article/view/6188>
- [11] D. Rimantho and M. Tamba, "Usulan strategi pengelolaan sampah padat di TPA Burangkeng Bekasi dengan pendekatan SWOT dan AHP," *J. Ilmu Lingkungan*, vol. 19, no. 2, pp. 383–391, 2021, doi: 10.14710/jil.19.2.383-391.
- [12] M. Rubiyannor, C. Abdi, and R. P. Mahyudin, "Kajian Bank Sampah Sebagai Alternatif Pengelolaan Sampah Domestik Di Kota Banjarbaru," *Jukung (Jurnal Tek. Lingkungan)*, vol. 2, no. 1, pp. 39–50, 2016, doi: 10.20527/jukung.v2i1.1066.
- [13] D. Winahyu, S. Hartoyo, and Y. Syaikat, "Strategi Pengelolaan Sampah Pada Tempat Pembuangan Akhir Bantargebang, Bekasi," *J. Manaj. Pembang. Drh.*, vol. 5, no. 2, pp. 1–17, 2019, doi: 10.29244/jurnal_mpd.v5i2.24626.
- [14] A. S. Rusydiana and A. Devi, "Analytic Network Process : Pengantar Teori dan Aplikasi," 2013.
- [15] A. Handayani, S. H. Ramdani, and D. Taurusyanti, "Analisi Penjadwalan Produksi Pada Pt. Kurnia Dwimitra Sejati," *J. Online Mhs.*, pp. 1–15, 2021.
- [16] K. Dewi, S. Haryono, J. Kusnendar, and A. Wahyudin, "Sistem Pendukung Keputusan Penyusunan Prioritas

- Perbaikan Standar Akreditasi Program Studi Menggunakan Metode AHP dan PROMETHEE Decision Support System for Study Program Accreditation Standard,” vol. 1, no. 1, pp. 42–50, 2018.
- [17] G. Garcia-Garcia, “Using Multi-Criteria Decision-Making to optimise solid waste management,” *Curr. Opin. Green Sustain. Chem.*, vol. 37, no. August, 2022, doi: 10.1016/j.cogsc.2022.100650.
- [18] N. Panagiotidou, G. S. Stavrakakis, and C. Diakaki, “Sustainable Urban Solid Waste Management Planning With The Use Of An Advanced Interactive Decision Support System Based On The PROMETHEE II Method,” *Int. J. Decis. Support Syst.*, vol. 1, no. 3, p. 294, 2015, doi: 10.1504/ijds.2015.070173.
- [19] A. E. Torkayesh *et al.*, “Integrating Life Cycle Assessment and Multi Criteria Decision Making for Sustainable Waste Management: Key Issues and Recommendations for Future Studies,” *Renew. Sustain. Energy Rev.*, vol. 168, no. August, p. 112819, 2022, doi: 10.1016/j.rser.2022.112819.
- [20] Hendrik *et al.*, “Determination of the Red Mud Industrial Cluster Sites in Indonesia Based on Sustainability Aspect and Waste Management Analysis through PROMETHEE,” *Energies*, vol. 15, no. 15, 2022, doi: 10.3390/en15155435.