

Selection of the Best Lip Cream According to Consumers Using the Multi-Attribute Utility Theory (MAUT) Method

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Abstract—Cosmetics are products applied externally to the human body, including the lips, to enhance appearance, protect, and improve aesthetic value. One of the most widely used cosmetic products is lip cream, which is favored due to its long-lasting properties, even color coverage, comfortable texture, and practicality. However, the selection of lip cream products by consumers is often subjective and not supported by systematic evaluation methods, resulting in less optimal purchasing decisions. Therefore, a structured decision support approach is required to assist consumers in choosing the most suitable lip cream based on multiple criteria. This study aims to apply the Multi-Attribute Utility Theory (MAUT) method as a decision support system to determine the best lip cream according to consumer preferences. The evaluation is based on four main criteria: long-lasting performance, light texture quality, even color coverage, and affordable price. Data were collected through questionnaires distributed to consumers, particularly women who actively use lip cream products. Eight lip cream brands were evaluated as alternatives, namely Hanasui, Wardah, OMG, Pink Flash, Maybelline, Implora, Make Over, and Purbasari. The MAUT method was implemented through several stages, including criteria weighting, normalization, marginal utility calculation, and final utility value determination. The results indicate that the Make Over brand achieved the highest utility value, followed by OMG and Implora, demonstrating that products with a balanced combination of durability, quality, and reasonable price are more preferred by consumers. These findings confirm that the MAUT method is effective in providing objective, accurate, and systematic decision support for cosmetic product selection. This research contributes to helping consumers make rational purchasing decisions and provides valuable insights for manufacturers and sellers to understand market preferences and improve product competitiveness in the cosmetics industry.

Keywords: Election; Lipcream; Consumer; DSS; MAUT

1. INTRODUCTION

Cosmetics are materials commonly used on the outside of the human body, such as the lips, nails, skin, hair, and other organs, with the aim of cleaning, perfuming, transforming, protecting, and nourishing, intended to provide better protection than before (Maharani, 2021; Singh, 2025). Beauty is an important activity for women. In general, women always want to look attractive before doing an activity, even if the activity is not too difficult or important so that someone can accept the invitation. When leaving the house, even if it is just to go shopping, women must always remember to use cosmetics to look beautiful. Likewise, housewives always use cosmetics, even if they are just buying vegetables and cooking a little. This situation makes cosmetics sales among women very promising.

More and more women who use cosmetics want their existence to be recognized by society and their environment, but women's knowledge about cosmetics is very low, and some cosmetics on the market are harmful to the body due to their ingredients (Chen, 2022). The increasing demand for cosmetics in the market has led to the growth of the Indonesian cosmetics industry. However, due to poor compliance and the use of products that are not suitable for their skin type or contain harmful chemicals, they are unaware of the risks and do not worry about their health and safety. The use of cosmetics is rapidly increasing in Indonesia, and many products from various domestic and foreign brands are available (Binh, 2025). Harmful cosmetic ingredients can be dangerous to health, especially because they contain mercury, which is commonly found in skin creams, heavy metals that are toxic and carcinogenic, and synthetic dyes that contain Rhodamine B. These ingredients interfere with liver function and cause cancer and hyperpigmentation (Bansal, 2021).

Currently, beauty has become a high-class habit for women. This preference often takes the form of looking attractive, which will boost your confidence when interacting socially with others, whether at home or on social media, as well as with cosmetics manufacturers. This presents opportunities for those who will eventually produce various types of cosmetics. Start with facial cosmetics, skin care, and the most common one is lipstick. The most popular lipstick color today is the cream-based type, commonly known as Lip Cream (Almeida, 2025). Lip Cream is a type of lip balm that is very popular, and women want to have it because it is very useful due to its uniform color texture, moisturizes the lips, lasts longer when used, and does not break easily compared to solid lip balm. It is also easy to carry anywhere thanks to its special applicator brush (Das, 2025). Lip Cream, which is often used to color the lips, has the ability to create an artistic touch to enhance the aesthetic value of facial makeup (Ajay, 2025). A good Lip Cream must meet certain criteria to adhere well and provide an even layer of lipstick on the lips, not feel sticky when applied, last long, not cause irritation, and offer attractive colors (Dhanalakshmi, 2025). Lips require care because they are a part of the body that attracts attention from others regarding beauty. People strive to care for and beautify their lips by always maintaining moisture and creating

