

# Giska Store Laundry Soap Product Brand Selection using Analytical Hierarch Process Method Guidelines for Author

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## ABSTRACT

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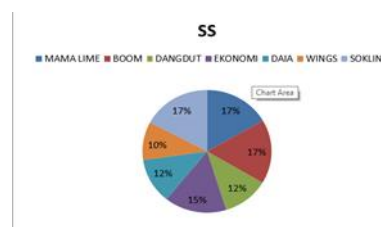
Soap;  
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Soap is a material for cleaning clothes is a basic requirement because every day people use soap for all needs. So many products of laundry soap brands that compete with each other in the market both local and foreign products. The importance of Decision Support System to assist buyers of laundry soap brand products in determining the choice of product brands that suit their needs and criteria. Analytical Hierarchy Process (AHP) is a multi-criterion decision-making method that can help certain parties in making the best decisions to achieve maximum results. Priority the most important criteria in determining the selection of brands of laundry soap products where the price of quality and capacity becomes the priority of users in the selection of brands of laundry soap products and the highest matrix value.

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## 1. Introduction

In the world of trade and the development of brands of laundry soap products among housewives, it always happens and never sinks from time to time. Soap is a material for cleaning clothes, is a basic need because every day people use soap that is many kinds for bathing, washing and others. So many products of laundry soap brands that compete with each other in the market both local and foreign products. The number of laundry soap brand products is often confusing, for people who have little knowledge about laundry soap brand products but want to wear them.



**Fig 1.** Diagram of Election Respondents Very Fond of brands of laundry soap products

Diagram in figure 1.1 shows the results of questionnaires to users of product brand selection as many as 50 Respondents who answered Very Like, 17% very fond of mama lime laundry soap product brand, 17% very fond of brand of laundry soap products boom, 12% very fond of brand of laundry soap products dangdut, 15% very fond brand of laundry soap products Economy, 12% very fond brand of laundry soap products Daia, 10% really like wing laundry soap product brand, and 17% really like soklin laundry soap product brand.

Decision Support System to assist buyers of laundry soap brand products in determining the choice of product brands that fit the needs and criteria. A system is a set of things or activities or elements or subsystems that work together or that are connected in certain ways so as to form a unit to carry out a function in order to achieve a goal [1]. In general, a decision support system (SPK) is an interactive computer-based system, which helps decision makers utilize data and models to solve unstructured and semi-structured problems [2]. SPK consists of two keywords, namely information systems and decisions. An information system is a series of formal procedures with stages in which data is grouped, processed so as to produce information that is subsequently provided to the user. A decision is a series of activities to choose an action in solving a problem. The act of choosing from the alternatives faced that are based on facts and done through a systematic approach that can provide the best solution performed by managers is called decision making [3]. The AHP method is also widely used in decisions for many criteria, planning, resource allocation and prioritization of strategies that players have in conflict situations [4]. Analytical Hierarchy Process (AHP) is a multi-criterion decision-making method, while lipstick brand decision making by relying on the criteria used to make decisions, thus helping certain parties in making the best decision to achieve maximum results.

Based on the perspective match of 50 respondents, the cohesion package assessment of results obtained using the AHP method showed 86.62% exactly with the user's expected results, while using the SAW method only obtained a percentage of 76.92% [5]. The results obtained by the Hamming Distance parameters on the results of the school's assessment found that the AHP-TOPSIS method was the best order with a percentage of 96.02%. Referring to the Euclidean Distance result against the report card value, the AHP method is the best method with a value of 0.47367. Therefore, based on the report card value parameters that look at the success rate of accelerated students and also as parameters for determining the method of recommendation, the AHP method becomes the best method given to the school in the case study of student admission acceleration program [6]. The conclusion of the House Selection study with the AHP and Fuzzy Mamdani methods can be used as an analysis in the support system of deciding the choice of a house, the comparison of AHP with Fuzzy Mamdani with the case of house selection is 0.90298, the accuracy rate of AHP is better than that of Fuzzy Mamdani in the case of house selection with MSE of 0.04853 [7].

