

Consumer Preference of Cosmetics Products Using AHP and PROMETHEE Method

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Abstract- Foundation is one of the important parts of makeup application. It is a skin coloured cosmetic that hides the uneven skin tone to get a smooth and flawless finish. Consumers have many choices of products and criteria to consider before purchasing their preferred foundation. The first objective of this study is to determine the weight of the criteria that influences a consumer's (beauty expert) cosmetic product preferences. Six criteria that influence consumer's decision making in this study are price, quality, packaging, availability, advertisement and "word-of-mouth" (WOM). Analytical Hierarchy Process (AHP) is used to weigh and prioritise the criterion. The second objective is to rank the most preferred cosmetics' foundations with the aid of Preference Ranking Organization Method of Enrichment Evaluation (PROMETHEE). The result of the research shows WOM is the major influence that affects customer's choice in purchasing the foundation cosmetics followed by quality, availability, price, packaging and advertisement. One of the international brands is the most preferred foundation which has existed in Malaysia for decades. In today's trend, WOM acts as the main source in creating customers' belief, confidence, awareness and marketing due to the technology development in terms of social media influences.

Keywords: Multi-Criteria Decision Making, AHP, PROMETHEE, Foundation Cosmetics, Word-of-Mouth.

I. INTRODUCTION

Cosmetics are defined as a medium for beautifying the complexion, skin, hair, and nails. Federal Food, Drug and Cosmetics Act described cosmetics as the substances which are applied on any exterior part on human body for cleansing purpose, beautifying the complexion, increase attractiveness or altering the appearance [1]. It can be classified into several parts, such as skin care (cleanser, face mask and sunblock), body care (shampoo, toothpaste and perfume) and colour cosmetics (lipsticks, foundation and eyeshadow) [2]. Foundation is a skin coloured cosmetic that hides the uneven skin tone to smoothen the skin and make it look flawless. Nowadays, foundations are available in many different forms, such as powder and liquid based. The liquid foundation contains colour pigments known as titanium dioxide and iron oxide (red, brown, yellow and black) which can produce hundreds of shades [3].

There are various local and international cosmetic brands available in Malaysia. Some of the local beauties are more thrilled to use international brands such as L'Oréal, Estee Lauder, NARS, Maybelline, Marc Jacobs and Bobbi Brown [4]. In 2018, a famous singer Rihanna launched her cosmetics brand called Fenty Beauty, worldwide including Malaysia at Sephora, KLCC. Fenty Beauty offer various types of cosmetics products that are suitable for all skin types and skin tones [5]. Well-known brands are exclusively established in Sephora store in Malaysia such as Dior, Estee Lauder, Lancôme and Clinique as well as offbeat brands like Amazing Cosmetics, Bare Minerals and Urban Decay.

Meanwhile, youngsters who are obsessed with the Korean wave will be attracted to buy Korean cosmetics and skin care products known as K-beauty. Today, Myeondong is one of the best shopping destinations for beauty product as well as food centre according to the residence since 1970s [6]. The first flagship store of Etude House, the South Korean cosmetic company is opened in Sunway Pyramid shopping mall due to the large influence of K-pop trend as well as the growing K-beauty waves among Malaysians. Apart from Etude, Sulwhasoo, Laneige, Mamonde and Innisfree are the largest South Korean cosmetics company that have been inducted in Malaysia [7].

Malaysia's cosmetic products are mainly founded by fashion entrepreneurs, professional make-up artists and celebrities since they could have a big impact in marketing the product itself, as well as social media influencers. The products are accessible through their own online portal or other authorize retail platforms such as Fashion Valet, Pretty Suci and Zalora. Some products are promoted internationally or sold on other retail stores, drugstore or global department stores under various categories such as Fame Cosmetics, Breena Beauty, DIDA for Women, Velvet Vanity, OhMostWanted and many more. In addition, Halal cosmetics seem to be a significant factor lately due to concerns among Muslims. Some founders highlighted the importance of these aspect in their products namely SimplySiti, Ronasutra, Zawara, Nurraysa Beauty and Sugarbelle Cosmetics [4].

