



The Location of Strategic Location and Distribution Center

(Case Studied in Dodol Marina, Garut)

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Abstract: PT. Marina is a company with its main business as a food maker typical dodol Garut city. The number of consumers who are interested in these products both from within and from outside the town of Garut, prompting the company to provide better service. In an effort to provide maximum convenience and waiters to consumers as well as expand the marketing area, it is necessary to set up a distribution center in the city of Garut dodol. In determining the location of a distribution center in the city of Garut required a variety of considerations required in determining strategic location. As things - things that need to be considered in determining the location, namely: Strategic location, amenities, Number of Competitors, distance from the factory to the prospective location and Rental Lot.

Keywords: Determining the location & strategic location.

1. BACKGROUND RESEARCH

Dodol industrial development in the town of Garut in recent years has grown well, as is evident by the increasing sales of dodol produced in various types. Increasing demand pose a problem for producers dodol that exists today, where the manufacturer must be able to compete for the products or services that have high competitiveness in an attempt to win market share.

At this time dodol product produced by PT. Marina many consumer demand both from the town of Garut and consumers who are from the city of Garut, while the company still markets its products around the town of Garut.

To provide convenience to consumers in obtaining this dodol products especially in the city of Garut, it is necessary PT. Marina establish the location of the distribution center in the city of Garut to meet the needs of consumers as well as reduce the cost of shipping, in order to expand marketing area and increase corporate profits.

Determining the location of the distribution center is one of the decisions that should be considered as good as possible. If the company wrong in taking the decision, the company will bear the risk of such loss or failure to achieve the desired goals and objectives of the company.

2. FORMULATION OF THE PROBLEM

As the formulation of the problem in this study correspond to the problems that have been described in the background of the study are:

- a. To what extent are the variables of the factors determining the location (facility, distance from factory to market, Number of Competitors, and rental prices) could affect the strategic location.
- b. Determining the location of a new distribution center for PT. Marina in the city of Garut's most strategically to expand the marketing area.

3. RESEARCH PURPOSES

The objectives to be achieved through this research are:

- a. Can define the criteria - the criteria considered in determining the strategic location.
- b. Knowing how much influence the criteria - the criteria to determine the location of product distribution
- c. Can determine the location of alternative strategic product distribution as well as profitable for the company.

4. RESEARCH MODEL

The method used to solve the problem in accordance with the objectives are achieved, namely Path Analysis and Promethee. Problem-solving model using Path Analysis (Path Analysis) aims to determine how much influence the given variables Independent (Facility, Distance, Total Competitors and Rental) against Strategic Market Area [1].

The second problem-solving model by using the method PROMETHEE (Preference Ranking organiza-tion Method For Enrichment Evaluation), which aims to decision-making in the selection of distribution locations. Method Promethee included in group problem-solving Multiple Criteria Decision Making (MCDM) or decision-making criteria for the compound which is a very important discipline in decision-making on an issue that has more than one criterion (multiple criteria). Brans, defines the effect that Promethee is a method of determining the order (priority) in the analysis of multiple criteria. The central issue is the simplicity, clarity and stability. The allegations of the dominance of the criteria used in Promethee is the use value of the outranking relationship.

5. DISCUSSION PROBLEMS

5.1 Sample Size Determination

The population in this study is the manufacturer of dodol comprising dodol Staff and employees of the company in the city of Garut. To determine the minimum number of samples required, then use the following equation [3]:

$$n = \frac{N \cdot \sigma^2}{(N - 1) \cdot D + \sigma^2}$$

The minimum number of samples may be used for this research are:

$$n = \frac{N \cdot \sigma^2}{(N - 1) \cdot D + \sigma^2} = \frac{2439 \times 266.34}{(2439 - 1)(6.51) + 266.34} = 40.2541$$

In this study, the number of respondents was set at 100 people with the following details:

Table 1 Distribution of the Sample Size Dodo companies in Garut

Dodo company	Number of people)
Employees PT. Marina	26
Employees PT. hade	20
Employees PT. Sarinah	18
Employees PT. imagery	18
Employees PT. Olimpik	18

Where :

N = total population of the research object

σ^2 = Variance of the population

D = Relations of Error Bound to a confidence level research

R = Range largest or smallest of data

B = Bound Of Errors

5.2 Validity test

Validity Testing was conducted to determine or quantify the extent to which a measuring instrument can measure what we want to measure. Results can be considered valid if there is a similarity between the data collected by the data actually happened on the object under study.