colors to make the lips look more glossy (Vellingiri, 2025). The lips are a part of the face that has a major influence on human facial aesthetics because they have about three or four layers compared to facial skin (Shafiq, 2025).

The high demand for lip cream provides an opportunity for lip cream manufacturers and sellers to compete in improving product quality and service so that consumers are interested in buying and using them (Prabhu, 2025). Consumers are people who use goods and services available in the market to meet their basic needs without having to resell them to others (P. Raj, 2024). Opinions (R. Raj, 2024) related to consumers state that an emotional assessment of the use of a product is based on fulfilled expectations and needs. Research (Khelfaoui, 2024) states that consumers are individuals in a household with the aim of purchasing and obtaining goods or services for personal use.

Decision Support Systems (DSS) provide search assistance in research by using certain methods that later provide alternative solutions, thereby providing efficient decisions on data and decision making (Khelfaoui, 2024; Sevim, 2024). Decision Support Systems (DSS) are also not intended to replace the role of decision making but to provide assistance in support of decision making (Raju, 2024). Research (Baraily, 2024) shows that a decision support system (DSS) is an operable system that provides modeling, data manipulation, and decision support tools instead of making decisions and completing processed data using the data needed to make decisions quickly and make the right decisions. This system is capable of dividing problem solving, conducting structured and unstructured communication in a criteria-based knowledge base (Sampath, 2024).

Common methods used for decision making include AHP, SMART, SAW, and WP. This study uses the Multi Attribute Utility Theory (MAUT) method because it has advantages in terms of fast and accurate calculations to produce decisions (Yontar, 2024). The MAUT method allows the calculation of weighted values for each attribute utility (Handrizal, 2024), as described in the study. In addition, this method can handle data with many different attributes that have unique utilities (Prabiantissa, 2024), such as various benefits. Each attribute can be evaluated independently without requiring adjustments. Multi Attribute Utility Theory (MAUT) converts several interests into numerical values on a scale of 0-1, where 0 represents the worst choice and 1 represents the best choice (Nwankiti, 2024).

The application of Multi-Attribute Utility Theory (MAUT) in the field of cosmetics has already been done. For example, study (Bansal, 2021) identified the main evaluation criteria in choosing lip cream, such as price, ingredient quality, color variety, durability, and packaging (Agustina, 2024). Using the MAUT method, the results showed that product X received a score of 1 as the first rank, followed by product Y with a score of 0.8, and product Z with a score of 0.7. These results are an important reference for consumers in choosing the best cosmetic products according to their needs. The application of MAUT shows that this method is effective in supporting consumer decisions, especially in the cosmetics sector (Jati, 2024).

This study aims to develop a decision support system for choosing the best lip cream according to consumers (Ghoushechi, 2023). With this system, (Riahi, 2023) the study is expected to help manufacturers understand market needs and provide appropriate product recommendations. (Chivukula, 2023) This system also helps prospective buyers (Barik, 2023) obtain information about the best lip cream based on specific criteria (Soetjipto, 2023), thereby (Ikasari, 2023) contributing to more accurate decision-making in the cosmetics market segmentation.

2. RESEARCH METHODOLOGY

This research method uses a quantitative approach with data analysis techniques based on Multi Attribute Utility Theory (MAUT). The research was conducted to evaluate and determine the best lip cream based on consumer preferences for several criteria, such as price, quality, durability, color, and ingredients. Data was collected through questionnaires distributed to consumers who are active users of lip cream, then processed to produce utility values for each product alternative (Safi, 2022).