In general, different products have different characteristics and specialties. Hence it is difficult for the consumers to decide the best product that will satisfy their needs and preferences. There are two type of factors influencing consumer decisions which are internal and external factors. Internal factors are referring to the individual demographic influence such as age, gender, marital status, income, social class, education and family background. External factors are referring to the environment effects for example brand, quality, price, country of origin, packaging, availability, shelf-life, ingredients, advertisement and promotion. Some of the previous research done on the attribution factors in selecting cosmetic products were carried out by [8-13].

Various methods of analysis have been used on customers' cosmetic products selection. Multiple regression analysis is used by [14] to examine the relationship of country-of-origin, quality of product, brand image and promotion on female buying behaviour in Manado city. Only product quality and brand have significant influence on female buying behaviour of cosmetic products. Customers tend to buy foreign cosmetics due to a trustworthy brand equity which reflected the high value in quality of the product, hence lowering the risk of purchasing it. Meanwhile, by applying Analytical Hierarchy Process (AHP), [11] reported that United States cosmetics tend to be the most selected among women. They agree that other factors are the discount or sale offered worth in spending money and the promotion attracted customer attention as well as packaging which are hygienic and more practical as well as user friendly. The product also can be easily purchased since it is available in many department stores, malls, supermarkets and online shops. In addition, products from the United States have various product specification for different skin types.

A study on packaging was conducted by [10]. They found that proper packaging strategies affect the brand preference in cosmetic products. By using Pearson Moment Correlation, it is found that size, colour and shape emphasizes the cosmetics' branding [15]. Customers are more interested in large pack sizes by considering other aspects such as weight along with attractive finishing and design of the product. Besides that, companies should highlight in producing creative colour combination since colours can stimulate the human's psychology to generate interest for buying and automatically give value to the brand itself. A good labelling decreased the hesitation by providing a compatible information which helps to influence the customer's decision to buy.

This research is limited to only the foundation cosmetics and focus on the external factors. Significant factors such as price, quality, packaging, availability, advertisement and "word-of-mouth" (WOM) that influence consumers in choosing a cosmetic product are analysed. WOM which seems to be an effective factor in marketing a product was not included in several research previously [16-17]. Hence, this study includes WOM as the external factor. Social media which comprises of feedbacks, discussion, testimonials in Instagram, Facebook, Twitter, WhatsApp, online newspaper, private communication are considered as WOM as well. Based on the chosen criteria, this study also examined the most preferred foundations of cosmetic products.

II. PROPOSED ALGORITHM

The study involves 10 beauty experts from Selangor and Kuala Lumpur. The integrated Multi-Criteria Decision Making, Analytical Hierarchy Process (AHP) [18-19] and Preference Ranking Organization Method of Enrichment Evaluation (PROMETHEE) methods are applied to solve the selection problem. AHP is used to determine the relative importance of the criteria of the preferred selection factors. PROMETHEE is developed by [20] and further extended by [21]. PROMETHEE used outranking method in the form of preference function and degree in ranking the preference of products in this study. The software used to analyse data in this study are AHP calculator [19] and Visual PROMTHER [21].

2.1 Data Collection

The first phase of data collection is to gather information for the AHP. A questionnaire distributed to the beauty experts, who are the consumers as well. The survey is carried out to evaluate how the customers' rated their preference criteria when purchasing foundation cosmetics. The first phase is the identification of criteria, which are Price (C_1), Quality (C_2), Packaging (C_3), Availability (C_4), Advertisement (C_5) and WOM (C_6). The second phase is the selection of the alternatives (product brand) which is based on the research articles on the current issues of foundation product on market. The selected foundation cosmetics for this study are currently in demand in Malaysia. International brands are F_1 , F_2 and F_3 while F_4 , F_5 and F_6 are local brands. Data for price of each foundation was collected from the product's catalogue. Data on other qualitative criteria are obtained from five experienced cosmetics' experts since the information are not available from the catalogues or the manufacturers. Based on the experts' evaluation, geometric mean is calculated using Likert scale (1 to 5), in which 1 represents poor and 5 represents excellent.

