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Determination of Factory Location PT. Kelola Lingkungan Kita Using Factor Rating

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The initial stage before establishing a B3 medical waste processing plant PT. Kelola Lingkungan Kita (PT. KLK), it's one of determines the right location. By choosing the right location can make transportation faster and more affordable to several hospitals in regional 1 or the island of Java and can improve company operations more effectively. This company using methods Location Factor Rating (LFR) by selecting the areas of Jakarta, Tangerang, Bekasi and Indramayu, Thus the calculation is done and the company location is obtained with the highest value of 3.67, at Indramayu. Here, PT. KLK built its factory in Indramayu Regency Industrial Estate. In addition to the industrial area being safe from environmental disturbances, salaries of employees in the Indramayu area are still relatively low compared to other areas. This study aims to determine the exact location of the PT KLK factory. There are several other factors that have a significant influence on determining the location of the PT. KLK, namely Minimum Wage for Employees, Factory Surroundings and Fleet Mobilization. This will have an impact on the effectiveness of the company and can reduce the company's operating costs, so that PT. KLK establishes a factory in the Indramayu Industrial Estate with the aim of being able to avoid the risk of environmental disturbances around the factory such as Community Social Institutions which can hinder operational activities, complaints from local residents because they are afraid that the environment will be polluted by the presence of a waste processing company, the Minimum Wage for Employees in the Indramayu area is classified as cheaper than in Jakarta, Tangerang and Bekasi.

Keywords: Location, Location Factor Rating, Medical Hazardous Waste Management Plant

1. INTRODUCTION

Hazardous and Toxic Waste (Hazardous Waste) it's a big problem if not managed properly over environment, especially in Indonesia. Indonesia is categorized as a large population country, where the economy continues to develop the emergence in manufacturing industries, chemicals and health care facilities has an environmental impact in the form of waste by generated business activities [1, 2]. Health facilities on hospitals or health centers, company clinics, and medical laboratories routinely produce medical waste which is included in the hazardous waste category. The various types, from used drug packaging cloth contaminated with body fluids and blood, body organs to used syringes. All of these wastes must be managed appropriately starting with the storage method and location also delivery schedules that must not exceed a certain time limit with transportation and special licensed vehicle to destruction at the B3 waste processing plant which has a permit from the Ministry of – Environment and Forestry (KLHK) [3, 4]. According to Indonesia's environmental regulations, medical waste classified as hazardous and toxic must be destroyed with equipment that meets the technical and administrative requirements stipulated in the law, certain types of waste must be chopped and disinfected before recycling. The steps of a number of hospitals to hand over their waste to be processed by third parties turned out to be stopped after the discovery of medical waste in public garbage dumps, even on the streets of a village in Cirebon Regency, West Java. Garbage in the form of infusion bags, tubes filled with blood until the rest of the body's organs are piled up and scattered around and have become the spotlight of the public and non-governmental organizations engaged in the environmental sector [5, 6]. Basically, B3 waste management in Indonesia refers to the principles and guidelines for sustainable development as outlined in the laws and regulations, in particular Law No.32 of 2009 on Environmental Protection and Management and Regulation of the Minister of Health

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No.453 / Menkes / Per / XI / 1983 regarding hazardous materials (medical only) also in Article 69 paragraph (1) no. 32 of 2009 concerning Environmental Protection and Management Every Person / Organization is prohibited from providing false, misleading, omitting information, destroying information, or providing false information [7].

The large amount of B3 medical waste produced by the hospital but still quite a lot that had not been treated. Based on data from the Indonesian Hospital Association (PERSI), every day there are 366 tons of B3 medical waste produced, while the hospital is only able to process 68 tons and the remaining 298 tons of B3 medical waste is available every day for external processing [7]. There are currently only 7 external parties in Indonesia that have a permit to treat B3 medical waste. Here, the business related the B3 waste management will be carried out by Kelola Lingkungan Kita company (PT. KLK) who integrated hazardous which includes transportation, collection and processing of medical hazardous waste with work areas covering DKI Jakarta, Banten, West Java, Central Java and East Java. The number of vehicles owned is 3 units of vehicles in the form of a Toyota Dyna type car. For each transported waste, PT KLK will issue a manifest with a code according to the serial number obtained from KLHK. Here, PT. KLK started doing business planning, where one of the important points of planning was determining the location of the factory to be built. Determining the location of the factory is very influential on the level of effectiveness of the company, in addition to reducing operational costs, the company can also avoid the risk of disruption from around the factory.