The first stage of this study was to determine the main criteria and attributes that formed the basis of the assessment. After that, weights were assigned to each criterion based on the level of importance stated by the respondents. This process used the pairwise comparison method or direct assessment. Next, the scores for each lip cream alternative were calculated based on the criterion scores obtained from the respondents, which resulted in a ranking of the best lip creams (Khorshidi, 2022).

The final stage is to validate the results by seeing whether the lip cream with the highest utility value matches the majority of consumers' choices (Wankhede, 2022). The MAUT method used allows for comprehensive analysis by integrating consumer preferences and objective factors simultaneously. The entire analysis process is carried out using statistical software to ensure the accuracy of the research results (Ranjith, 2022).

2.1 Research Stages

The research stages can be seen in Figure 1 below, where the research stages are a process or series that must be identified as a form of problem solving or steps towards achieving objectives. The following are the stages used by the researcher:

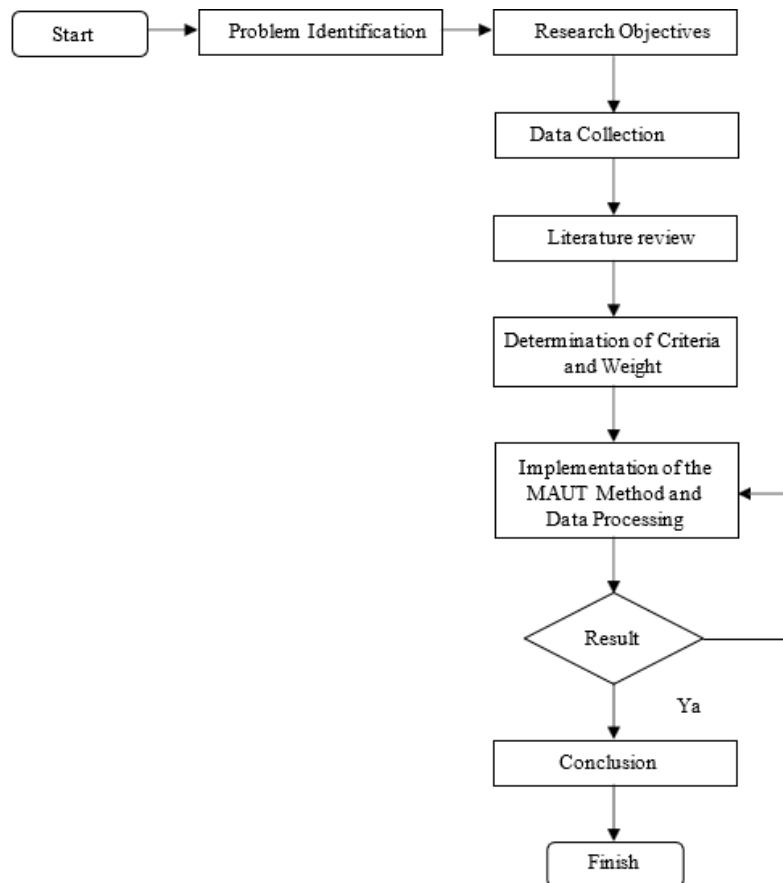


Figure 1. Research Stages

The explanation of the research stages in the diagram above is as follows:

- a. Start
Begin by planning the research or analysing the data
- b. Problem Identification
Explains the problems that occur in a research decision-making process
- c. Research Objectives
After identifying the problem, the research objectives are determined so that the research steps will be more focused
- d. Data Collection
Data collection is carried out through observation to better understand the process of product selection
- e. Literature Study
The Literature review process was conducted by studying previous research journal articles and reference books to gather information related to the problem being studied
- f. Determination of Criteria and Weight
Determine relevant research criteria and weight, and assign weight to each criterion according to their level of importance
- g. Implementation of the MAUT Method and Data Processing
The implementation stage of this research method uses the Multi Attribute Utility Theory (MAUT) method to solve the problems being studied
- h. Results
The final results of the research after data processing, if they meet the research objectives, will proceed to the next stage; if not, improvements will be made at the previous stage
- i. Completion
Drawing conclusions from the entire process or stages that have been carried out