2.2 AHP Method

AHP is a structured technique for organizing and analysing complex decision-making problem, which was developed by [18]. AHP structured the problem in the form of hierarchy system and used pairwise comparison to rank the criteria based on the expert evaluation. AHP applies the mathematical matrices included the eigenvector and eigenvalue which determine the approximate weight for comparison purpose as follows:

Step 1: Identification of the decision problem.

Step 2: Construction of the structure hierarchy.

Step 3: Establishment of the pairwise comparisons matrices.

The pairwise comparison is obtained by using the Saaty's Rating Scale [19] as in Table 1. It is conducted based on the feedback from the beauticians, who evaluated the relative preference of each criterion over the other.

Table 1: Saaty's Rating Scale

Intensity of Importance	Definition	Explanation
1	Equally Important	Two elements contribute equally to the objective
3	Moderate Important	Experience or judgement slightly favour one element over one another
5	Strong Important	Experience or judgement strongly favour one element over one another
7	Very Strong Important	Experience or judgement very strongly favour one element over one another
9	Extreme Important	The evidence favouring one over the other is one of the highest possible validity
2,4,6,8	Used to express intermediate values	

Pairwise comparison matrix is formed based on pairwise comparison scale. The element $A = a_{ij}$ indicate the experts preference (A_i versus A_j for all $i, j = 1, 2, 3 \dots, n$).

Step 4: Determine the eigenvalue and the eigenvector.

This eigenvector also known as priority vector. The priority's values represent the weights of criteria and used to evaluate the rank of the criteria, which is also known as eigenvalue. First, calculate the sum of each column of the pairwise matrix. Then, divide each element of matrix A by its column total to generate a normalized pairwise matrix. Then, the eigenvector is obtained by dividing the sum of normalized column of matrix by the number of criteria used, n which is also known as weighted matrix.

Step 5: Calculate the consistency ratio (CR).

For validation purpose, the consistency index (CI) is calculated using Equation (1) where λ_{max} is the maximum eigenvalue. CR is calculated by using Equation (2) where RI is the random index and the value as in Table 2. The consistency ratio's value must be smaller than 0.1 ($RI < 0.1$), otherwise it is inconsistent.

$$CI = \frac{(\lambda_{max} - n)}{(n-1)} \quad (1)$$

$$CR = \frac{CI}{RI} \quad (2)$$

Table-2 Random Consistency Index Value

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0.00	0.00	0.52	0.89	1.11	1.25	1.35	1.45	1.45	1.49	1.52	1.54	1.56	1.58	1.59

2.3 PROMETHEE method

PROMETHEE is a technique to solve MCDM by using outranking method which is implemented in the form of preference function and degree [21]. It is an upright tool because it involves the views and judgment among the experts. Besides, PROMETHEE is applicable in evaluating qualitative and quantitative criteria and suitable for uncertainty and fuzzy data. The implementation of PROMETHEE is applied after the second phase for ranking purposes of the alternatives (product brand). PROMETHEE is used to rank preference of experts toward the product brands. The method consists of the following steps [22]:

Step 1: Construct the Evaluation Matrix.

The criteria ($j = 1, 2, \dots, k$) and ($i = 1, 2, \dots, n$) and alternatives are identified from the gathered quantitative and qualitative data. Then, determine the weight of each criterion. Assuming the analysis of the criteria are to be solved in maximization.

Step 2: Computation of the Pairwise Difference.

Calculate the pairwise difference, d_j between the value of alternative for each criterion by using Equation (3).

$$d_j = f_j(a) - f_j(b) \quad (3)$$

Step 3: Selection of the Criterion Function.

Choose the type of criterion function, indifferent, q and/or preference, p_j function values for each criterion. The selection of the criterion's functions is clearly explained by [23].

Step 4: Computation of the Preference Function Values.

The calculation of Preference function $P_j(a, b)$ depends on pairwise difference d_j and type of chosen criterion function. The pairwise difference is calculated first, followed by the preference function value for each criterion using Equation (4). There are six types of criterion function as in [21].

$$P(a, b) = \begin{cases} 0, & f(a) \leq f(b) \\ p[f(a) - f(b)], & f(a) > f(b) \end{cases} \quad (4)$$

Step 5: Computation of the Multi-criteria Preference Index.