This study uses Construct validity testing is done by testing the validity of each of the questions. The answers obtained from the questionnaires and then calculated the correlation of each item, then all the questions can be declared valid when compared with the value t table. Correlationproduct Moment as follows: [4]

$$r = \frac{n(\sum XY) (\sum X)(\sum Y)}{\sqrt{[n\sum X^2 (\sum X)^2][n\sum Y^2 (\sum Y)^2]}}$$

Table 2 Validity Test for Factor Variable Strategic Locations

r Correlation	r - Table	Conclusion
0669	0202	invalid
0619	0202	invalid
0734	0202	invalid
0598	0202	invalid
0473	0202	invalid
0456	0202	invalid
0498	0202	invalid
0581	0202	invalid
0682	0202	invalid
0597	0202	invalid
0526	0202	invalid
0625	0202	invalid
0603	0202	invalid
0600	0202	invalid
0528	0202	invalid
0512	0202	invalid
0558	0202	invalid

5.3 Test Reliability

Reliability testing is used to determine the extent of the questionnaire used can be trusted or can provide a consistent acquisition research results if the measuring instrument is reused in the measurement of the same symptoms.

The method used in testing the reliability of this is by using the Cronbach alpha is formulated as follows: [4]

$$r_i = \frac{K}{K-1} \left\{ 1 - \frac{\sum S_i}{S_r} \right\}$$

Where :

$$S_i = \frac{\sum K_i}{n} - \frac{\sum K_s}{n^2}$$

$$\sum X_i^2$$

$$S_r = \frac{\sum X_i}{n} - \bar{x}$$

Results of testing the reliability of factors Strategic Location and Siting factors can be seen in Table 4, 5.

Table 4. Strategic Location Factor Test Reliability

No.	variance	Alpha	r - Table	Conclusion
1	0178	0538	0202	reliable
2	0217			
3	0168			
4	0273			

Table 5. Test Reliability Factor Siting

No.	variance	Alpha	r - Table	Conclusion
1	0250	0.8026	0202	reliable
2	0330			
3	0346			
4	0196			
5	0692			
6	0430			
7	0771			
8	0224			
9	0711			
10	0490			
11	0215			
12	0351			
13	0161			

5.4 Determining Research Variables Influence

Data processing techniques further in completing this research is to use Path Analysis (Path Analysis), where the analysis of this pathway serves to determine the effect of direct and indirect collection of variables, as a cause variable (variable exogenous) to a set of other variables which are variable due to the (variable endogenous) [5].

5.5 Determination of the Strip Coefficient

In determining the overall effect of the variables in the path to the coefficient of the sum of all exogenous variables (variables Siting Factors) of the endogenous variables (variables Strategic location). Path coefficient value (based estimate) a variable factor Strategic Siting of the location can be seen in Figure 2.

To determine the effect of variable large proportion Siting factors to the strategic location can be seen in Figure 3.