The public perception of the medical hazardous waste processing plant is that it is damaging the surrounding environment and of course there will be many organizations asking for part of the hazardous medical hazardous waste treatment activities. In addition, the target market chosen by PT. KLK is a hospital located in Regional 1 or the island of Java, so determining the location of the factory to be built is important so that the mobilization from picking up B3 medical waste at the hospital until the stage where the waste is taken to the factory for processing can be carried out effectively and economically.

2. METHODOLOGY

A. Location Factor Rating

Operational management of Kelola Lingkungan Kita company (PT. KLK) at the initial planning stage before establishing a factory to determine the location of the factory establishment. One of the factors determining the location is correct or not is to determine the level of ease of reaching the location which is influenced by distance, means of transportation, availability of connecting facilities and their frequency and level of safety and comfort of the route. The optimal location can be influenced by the source of the raw materials needed to be processed in production activities or the location of the marketing area where the output of processing products must be distributed. This method is made by taking into account the distance of each material source location or marketing area to the planned factory location. The production and distribution costs for each location are equal or negligible. PT. KLK uses the Location Factor Rating method to determine the location that will become the factory (see Table I).

Table I. Step Determine Location

No	Step Determine Location
1.	Make a list of key factors for success
2.	Carry out weighting for each factor that has been determined
3.	Set several alternative locations
4.	Provide an assessment for each alternative location
5.	Add up the respective weights and ratings obtained
6.	Choose the highest score and provide recommendation on the choice

The first step of PT. KLK makes a list of key success factors that include the influence of the supply side (Supply Side Influence) consisting of Labor, Land, Energy, Community Factor and Access to Raw Materials and the influence of the demand side (Demand Side Influence) which consists of Labor Skills, Site Suitability, Image and Customer Convince. The second step of PT. KLK assigns a weight to each factor according to its level of importance based on the perceptions of the founders of PT. KLK with the understanding that the higher the weight given, the more important these factors are and the lower the weight given means that these factors are not too influential (see Table II).

Table II. Weight and Key Success Factor

Criteria	Weight
Supply Side Influence	
- Labor	10%
- Land	15%
- Energy	12%
- Community Factor	12%
- Access to Raw Material	10%
Demand Side Influences	
- Labor Skill	13%
- Sirte Suitability	10%
- Image	10%
- Customer Convenience	8%
Total	**100%**

The third and fourth steps carried out by PT. KLK is to determine several alternative locations where factories are planned to be built in Jakarta, Tangerang, Bekasi and Indramayu. After that, an assessment (rating) is carried out with 1 to 5 value range (see Table III).

Table III. Rating factor assessment

Rating factor assessment	
1	Does not support
2	Less supportive
3	Enough
4	Support
5	Very Supportive

The fifth step of PT. KLK adds up each weight and assessment for each alternative location and adds up to determine the calculation between the criteria and the

level of influence of each weight that has been determined based on the results of the discussion and the conditions in the area by using equation one.

$$W \times R = S \quad (1)$$

where, the variable S stand for Weight Score while W and R stand for weight and rating, respectively. After obtaining the weight value of each alternative location, PT. KLK performs the addition and in the sixth step, the largest value is selected from the sum of each alternative location. The summation results for Jakarta, Tangerang, Bekasi and Indramayu. Table IV shows the Location Factors Rating Jakarta.

Table IV. Location Factor Rating Jakarta

Criteria	Weight	Jakarta	
		Rating	Score
Supply Side Influence			
Labor	10%	3	0.3
Land	15%	1	0.15
Energy	12%	4	0.48
Community Factor	12%	2	0.24
Access to Raw Material	10%	5	0.5
Demand Side Influences			
Labor Skill	13%	4	0.52
Sirte Suitability	10%	2	0.2
Image	10%	4	0.4
Customer Convenience	8%	4	0.32
Total	**100%**	**29.00**	**3.11**

Here, the calculation of the rating factor in Jakarta, Indonesia around 3.11 from data analysis.