It is a weighted average of preference function $P_j(a, b)$ for all criterion and defined as Equation (5) where w_j is the weight of criterion j .

$$\pi(a, b) = \frac{\sum_{j=1}^n w_j \times P_j(a, b)}{\sum_{j=1}^n w_j} \quad (5)$$

Step 6: Computational of outranking flows for each alternative.

The positive and negative preference flows for each alternative can be calculated by using Equations (6) and Equation (7) respectively.

$$\phi^+ = \frac{1}{n-1} \sum_{x \in A} \pi(a, x) \quad (6)$$

$$\phi^- = \frac{1}{n-1} \sum_{x \in A} \pi(x, a) \quad (7)$$

Step 7: Computational of complete ranking.

The PROMOTHEE II provide the complete ranking based on outranking net value (ϕ) and is calculated by using Equation (8). It is the balance between positive and negative outranking flows.

$$\phi = \phi^+(a) - \phi^-(a) \quad (8)$$

III. EXPERIMENT AND RESULT

3.1 Geometric Mean for Criteria

The geometric mean for the criteria of each product are shown in Table 3.

Table 3: Mean for Criteria

	Price C_1	Quality C_2	Packaging C_3	Availability C_4	Advertisement C_5	Word of Mouth (WOM) C_6
F_1	50	3.3659	3.1777	4.1602	4.1602	4.1602
F_2	75	3.3659	3.1777	4.1602	4.1602	3.9230
F_3	136	3.3659	3.1777	3.6247	3.8467	4.1602
F_4	25	2.9302	2.7663	3.9230	3.6247	3.5543
F_5	35	2.7019	2.7663	3.6247	3.9230	3.6247
F_6	115	3.0000	3.1777	3.8467	4.1602	4.1602

Table 4 shows the criteria weight based on the experts' evaluations. The final weights are obtained by calculating the average of the criteria weight ($\bar{W}$). The criteria that has the highest weight is WOM (0.7809). It can be concluded that WOM is the main contribution in preference to buy cosmetics, followed by Quality (0.3678), Availability (0.1562), Price (0.1324) and Packaging (0.0674). The least impact on preference is Advertisement (0.0572). The consistency ratio is acceptable since the value is less than or equal to 0.10 and the overall consistency ratio of this criteria priority is 0.0814. Hence, the data is valid and consistent.

Table 4: The Aggregation of Criteria Weight by Beautician

	Price C_1	Quality C_2	Packaging C_3	Availability C_4	Advertisement C_5	Word of Mouth C_6
Weight, $\bar{W}$	0.1324	0.3678	0.0674	0.1562	0.0572	0.7809
Rank	4	2	5	3	6	1

There might be relevant reasons why most beauty experts prefer WOM (C_6) as the impact factor when they decide to purchase certain foundation. First, it is based on the individual's influence due to the desire to gain as much information as possible about the product. They usually trust what is heard directly from their close circles such as relatives, families, friends and colleagues to assist and support in purchasing foundation. Secondly, testimonials influenced their purchases, such as other beautician's experiences who already used and relied on certain product for a long-term. Besides, WOM from reliable sources provide satisfaction judgement and the information from trustworthy sources made them more gratified. Nowadays, the interactive form of media effect individuals globally with the creation of various social network sites for mutual conversation among people. Hence, with the aid of social network (Instagram, Facebook, Twitter, WhatsApp, YouTube, etc.) has created a nature of WOM viral scenario for product promotion and brand management are created.

The second weightage is quality (C_2). Product quality is also an important element that effects experts' selection decision. They buy cosmetics due to the quality of the products with perception that high quality from well-known brands will bring no harm or side effect on their customer's face. They give important attention to the quality of the product due to higher expectations on the appearance for their customers. With the better quality of the foundation, consumer's preference of the product also increases. These results are consistent with [24].

Availability (C_4) is on the third rank as the significant factor in selection of cosmetic products. Some of these products are available in drugstore, shopping mall and perfumery while some products are also available through online shopping. Consumers do not change their cosmetics preference easily due to lack of availability. It is not easy to substitute with other product if the cosmetics being used has already shown positive impact on the customer's appearance. Indeed, [9] also claim that availability plays an important role in consumer's purchasing behaviour.