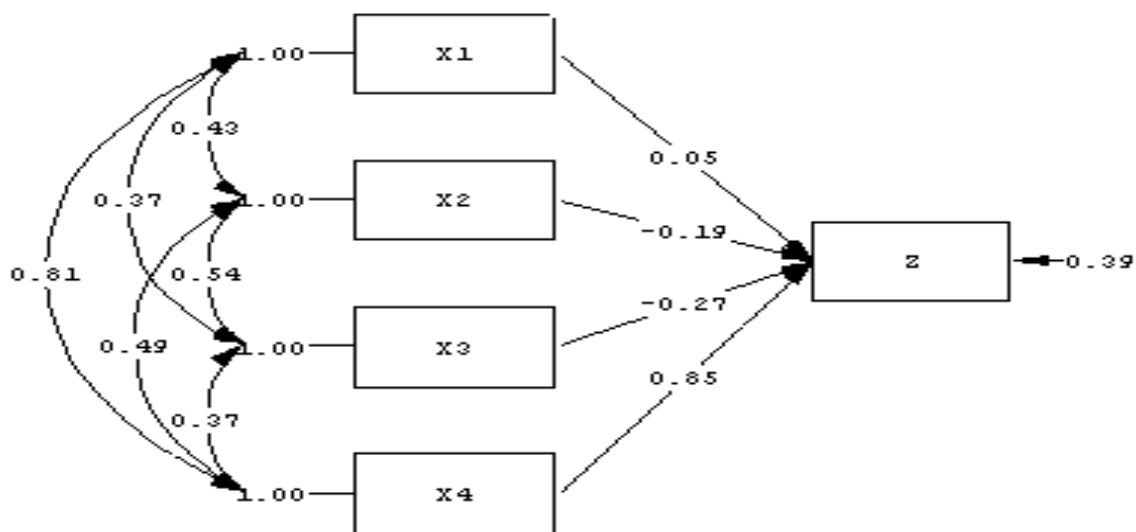


Figure 2. Path coefficient value of Factor Siting of the Strategic Locations

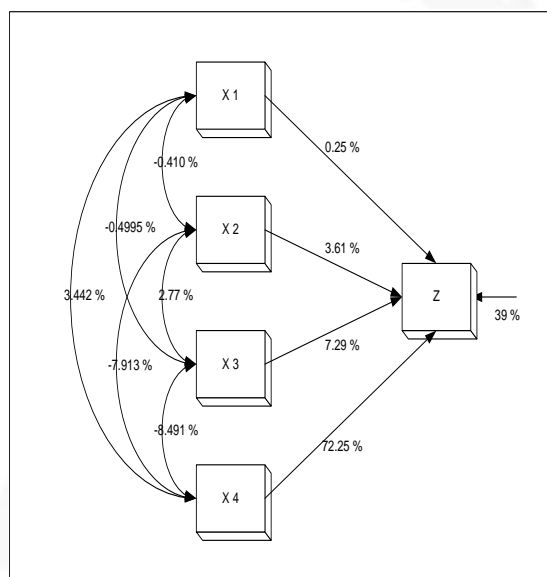


Figure 3. Value Proportion of Variable Factors Influence Siting of the Strategic Locations

5.6 Significance of Research Variables

Tests of significance to the study variables based on a t test (T-Value) that is a hypothesis testing whether the coefficient lines are formed in these studies significantly or not at the 5% significance level. As for the effect of significant variables that study, if the value of t is greater than t table (1.99). While the value of t is generated from tests of significance to the study variables via software lisrel presented in Figure 6.

Based on the results of tests of significance that there is only one variable that the effect is not significant, the factor Facility (X1). The variables determining factor locations significantly affect the determination of the strategic location, the rental price (X4) amounted to 72.25%, Distance to the location (X3) of 7.29%, and the amount of competitors (X2) is 3.61 %. While the variable factors determining the location described in this study contributes a considerable influence on the determination

strategic locations, namely by 61%, and the balance of 39% is a variable other than the variable of this study, which will affect the determination of a strategic location for the establishment of a new distribution center such as company policies, government policies or other factors.