2.2 Problem Identification

Lip cream is classified as a cosmetic product used as a lip colorant that has a semi-solid form to produce the desired color for the user to look more attractive. In addition, lip cream also acts as a long-lasting lip moisturizer, making the lips look shiny and evenly colored (Jati, 2024). However, the selection of the best Lip Cream is still subjective, and there is no structured and quantitative method for evaluation due to the lack of clear and measurable assessment criteria, resulting in suboptimal selection of Lip Cream. The application of the Multi-Attribute Utility Theory (MAUT) method is intended to assist in the evaluation and determination of the best Lip Cream in a systematic, objective manner using valid data.

2.3 Research Objectives

This study aims to apply the Multi Attribute Utility Theory (MAUT) method in evaluating and determining the best lip cream based on consumer assessments of various brands according to predetermined criteria. This study also develops a decision support system to help manufacturers or sellers obtain information about lip creams that can be recommended to potential buyers according to market segmentation.

2.4 Literature Review

2.4.1 Decision Support System

A Decision Support System (DSS) is a system designed to assist in decision-making on an issue, whether in an organization or a company, by processing relevant data, information, and criteria. DSS serves to solve problems in decision-making, deal with various situations, and determine the best choice to achieve a specific goal. In general, the purpose of DSS is to provide accurate, structured, relevant, and systematic information. DSS can be applied in various fields such as management, health, business, and others. The collected data will be processed, analyzed, and produce solutions or recommendations that can support decision makers.

2.4.2 Multi-Attribute Utility Theory (MAUT) Method

The Multi-Attribute Utility Theory (MAUT) method is one of the methods whose formulation and resolution are based on the idea that decision-making has different preference values for each criterion, which will later be calculated and can consider a weight or relative value for each criterion.

Applying the Multi Attribute Utility Theory (MAUT) method involves several steps:

a. Prepare the Decision Matrix

$$X = \begin{bmatrix} r_{i1} & \cdots & r_{ij} & \cdots & r_{in} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ r_{m1} & \cdots & r_{mj} & \cdots & r_{mn} \end{bmatrix}_{m \times n} \quad i = 1, \dots, m \quad j = 1, \dots, n \quad (1)$$

b. Calculating the Normalization Matrix (r_{ij}^*)

For Criteria Benefit

$$r_{ij}^* = \frac{r_{ij} - \min(r_{ij})}{\max(r_{ij}) - \min(r_{ij})}, \quad i = 1, \dots, m, \quad j = 1, \dots, n \quad (2)$$

Explanation :

r_{ij}^* = Alternative weight normalization

$r_{ij}^* \min$ = Normalization of minimum criteria (lowest weight)

$r_{ij}^* \max$ = Maximum criterion value (highest weight)

For the cost criteria

$$r_{ij}^* = 1 + \frac{\min(r_{ij}) - r_{ij}}{\max(r_{ij}) - \min(r_{ij})}, \quad i = 1, \dots, m, \quad j = 1, \dots, n \quad (3)$$

c. Calculating Marginal Utility Value (u_{ij})

$$u_{ij} = \frac{e^{(r_{ij}^*)^2} - 1}{1.71}, \quad i = 1, \dots, m, \quad j = 1, \dots, n \quad (4)$$

Explanation :

u_{ij} = utility or satisfaction of alternative i with respect to criterion j

$e^{(r_{ij}^*)^2}$ = Ideal evaluation of criterion j for alternative i

d. Calculating the Final Utility Value (Preference Value)

$$U_i = \sum_{j=1}^n U_{ij} * W_j, \quad i = 1, \dots, m \quad (5)$$

Explanation :

u_i = Total evaluation of alternative

n = Number of criteria

i = Index to show the criteria

w_j = Alternative criteria weights

2.5 Data Collection

The data used in this study consists of primary and secondary data, where primary data was obtained through field observation and interview with stakeholders such as users of Lip Cream product and sellers of these products. Secondary data was obtained from sellers reports on these products.