In this research, price (C_1) is rank at the fourth place. Price is normally related to quality. In today's trend, consumers are very concerned with their appearance. They demand a long-lasting foundation with flawless finishing makeup. Hence, the beauty experts are not very concerned with the price as long as the product gives high-quality result for their customers. Besides, there are many foundations available with an affordable price

with high quality either international or local brand. This finding is not consistent with [15] who claim that price is the most concerned matter compared to other factors.

Packaging (C_3) is placed in the fifth rank. It is not that significant criterion that will influence the consumer's selection decision. Consumers are more interested with the ingredients. In other words, customers are more concerned with the quality of the product instead of the packaging of the foundation. Packaging can be considered as an aesthetic factor. Hence, consumers are willing to spend on the quality of the product instead of the packaging. This result is not consistent with [10] who found otherwise. All experts are concerned with the inner features of the foundation products instead of the packaging.

The least preferred criterion is the advertisement (C_5). Advertisement is based on the mass marketing and one way directed media such as television, radio, newspaper, pamphlets and online / digital marketing. Due to the usage of internet that has spread rapidly and the influence of social media, people tend to focus on the social network application instead of reading newspaper and listening to the radio and watching television. It is quite surprising why advertisement falls into the lowest ranking since technological development is expanding rapidly. Many of the selected products in this research are still depending to shop's advertisements. This finding is also not consistent with [8] as he found that advertisement is the important criteria that influence customers' behaviour in purchasing cosmetics product.

3.2 Foundation Cosmetics Product's rank using PROMETHEE method

PROMETHEE was applied to rank the foundation cosmetics. The evaluation matrix was formed by using the collected data (Table 5).

Table 1: Evaluation Matrix for PROMETHEE Method

	C_1	C_2	C_3	C_4	C_5	C_6
Weight, w_j	0.1234	0.3678	0.0674	0.1562	0.0572	0.7809
F_1	50	3.3659	3.1777	4.1602	4.1602	4.1602
F_2	75	3.3659	3.1777	4.1602	4.1602	3.9230
F_3	136	3.3659	3.1777	3.6247	3.8467	4.1602
F_4	25	2.9302	2.7663	3.9230	3.6247	3.5543
F_5	35	2.7019	2.7663	3.6247	3.9230	3.6247
F_6	115	3.0000	3.1777	3.8467	4.1602	4.1602
Analysis	Min	Max	Max	Max	Max	Max

The selection of criterion function is normally based on the decision makers. In this study, the quantitative criteria used linear preference function due to the negligibility of a small amount when considering on purchasing of two products to choose [25]. Meanwhile, for the qualitative criteria, usual preference function is selected due to the analysis done by using small scale value [26]. The preference function and parameters for all criteria are presented in Table 6.

Table 2: The Preference Function and Parameters

Criteria	Type	Criterion Function	Parameters	
			q	p
C_1 : Price	5	Linear	15	75
C_2 : Quality	1	Usual	-	-
C_3 : Packaging	1	Usual	-	-
C_4 : Availability	1	Usual	-	-
C_5 : Advertisement	1	Usual	-	-
C_6 : Words-of-Mouth	1	Usual	-	-

By using Visual PROMETHEE software [20], the evaluation of alternatives (foundation cosmetics) is ranked from best to worst. The obtained data are verified as input and program outputs are shown as in Figure 1, Figure 2 and Figure 3.

Figure 1 displays values of ϕ , ϕ^+ and ϕ^- score for each foundation cosmetic. The cosmetic foundations are ranked according to the PROMETHEE II complete ranking, known as net outranking flow. It is shown that F_1 is the most preferred brand for foundation cosmetics product as indicated by the highest preference index value, $\phi = 0.5916$. The choices of brands with respective ϕ are followed by F_3 (0.2910), F_6 (0.2187), F_2 (0.1608), F_5 (-0.6163) and

F_4 (-0.6458). The geometry shape of green square refers to international brand while the blue circle refers to local brands.