## 2. Methods

Research method is a step taken by researchers in the process of collecting data or information and conducting analysis on the data obtained. This research method is the most important way to achieve the goal and determine the answer to the problem that occurred. Research was conducted for the manufacture of models of the application of AHP in the selection of brands of laundry soap products. AHP or Analytical Hierarchy process is one model for decision making that can help the human frame of mind. The basis of thinking the AHP method is the process of forming a numerical score to rank each alternative decision based on how the alternative should be matched with the criteria of the decision maker.

A decision support system is a specific information system to assist management in making decisions, with problems that are semi-structured effectively and efficiently, but do not replace the decision-making function in making decisions [13]. AHP is a decision support method developed by thomass L. Saaty, this decision support model will describe complex multi-factor or multi-criterion problems into a hierarchy [12].

The stages of decision making with the AHP Method :

- a. Define the problem and determine the desired solution.
- b. Create a hierarchical structure that begins with a general purpose, followed by criteria, sub-criteria and alternative options that you want to sort.
- c. Form a paired comparison matrix that describes the relative contribution or influence of each element to each of the above-level goals or criteria. Comparisons are made based on the choice of the decision maker by assessing the level of importance of one element over other elements.

Chang defines the intensity value of AHP into a triangular fuzzy scale that divides each fuzzy set by 2, except for the intensity of interest 1. The fuzzy triangle scale that Chang uses can be seen in the following table.

**TABLE 1**  
TRIANGULAR AHP VALUE SCALE (CHANG,2015)

Weight	Interests
1	Both elements are equally important. The two elements have the same influence:Just Equal)
3	One element is slightly more important than the other, experience and judgment support one element slightly compared to another(moderately important)
5	One element is more important than the other, Experience and judgment strongly support one element over another)
7	One element is obviously more absolutely important than the other element. One strong, supported and dominant element is seen inpractice)
9	One element is more important than the other. Evidence supporting one element against another has the highest possible level ofaffirmation)
2,4,6,8	Nilai -nilai antara dua nilai pertimbangan pertimbangan yang berdekatan, Nilai ini diberikan bila ada dua kompromi di antara 2 pilihan

- d. Normalize data by dividing the values of each element in a matrix that pairs with the total value of each column.
- e. Calculate the vector eigen value and test its consistency, if it is inconsistent the data taker (preference) needs to be repeated. The vector eigenvalue in question is the maximum vector eigen value obtained using matlab or manual.
- f. Repeat steps 3, 4, and 5 for the entire hierarchy level.
- g. Calculate the vector eigen of each paired comparison matrix. The vector eigen value is the weight of each element. This step synthesizes choice and prioritization of elements at the lowest hierarchical level until the achievement of goals.
- h. Test the consistency of the hierarchy. If it does not meet with  $CR < 0.100$  then the value must be repeated.

## 2.1 Research Stage

The research stages conducted are as follows:

### a. Research Object

The object of the study is the point of concern of a study, in this study the authors took objects that are users of branded laundry soap products in Sukabumi

### b. Identify the Problem

The problem in this study is that it is difficult to make decisions in choosing a brand of laundry soap products that are in accordance with the cry and user needs.

### c. Data Collection

The data collection on this study is an interview and litelatur study.

### d. Variables

Variables are the object of research or what is the focus of a study, the variables in this study are price, fragrance, capacity, Quality andpackaging data processing.

Data processing is the process or act of processing all information in research that is organized and planned, in this study processing using the AHP method using Ms. Excel

## 2.2 Source and Data Collection

The data sources used are:

### a. Primary Data

These are data obtained directly from the field by researchers. Primary data is obtained from field studies through the dissemination of a list of questions / questionnaires and interviews directly from sources. The information obtained will be processed to become the object of analysis, especially in interpresenting or explaining the meaning of the data obtained. From the observations obtained 5 criteria, namely price, fragrance, capacity, quality and packaging with each criterion has a criterion weight, the weight of the researcher's criteria can be seen in the table below.