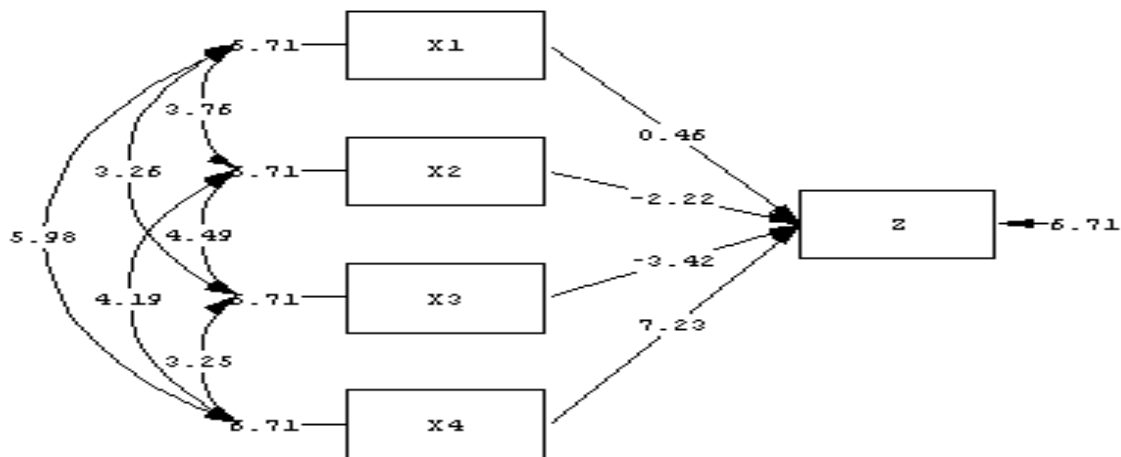


Figure 6. Significance test (t) Variable Factor Siting of the Strategic Locations

5.7 Siting Distribution Center

Solving problems in the distribution center site selection study PT. Marina in the city of Garut in order to develop product marketing expansion and optimization of customer services needed data to support solving the problem. Chairman of PT. Marina as decision (Decision Maker) intends to know the location of the city of Garut strategic distribution center locations for the placement of dodol Marina with a set of 4 (four) alternative locations proposed by four (4) criteria to be considered, namely:

alternative:

- 1.A 1 = Market Kosambi
- 2.A 2 = New Markets
- 3. A 3 = Market Long Leuwi
- 4.A 4 = Market Lembang

criteria:

- 1.f 1 = Rental
- 2.f 2 = Distance
- 3. f 3 = Number of Competitors
- 4.f 4 = Strategic Location

To facilitate the process of calculation and analysis of the evaluation are presented in Table 6 as follows:

Table 6. Evaluation

Criteria	f1 (.)	f2 (.)	f3 (.)	f4 (.)
Min / Max	Min	Min	Min	Max
Type	V	II	III	II
Q	1000	20	-	3
P	2000	-	2	-
A1	6750	98	7	14
A2	8500	101	9	13
A3	6500	90	4	16
A4	6000	130	5	9

Information :

f_j = Criteria

A_i = Regions candidate

p = preferences threshold

q = indifference threshold

Compilation 5.7.1 Dominance Relations

The preparation of this domination relationship is a process of determining the priority relationship between the alternate one with the other. At this stage, step - step calculation as follows:

a. Ranking Out Positive Flow

Also called Leaving Flow, The greater the value, the greater the dominance of an alternative to other alternatives

b. Out Ranking flow negative

Entering also called Flow, the greater the value, the greater the dominance of an alternative to other alternatives.

c. Net Flow / Balance Flow

Is the excess of the value of Positives Out Ranking and Negative Out Ranking and the result is the value of dominance for each alternative.

Table 7. Positive and Negative Calculation Results Out Ranking

Alt	+	Rank	-	Rank
A1	0.3125	2	0.1666	2
A2	0.1666	4	0.4790	3
A3	0.4583	1	0.0000	1
A4	0.2500	3	0.5416	4

Table 8. Net Flow Calculation Results

Alt	Rank	Rank
A1	0.1459	2
A2	-0.3124	4
A3	0.4583	1
A4	-0.2916	3

5.7.2 Decision Aid

(A) Promethee I (Partial Ranking)

Preparation of Partial Ranking is based on positive and negative values out ranking. The use Promethee I provide a more realistic and complete.