Rank	action		Phi	Phi+	Phi-
1	F1	■	0,5916	0,5944	0,0028
2	F3	■	0,2909	0,4658	0,1749
3	F6	●	0,2188	0,4751	0,2563
4	F2	■	0,1607	0,4805	0,3198
5	F5	●	-0,6162	0,1557	0,7719
6	F4	●	-0,6458	0,1537	0,7995

Fig. 1: PROMETHEE Flow Table

The final ranking of foundation cosmetics obtained is presented in Figure 2. It represents the PROMETHEE II graph which describes the results based on the values on the vertical axis (y-axis) and the values are divided into four levels. The ranking is categorized into high (level 1), medium (level 2) and low (level 3) and lowest (level 4). Only one high preference of foundation cosmetics which is F_1 with the preference value of 0.5916 in level 1. Since the value lies on the first scale, F_1 is the most preferred brand among other foundation cosmetics by consumer. The medium preference of foundation cosmetics with scores between 0.5 and zero (minimum) in level 2 are F_3 (0.2909), F_6 (0.2188) and F_2 (0.1607). Both F_5 and F_4 are in the lowest level with preference value -0.6162 and -0.6458 respectively.

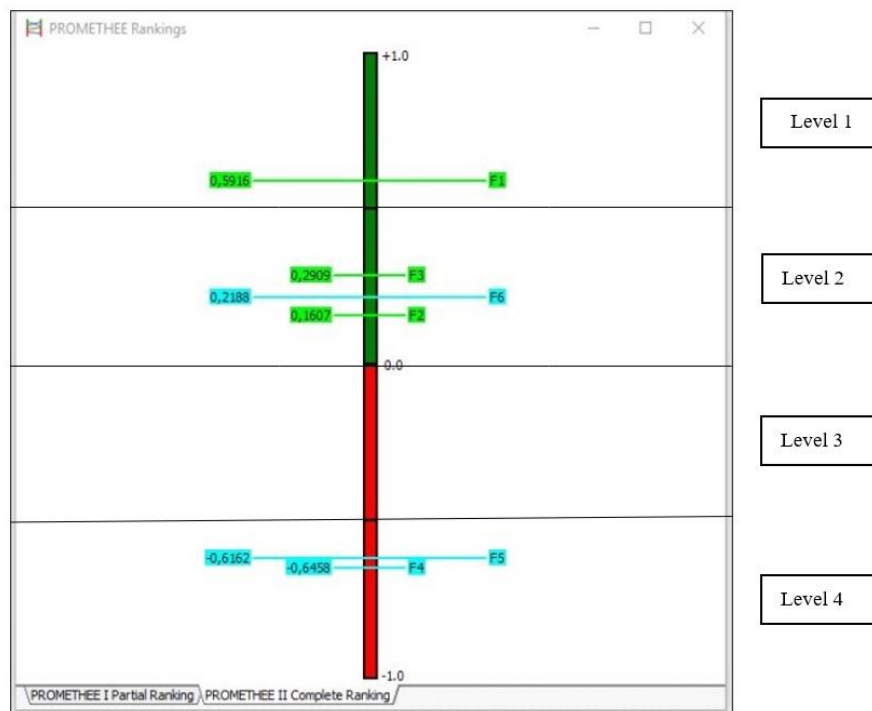


Fig 2: PROMETHEE II Complete Ranking

In Figure 3, F_1 exhibits no negative slices which means all criteria contribute positively to its net flow score. Hence, F_1 expresses no weaknesses in all criteria as compared to other products. In the medium preference, both F_3 and F_6 products have three positive criteria that contribute to customers' preference while F_2 has four positive criteria. Both F_5 and F_4 which are in the lowest level have more negative criteria compared to positive criteria.

The most preferred product F_1 has WOM (the green slice) as the thickest slice followed by quality, availability, price, advertisement and packaging. F_1 product existed in Malaysia for decades and there is the customer loyalty aspect to it. Since the products have a global reputation as an international product from United States, hence it has an established brand image and brand loyalty in Malaysia. The effect of WOM in spreading the news about the product's good quality and positive feedback of the product have influence many of consumers to try and use the product themselves.