**Table 2**  
Criterion Weights

	Criterion Weights	Percentage
Price	0.30	30%
Fragrant	0.04	4%
Capacity	0.08	8%
Quality	0.38	38%
Packaging	0.20	20%

**b. Secondary Data**

These are written data that is not obtained from the field directly. Secondary data is data obtained from library studies that collect data by reading, studying and analyzing sources that have to do with the object of research, in this case about the brand of laundry soap products that are most needed by the people of Sukabumi. The form can be in the form of research results, scientific articles, scientific publications such as journals and so on. While the data collection technique in this study is done by way of a list of questions / questionnaires, namely the collection of data and information to sources conducted with written interview sheets to get answers or responses from respondents related to the object of the study

**3. Results and Analysis**

**3.1 Results**

The results of the study contained data processing using analytical hierarchy process(AHP) methods assisted by Ms. Excell.

Comparison of Paired Criteria

For each criterion and alternative,a pairwise comparison is done that compares one element with another.

**Table 3**  
Matrix Comparison Of Pairs

Criterion	Price	Fragrant	Fill	Quality	Packaging
Price	1,00	3,00	2,00	0,14	2,00
Fragrant	0,33	1,00	3,00	0,50	2,00
Fill	0,50	0,33	1,00	0,14	2,00
Quality	5,00	2,00	5,00	1,00	5,00
Packaging	0,50	0,50	0,33	0,14	1,00
Sum	7,33	6,83	11,33	1,92	12,00

**TABLE 4**  
MATRIX NORMALIZATION COMPARISON

EIGEN VALUE						
Price	fragrant	Fill	Quality	Packaging	sum	Average
0,13636	0,43902	0,17652	0,07292	0,16667	0,99149	0,19830
0,04545	0,14634	0,26478	0,26042	0,16667	0,88366	0,17673
0,06818	0,04878	0,08826	0,07292	0,16667	0,44481	0,08896
0,68182	0,29268	0,44131	0,52083	0,41667	2,35331	0,47066
0,06818	0,07317	0,02913	0,07292	0,08333	0,32673	0,06535
						1,00000

**LAMDA MAX** 5,357615394  
**CI=(LAMDA MAX-N)/(N-1)** 0,089403848  
**CR=CI/IR** 0,079824865

Determinant Merek Washing Soap Products

The new soap brand determinant uses the AHP method by looking for the Market Matrix Value of each criterion by taking the data of prospective users of the brand of laundry soap products. After Determining and calculating the Matrix Comparison each subsequent criterion of matrix comparison in normalization and searched the value of Alternative Weights.



**TABLE 5**  
MATRIX PRICE COMPARISON

Alternative	Mama lime	Boom	Dangdut	Economics	Daia	Wings	Soklin
Mama lime	1,00	0,50	3,00	0,50	3,00	4,00	0,50
Boom	2,00	1,00	3,00	2,00	3,00	7,00	2,00
Dangdut	0,33	0,33	1,00	0,33	2,00	2,00	0,33
Economics	2,00	0,50	3,00	1,00	3,00	4,00	2,00
Daia	0,33	0,33	0,50	0,33	1,00	3,00	0,25
Wings	0,25	0,14	0,50	0,25	0,33	1,00	0,20
Soklin	2,00	0,50	3,00	0,50	4,00	5,00	1,00
Sum	7,92	3,31	14,00	4,92	16,33	26,00	6,28

**TABLE 6**  
EIGEN VALUE

Mama lime	Boom	Dangdut	Economics	Daia	Wings	Soklin	Sum	Average
0,1263	0,1511	0,2143	0,1017	0,1837	0,1538	0,0796	1,0105	0,1444
0,2526	0,3022	0,2143	0,4068	0,1837	0,2692	0,3183	1,9471	0,2782
0,0421	0,1007	0,0714	0,0678	0,1224	0,0769	0,0531	0,5345	0,0764
0,2526	0,1511	0,2143	0,2034	0,1837	0,1538	0,3183	1,4772	0,2110
0,0421	0,1007	0,0357	0,0678	0,0612	0,1154	0,0398	0,4627	0,0661
0,0316	0,0432	0,0357	0,0508	0,0204	0,0385	0,0318	0,2520	0,0360
0,2526	0,1511	0,2143	0,1017	0,2449	0,1923	0,1592	1,3160	0,1880