2.5.1 Criteria

Criteria are measures or rules that are always used to determine the best alternative from several alternatives. The following criteria were used to determine the best Lip Cream according to consumers. The criteria used are presented in Table 1 :

Table 1. Criteria

No	Criteria	Variable
1	Long-Lasting	C1
2	Light Texture Quality	C2
3	Even Color	C3
4	Affordable Price	C4

The criteria shown in Table 1 were determined based pn interviews with Lip Cream users and sellers. Criteria established in the study based on interviews with users and sallers Lip Cream. Explanation of the criteria in the table above :

Long-Lasting: Lip Cream with long-lasting color is highly valued because reduces the need for reapplication.

Light Texture Quality: The Lip Cream has a comfortable texture that is non-sticky and easy to apply to the lips.

Even Color: Lip Cream provides even coverage when applied to the lips.

Affordable Price: The price of Lip Cream is an important factor for consumers; products with reasonable prices but good quality will be more attractive.

After determining the evaluation criteria, each criterion was assigned a weight to reflect its level of importance in the decision-making process. The weighting of criteria was carried out based on consumer preferences obtained from interviews and questionnaires. The weighted values of each criterion are presented in Table 2 :

Table 2. Weighted Criteria Values

No	Criteria	Description	Weight
1	C1	Long-Lasting	0.25
2	C2	Light Texture Quality	0.25
3	C3	Even Color	0.2
4	C4	Affordable Price	0.3

As shown in Table 2, each criterion has a different weight according to its impotance in selecting the best Lip Cream. The criterion Affordable Price (C4) has the highest weight, indicating that price a major role in consumer decision-making, followed by Long-Lasting (C1) and Light Texture Quality (C2), while Even Color (C3) has a relatively lower weight.

2.5.2 Alternative

In general, alternatives refer to options or choices that can be considered through the decision-making process. In accordance with the context of Decision Support System (DSS) alternatives are usually solutions that can be chosen to achieve the desired objectives. The following alternatives were used in this study.

Table 3. Alternatives

No	Lip Cream Brand	Variable
1	Hanasui	A1
2	Wardah	A2
3	OMG	A3
4	Pink Flash	A4
5	Maybellin	A5
6	Implora	A6
7	Make Over	A7
8	Purbasari	A8

Based on these criteria, there are values within the criteria, as shown in Table 4 :

Table 4. Criteria Weight Values

Criteria	Parameter	Criteria Weight Value
Long- Lasting	Poor	1
	Fair	2
	Good	3
	Very Good	4

Criteria	Parameter	Criteria Weight Value
Light Tecture Quality	Poor	1
	Fair	2
	Good	3
	Very Good	4
Even Color	Poor	1
	Fair	2
	Good	3
	Very Good	4
Affordable Price	LessAppropriate	1
	Appropriate	2
	Expensive	3
	Very Expensive	4

After determining the weight values for each criterion, the alternative data obtained from the questionnaires filled out by consumers can be determined, as shown in Table 5 :

Table 5. Alternative Data

No	Lip Cream Name	Long-Lasting	Light Texture Quality	Even Color	Affordable Price
1	Hanasui	3	2	3	3
2	Wardah	3	3	4	2
3	Omg	4	2	3	3
4	Pink Flash	1	2	2	2
5	Maybeline	3	4	2	1
6	Implora	3	2	4	3
7	Make Over	4	3	4	3
8	Purbasari	1	2	3	3

3. RESULT AND DISCUSSION

The results of the study show that after calculating the weight values using the MAUT method, each lip cream alternative has a different utility value based on the specified criteria. The criteria that most influence the selection of lip cream are quality and durability, followed by price, color, and ingredients. This illustrates that consumers tend to focus more on attributes that directly affect the product usage experience. Lip creams with the highest scores for quality and durability generally rank at the top of the alternative rankings.