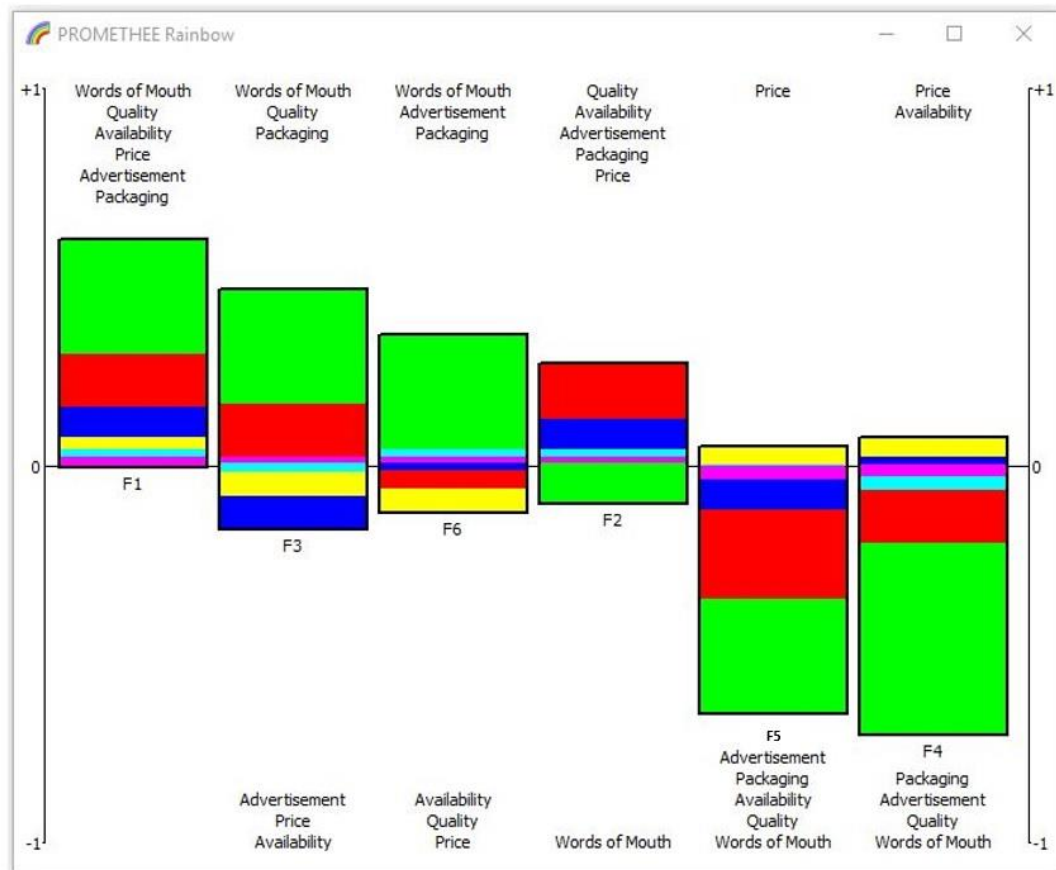


Fig 3: PROMETHEE Rainbow

WOM is an effective medium that make the product well known. The quality of the products is excellent due to the existence of loyal customer. Besides, the availability of the F_1 products can be considered as the best since it is available in most drugstores and pharmacies including malls and online website. On the other hand, due to the affordable price, consumers are willing to purchase the product instantly. Advertisement seems to be among the least preferred criteria. As for the packaging, the design was very up to date with current trend by applying the modern technique which are easy, hygienic and practical for users. Therefore, F_1 brand is very marketable and the most preferred brand.

For medium preference, F_3 is a new international brand founded by a famous artist whereas F_6 is founded by a successful Malaysian blogger and entrepreneur. WOM is the thickest slice for F_3 and F_6 . With the impact of WOM, both products which are founded by artists have more advantages in influencing the consumers even though the products are still new in the market. These artists are influencers who promoted their product dependently in their social media platform. Between F_3 and F_6 , consumers seem to favour international brands more than local brands. Most international brands generate more brand awareness in the consumer's mind with the inspirations of global reputation. In fact, F_6 is the more preferred local brand compared to the other two local brands F_4 and F_5 .