LAMDA MAX

**7,366893293**

CI=(LAMDA MAX-N)/(N-1)

**0,061148882**

CR=CI/IR

**0,046324911**

**TABLE 7**  
EIGEN VALUE

WARKINGAN	
MAMA LIME	0,39262869
BOOM	0,63781636
DANGDUT	0,38526404
EKONOMI	0,42106192
DAIA	0,2695179
WINGS	0,21867489
<b>SOKLIN</b>	<b>0,50665596</b>



From the table above it can be seen that the highest value obtained by the Soklin brand with a matrix value of 0.506655 compared to other brands. If depicted in the form of a percentage graph then it can be seen as follows.

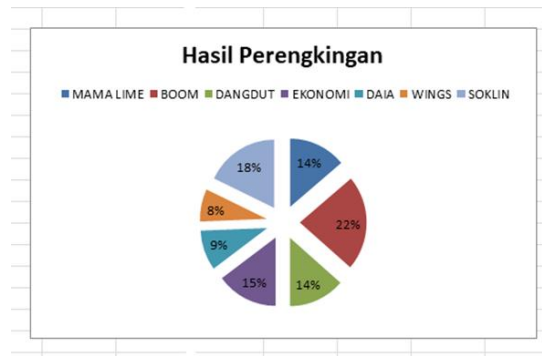


Fig 2. Graphic Presentation of Matrix Value Determination of Laundry Soap Products

### 3.2 Discussion

In this case study used data taken from the results of questionnaires and interviews. The data used consists of primary and secondary data. Secondary data is data obtained from journals, articles and others related to the problems in this study while primary data is data obtained directly from decision making which in this case is the seller of laundry soap product brands and consumers of laundry soap product brands by conducting interviews and observations at Rini Store.

In this case study using the Method Analytical Hierarchy Proses (AHP) can be described graphically so that it is easily understood by all parties involved in decision making. In this case, the AHP method helps give weight to each influence so that decision making can take decisions appropriately and effectively, namely which brands of laundry soap products give weight and will be prioritized first by consumers. In the completion of calculations used Ms.Excel.

The problem to be solved will be described into elements that are goals / goals, criteria and alternatives. Thus the hierarchical structure in the influence of student achievement is as follows:

- a. Level 1, is the goal or goal that will be obtained, namely the brand of laundry soap products.
- b. Level 2, is a criterion, in this case the criteria that are often used by consumers there are five, namely: price, fragrance, quality, quantity, packaging.
- c. Level 3 is an alternative. In this case will be taken seven brands of laundry soap products, namely: mama line, boom, dangdut, economy, daia, wings and soklin.

Furthermore, a comparison matrix will be created in pairs of criteria and alternatives to obtain the weight value (priority) of each selected achievement influence. From table 4.14 the highest value obtained by the Soklin brand with a matrix value of 0.5066655 compared to other brands so that Soklin alternative is the preferred laundry soap product brand for buyers.

### 4. Conclusions

Based on the purpose of research, data processing and analysis that has been done, it can be concluded:

- a. Selection of lipstick brands using analytical hierarchy process (AHP) method can help laundry soap users in choosing the brand of product easily according to the desired criteria. AHP data obtained from the filling of questionnaires by then calculated and found the final results of the brand of priority laundry soap products.
- b. Based on the calculation of AHP, the most important priority criteria are obtained in determining the selection of the brand of washing meth products where the price and capacity become the priority of the user in the selection of the brand of laundry soap products and the highest matrix value obtained by the soklin brand with a matrix value of 0.505566.

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