Table V. Location Factor Rating Tangerang

Criteria	Weight	Tangerang	
		Rating	Score
Supply Side Influence			
Labor	10%	4	0.4
Land	15%	3	0.45
Energy	12%	3	0.36
Community Factor	12%	3	0.36
Access to Raw Material	10%	3	0.3
Demand Side Influences			
Labor Skill	13%	3	0.39
Sirte Suitability	10%	3	0.3
Image	10%	3	0.3
Customer Convenience	8%	3	0.24
Total	**100%**	**28.00**	**3.10**

Furthermore, the calculation of the rating factor obtained for Tangerang is 3.10 from data analysis.

Table VI. Location Factor Rating Bekasi

Criteria	Weight	Bekasi	
		Rating	Score
Supply Side Influence			
Labor	10%	4	0.4
Land	15%	4	0.6
Energy	12%	3	0.36
Community Factor	12%	3	0.36
Access to Raw Material	10%	3	0.3
Demand Side Influences			
Labor Skill	13%	3	0.39
Sirte Suitability	10%	4	0.4
Image	10%	4	0.4
Customer Convenience	8%	3	0.24
Total	**100%**	**31.00**	**3.45**

while the calculation of the rating factor obtained for Bekasi is 3.45 from data analysis.

Table VII. Location Factor Rating Indramayu

Criteria	Weight	Indramayu	
		Rating	Score
Supply Side Influence			
Labor	10%	4	0.4
Land	15%	5	0.75
Energy	12%	3	0.36
Community Factor	12%	4	0.48
Access to Raw Material	10%	3	0.3
Demand Side Influences			
Labor Skill	13%	2	0.26
Sirte Suitability	10%	4	0.4
Image	10%	4	0.4
Customer Convenience	8%	4	0.32
Total	**100%**	**33.00**	**3.67**

Finally, the calculation of the rating factor obtained for Indramayu is 3.67 from data analysis.

B. Data and Location

The data collection method for research uses descriptive analysis tools to analyze the effectiveness of determining the factory location and in-depth interviews to obtain data and information from informants based on key factor indicators. In-depth interviews are interviews where the resource person is asked to talk in depth about the topic being investigated without the use of pre-determined, focused, short questions. Here, the resource persons were chosen due to the person have relationships with company who work in transportation, hospitals and regulatory authorities. The company also held discussions to get an overview of the environment of several locations that will be selected to build a waste treatment plant.

3. RESULTS AND DISCUSSION

After weighting and calculations using the Location Factor Rating for each point, it was found that the value of Jakarta was 3.11, Tangerang 3.10, Bekasi 3.45 and the highest score was Indramayu 3.67 from data analysis. The following describes several other factors that influence the selection of a factory location as follow (1) The factory is established in an Industrial Estate, so that it can avoid the risk of environmental disturbances around the factory such as Community Social Institutions which can hinder operational activities, complaints from local residents because they are afraid that the environment will be polluted by the presence of a waste processing company. (2) Minimum Wage for Employees in Indramayu is cheaper than in Jakarta, Tangerang and Bekasi. (3) In Indramayu District, the mobilization to pick up B3 medical waste is more affordable for hospitals in Regional 1, thus reducing company operating costs. (4) The minimum wage for employees in Jakarta is around 4.450 Million IDR. The land available for factory construction is not available for Industrial Estates and the price of land per meter is 3 to 6 Million IDR. (5) The minimum wage for employees in Tangerang is around 4.2 Million IDR. The land available for factory construction is not available for industrial estates and the price of land per meter is 5 to 7 Million IDR. (6) The minimum wage for employees in Bekasi is around 4.5 Million IDR. Land available for factory construction is quite difficult to find because in the Industrial Estate in Cikarang there is not enough space available according to the needs of PT. KLK. (7) The minimum wage for employees in Indramayu is around 2.3 Million IDR. We received information from our colleagues that there is a plan to build an Industrial Estate in the Indramayu Regency area with available land according to the needs of PT. KLK.

4. CONCLUSIONS

There are several other factors that have a significant influence on determining the location of the PT. KLK, namely Minimum Wage for Employees, Factory Surroundings and Fleet Mobilization. This will have an impact on the effectiveness of the company and can reduce the company's operating costs, so that PT. KLK establishes a factory in the Indramayu Industrial Estate with the aim of being able to avoid the risk of environmental disturbances around the factory such as Community Social Institutions which can hinder operational activities, complaints from local residents because they are afraid that the environment will be polluted by the presence of a waste processing company, the Minimum Wage for Employees in the Indramayu area is classified as cheaper than in Jakarta, Tangerang and Bekasi.

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