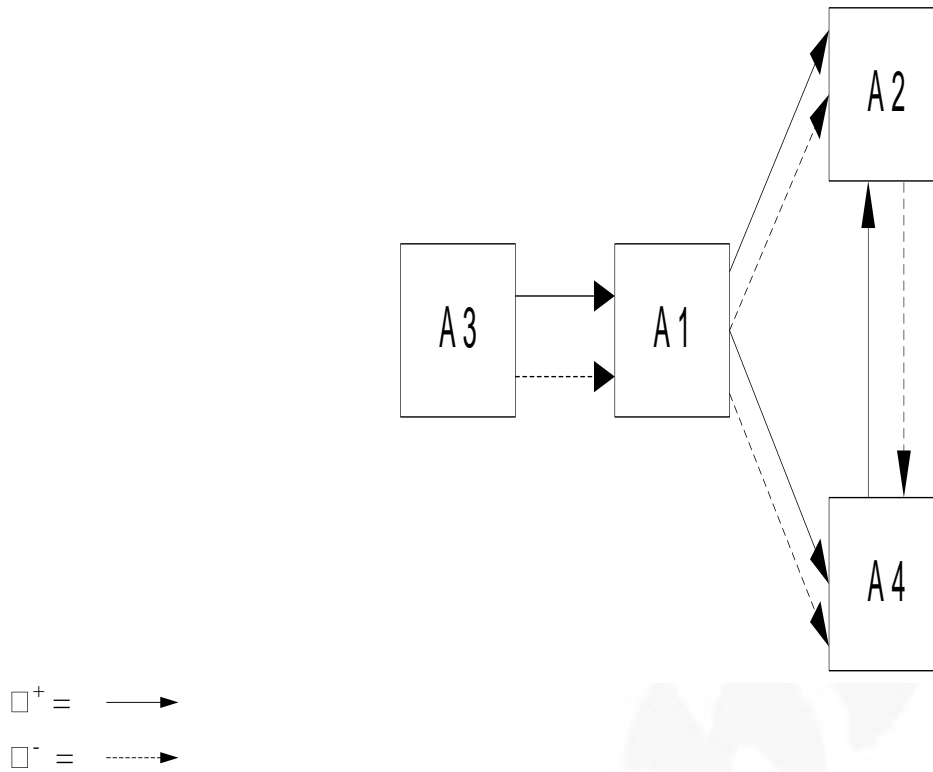


Figure 7. Relations between the alternative - Promethee 1

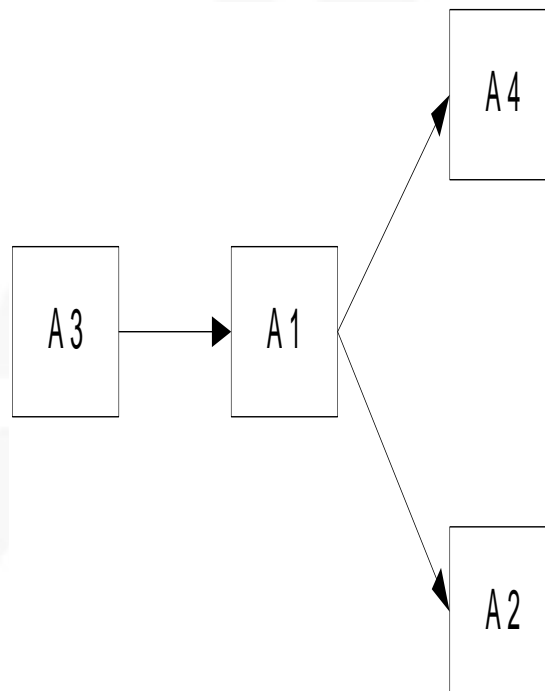


Figure 8. Promethee I - Partial Ranking

(B). Promethee II (Complete ranking)

Complete the preparation of the ranking is based on the value of Net Flow obtained from previous calculation for each alternative. The use Promethee II is more practical for decision makers in the decision process.