During the discussion process, it was found that the highest weights were given to quality (35%) and durability (30%), while the weights for price, color, and ingredients were 20%, 10%, and 5%, respectively. This weight adjustment shows consumers' priority in choosing products that provide long-term benefits over just aesthetics or economic value. In addition, affordable but high-quality lip creams successfully secured top rankings, reinforcing the influence of attribute balance in the decision-making process.

After calculating the utility values, lip cream brand A ranked first with the highest utility score, followed by brands B and C. Brand A showed consistent performance across all criteria, especially in durability and quality, which were the main reasons it was preferred by consumers. Meanwhile, brand B, which was more economical but sacrificed quality slightly, came in second. This shows that there is diversification in consumer preferences based on individual needs.

The discussion of the results also shows that the MAUT method is able to provide rankings that are in line with consumer expectations. For example, brands with low utility scores on key criteria such as quality and durability, even though they excel in price, tend not to be among consumers' top preferences. Thus, these results confirm that a utility-based approach provides relevant results for use in purchasing decisions.

Overall, the discussion of this study provides insight that by using the MAUT method, producers can better understand consumer needs and preferences. The information obtained can be used to design products that meet key consumer criteria, thereby increasing customer satisfaction and competitiveness in the market. This also indicates the importance of attribute-based analysis in supporting more effective marketing strategies.

After completing the weight value calculation, the following are the steps to apply the MAUT method based on the criteria determined for each alternative.

a. Create a Decision Matrix

3	2	3	3
3	3	4	2
4	2	3	3
2	2	2	2
3	4	2	1
3	2	4	3

4 3 4 3
1 2 3 3

Max : 4, 4, 4, 3

Min : 1, 2, 2, 1

Calculation the normal matrix ((r^*ij) For Criteria C1(Benefit)

$$r * 1.1 = \frac{3-1}{4-1} = \frac{2}{3} = 0,67$$

$$r * 2.1 = \frac{2-2}{4-1} = \frac{0}{3} = 0$$

$$r * 3.1 = \frac{3-2}{4-1} = \frac{1}{3} = 0,5$$

$$r * 4.1 = \frac{3-1}{3-1} = \frac{2}{2} = 1$$

In steps C2, C3, and C4 which are the same as step C1, the normalization matrix calculation process is also the same. Based on the normalization matrix calculation, the following matrix values are obtained:

Table 6. Normalization Matrix Results

No	Lip Cream Name	Long-Lasting	Light Texture Quality	Even Color	Affordable Price
1	Hanasui	0,666666667	0	0,5	1
2	Wardah	0,666666667	0,5	1	0,5
3	Omg	1	0	0,5	1
4	Pink Flash	0	0	0	0,5
5	Maybeline	0,666666667	1	0	0
6	Implora	0,666666667	0	1	1
7	Make Over	1	0,5	1	1
8	Purbasari	0	0	0,5	1

Calculating the marginal utility value (U_{ij}) For Criteria C1

$$U_{1.1} = \frac{e^{(0.67^2 - 1)}}{1.71} = 0.2599$$

$$U_{2.1} = \frac{e^{(0^2 - 1)}}{1.71} = 0.$$

$$U_{3.1} = \frac{e^{(0.5^2 - 1)}}{1.71} = 0,1462$$

$$U_{4.1} = \frac{e^{(1^2 - 1)}}{1.71} = 1.1696$$

In steps C2, C3, and C4, the process is the same as in step C1 in calculating the marginal utility matrix. Based on the normalization matrix calculation, the following matrix values are obtained:

Table 7. Matrix Values

No	Lip Cream Name	Long-Lasting	Light Texture	Even Color	Affordable Price
1	Hanasui	0,2599	0	0,1462	1,1696
2	Wardah	0,2599	0,1462	0,5848	0,5848
3	Omg	0,5848	0	0,1462	1,1696
4	Pink Flash	0	0	0	0,5848
5	Maybeline	0,2599	0,5848	0	0
6	Implora	0,2599	0	0,5848	1,1696
7	Make Over	0,5848	0,1462	0,5848	1,1696
8	Purbasari	0	0	0,1462	1,1696

b. Calculating the final utility value

$$U_1 = (0.25 * 0.2599) + (0.25 * 0) + (0.2 * 0.1462) + (0.3 * 1.1696) = 0.4451$$

$$U_2 = (0.25 * 0.2599) + (0.25 * 0.1462) + (0.2 * 0.5848) + (0.3 * 0.5848) = 0.3939$$

$$U_3 = (0.25 * 0.5848) + (0.25 * 0) + (0.2 * 0.1462) + (0.3 * 1.1696) = 0.5263$$

$$U_4 = (0.25 * 0) + (0.25 * 0) + (0.2 * 0) + (0.3 * 0.5848) = 0.1754$$

$$U_5 = (0.25 * 0.2599) + (0.25 * 0.5848) + (0.2 * 0) + (0.3 * 0) = 0.2112$$

$$U_6 = (0.25 * 0.2599) + (0.25 * 0) + (0.2 * 0.5848) + (0.3 * 1.1696) = 0.5328$$

$$U_7 = (0.25 * 0.5848) + (0.25 * 0.1462) + (0.2 * 0.5848) + (0.3 * 1.1696) = 0.6506$$

$$U_8 = (0.25 * 0) + (0.25 * 0) + (0.2 * 0.1462) + (0.3 * 1.1696) = 0.3801$$

The results of the final utility value calculations are shown in the ranking table below:

Table 8. Alternative Ranking Results

Alternative	Lip Cream Name	Result	Rank
A1	Hanasui	0,4451	4
A2	Wardah	0,3939	5
A3	Omg	0,5263	2
A4	Pink Flash	0,1754	7
A5	Maybeline	0,2112	8
A6	Implora	0,5328	3
A7	Make Over	0,6506	1
A8	Purbasari	0,3801	6

4. CONCLUSION

This conclusion states that selecting the best lip cream using the MAUT (Multi-Attribute Utility Theory) method produces accurate and structured results. The assessment was based on four main criteria: long-lasting, light texture, even color, and reasonable price, involving eight product alternatives: Hanasui, Wardah, OMG, Pink Flash, Maybelline, Implora, Make Over, and Purbasari. Based on the discussion and calculations performed, the alternatives were ranked according to the criteria applied. The first place was achieved by the Make Over (A7) product with a score of 0.6505, followed by the OMG (A3) product in second place with a score of 0.5263, and the Implora (A6) product in third place with a score of 0.5328. This conclusion shows that the Multi Attribute Utility Theory (MAUT) method is effective in helping consumers determine the best lip cream based on certain criteria, such as price, quality, color, durability, and ingredients used. By using this approach, consumer preferences can be converted into numbers that describe the level of satisfaction with each product attribute, so that purchasing decisions can be made rationally and objectively. This conclusion illustrates that by considering attributes that match consumer preferences, the MAUT method provides more systematic results in selecting the best product. Lip cream with the highest utility value is usually the result of an optimal combination of attributes that are most valued by consumers. This proves that this method is very suitable for use in beauty product market research. This conclusion shows that the lip cream brand with the highest utility value based on the MAUT method is the one with the best balance between affordable price and satisfactory quality. This finding reflects that consumers are not only looking for high-quality products, but also those that provide the best economic value according to their budget. Therefore, lip creams that meet both of these aspects have great potential to become the top choice for consumers. This conclusion confirms that analytical approaches such as MAUT are not only beneficial for consumers in making purchasing decisions but can also be used by manufacturers to understand the attributes that are considered important by their target market. This information can serve as a guide for manufacturers to develop products that align with consumer needs and preferences, thereby enhancing their competitiveness in the market.

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