Other criteria that contribute to the ranking of F_3 are quality and packaging. While for F_6 , advertisement and packaging give positive effects. Both F_3 and F_6 are less preferred in terms of price and availability. F_2 has four positive criteria, which are quality followed by availability, advertisement, packaging and price. The only product that has the highest stacked slice on quality is F_2 . However, WOM gives negative effect to the preference of F_2 as shown by the stacked slice at the most bottom of the chart. F_2 is a well-known Asian brand from South Korea which is endorsed by Korean faces as an ambassador. Even though F_2 is promoted by Korean actress, it was least preferred among the three international brands. The result might be due to lack of WOM influence since there are less Korean fans in Malaysia. The price for F_2 is considered fair. It might be due to regular promotions and discounts especially during festive seasons offered by F_2 . Both F_3 and F_6 brands are in negative scale for prices. Their prices are considered expensive for the customers. In terms of availability for F_2 , with the collaboration of online platform such as Hermo, Lazada and Althea Korea, it is much easier for the consumers to buy the product. Both products, F_3 and F_6 are not easily accessible since they are available in certain store and online platform only. Both brands also have almost at the same level, thickness and at positive scale in terms of packaging as shown by

the purple slices. F_3 and F_2 are good in terms of quality. Product design by F_3 and F_2 provide a user-friendly bottle with pump on the lid. In contrast, F_6 still apply the traditional way where users need to squeeze the bottles. This seems to be less attractive and inconvenient. For advertisement criteria (cyan colour), both F_6 and F_2 are at positive scale and only F_3 is at the negative scale. This implies that F_3 advertisement is not attractive and has less impact compared to the other two brands.

For the least preferred brand, price is the only criterion that give positive affects to F_5 while price and availability affect positively on the preference of F_4 . Customers choose product F_5 and F_4 because they are much cheaper than other products. Since F_5 and F_4 are local products, they can afford to offer cheaper price and the prices are considered attractive. Advertisement followed by packaging, availability, quality and WOM give negative effect to F_5 . As for F_4 , the unpreferred criteria is packaging, followed by advertisement, quality and WOM. WOM gives the most negative effect to the preference of F_5 and F_4 . Furthermore, F_4 is the most unpreferred brand in terms of WOM as it has the thickest slice at the most bottom. Product F_5 and F_4 seem to be perceived as low in quality. This might be due to local users who are not so confident with the product and its impact. F_4 is among the preferred brands in terms of its availability. This can be rationalized due to its available outlets for a few years with strong name in many drugstores, pharmacies including in malls and supermarket. Lately, F_5 has also improved since they are being proposed to display in selected drugstores so that consumers have access to the products instead of in-store and online platform only. Brand's owner of F_5 is a humble influencer who offer better promotion through advertisements compared to F_4 . Weekly, for a few months in a year there will be a slot of promotion on-air on radio which attracts Malay listeners. The product ranges from natural herbal to cosmetics product which is advertised by the owner effort even before internet marketing becomes active.

IV.CONCLUSION

This research was conducted to examine the consumer's behaviour in purchasing the foundation cosmetic products. The multi criteria decision making which is the hybrid of AHP and PROMETHEE are used to analyse customers' preference. By using AHP, the ranking of criteria is WOM followed by quality, availability, price, packaging and advertisement. WOM is the major influence that attract consumer's intention in purchasing the foundation cosmetics. By using PROMETHEE method it can be clearly seen how the criteria effect the preferences of products in terms of the thickness, positive and negative stacked slices. The most preferred foundation is F_1 with all criteria giving positive effects. The medium preferred foundations are F_3 followed by F_6 , F_2 . The least preferred brands are F_5 and F_4 . Customers have confidence with international product such as F_1 , F_3 and F_2 including their quality. The new local brand F_6 is ranked third choice mainly through the effect WOM, advertisement, packaging and the owner herself as an icon of young influencer and blogger. The other two local brands F_5 and F_4 have been in the market for a long time and they attract customers because of their fair prices. As a conclusion, the effect of WOM plays a very important role as consumers are easily attracted to the influencer of artist and social media platforms.

The results of this study may contribute to the development of cosmetics industry in Malaysia by providing knowledge and insights on customer preferences. The ranking of factors will benefit the cosmetic companies to improve and to market their product. Besides AHP and PROMETHEE, further research on selecting and ranking of criteria and alternatives can be carried out using Principal Component Analysis (PCA)[27], Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) [28] and many others.

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