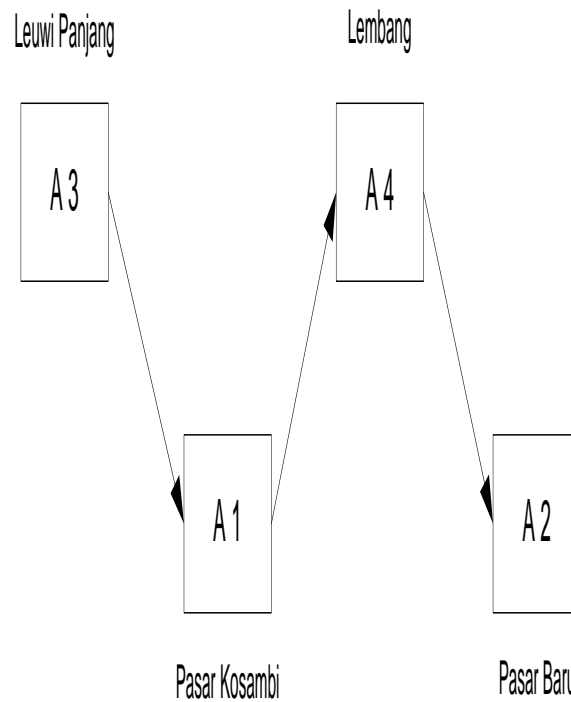


Figure 9. Promethee II - Complete Ranking

Based on Figure 7, 8 and 9 can be seen an alternative candidate sites can be used as a distribution center that is sorted based on the ranking of each - each potential location. Preparation of the relationship of domination (Fuzy outranking) based on the positive and negative outranking outranking each - each alternative. The discussion at this stage are as follows:

1. PositiveOut Ranking

Outranking positive calculation is performed to determine the value of kindness an alternative to other alternatives. If an alternative has a positive value outranking larger (more positive), then the alternative is said to dominate other alternatives.

From the results of data processing can be seen that the length Leuwi dominates all other alternatives, this is due to the long Leuwi having value more than other areas.

2. Negative Out Ranking

Outranking negative calculation is performed to determine the value of an alternative with other alternatives. If an alternative has a negative value outranking smaller (more negative) then the alternative is said to dominate other alternatives. From the results of data processing can be seen that the market is dominated Lembang other alternatives, this means Lembang has a value of benefits is not good to be used as a distribution center.

3. Net Flow

Net flow calculation is done to determine the value alternative to other alternatives. If an alternative has a net flow value greater (more positive), then the alternative is said to be better than other alternatives. The calculation of net flow value decimate done with negative out positive outranking ranking. From the results of data processing can be seen that the length Leuwi is ranked first, followed by Kosambi market, the market last Lembang and New Market. This means that the location is very good Leuwi length to be used as a distribution center.

4. Sensitivity Analysis

The sensitivity analysis was performed for each of the weight criteria that can be known pengaruhnya the weight of the value outranking positive, negative outranking which will determine the value of the net flow or results of a previous decision-making process.

The sensitivity analysis was done by changing (adding and subtracting) the percentage weight of each criteria gradually and alternately using the method Walking and Weight Weight Stability Intervals.

In determining the weight change in the sensitivity analysis is done by trial and error, by trying - trying to add or reduce the weight values for each criterion. In the analysis in this study were taken additional weight by 10% and 20% as well as a weight reduction of 10% and 20%.

This value is chosen so that it can be seen clearly rank order for each - each alternative location. Another thing to be considered a value addition and reduction in weight are based on the weight interval values for each - each criterion. From the results of the weight interval can be seen that the maximum value for the addition or subtraction of criteria weight is equal to 23.94%, resulting in a sensitivity analysis performed with the addition and reduction in weight by 10% and 20%.

Table 9. Interval Weight

Criteria	Weight	Interval	Weight %	Interval %
Price	1	(0.93 to 22)	25	(23.73 - 88)
Distance	1	(0 to 1.063)	25	(0 - 26.15)
Competitor	1	(0.94 - 3.1)	25	(23.94 - 50.82)
Strategic	1	(0-1063)	25	(0 - 26.15)

After sensitivity to each criterion, the area gained the most stable against changes in weight ie Long Leuwi market.

6. CONCLUSION

After conducting a series of studies and to collect the necessary data and then process until it reaches the stage of the analysis that this study is more meaningful, then it can be concluded that

1. Influence Factors - Factors Strategic location to location is:
 - a. The influence of variable factors determining the location of the strategic location of significant influence by 61%, while the variable is not identified by 39%
 - b. Overall a great influence of the factors determining the location of the strategic location affect the strategic location. Factors rental price (X4) influenced significantly by 72.25%, the distance factor (X3) significantly by 7.29%, and the factor of the number of competitors (X2) significantly by 3.61%, but there is one factor that is not significant influence is factor Facility (X1) which only effect of 0.25%.
2. Based on calculations by the method Promethee that the location of the distribution center dodol Marina in the city of Garut's most strategic in Long Leuwi Market area.

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