The Decision of Selecting Online-Store Alternative in Marketing Cosmetic Products Using Analytical Hierarchy Process (AHP)

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Abstract: The selection of online product marketing sites is an interesting topic to study considering that each online shop has a different appeal in marketing the product, so consumers are attracted to choose a particular online shop. The purpose of this research is how to determine the right choice of a online shop to market a product, in this case cosmetics products. To achieve this goal the steps taken are first to determine the population of respondents in this case are conventional shops that sell cosmetic products, located in the District of Singosari-Malang-East Java-Indonesia as many as 300 stores, secondly determine the number of samples using the Bernoulli formula obtained a sample of 14 stores, the third step is distributing questionnaires to get criteria used as a measure to choose an alternative online shop, in this case there are 3 online shops, namely online shops A, B and C, then proceed to the weighting process using the Analytical Hierarchy Process method (AHP), then do the weighting for each online shop on each criterion using the Analytical Hierarchy Process (AHP) method, then an aggregate calculation is performed for all criteria for each online shop. The results obtained from this study that the selected online shop is online shop A. with the largest total weight of 0.507. Conclusion: In this online-shop selection is strongly influenced by the specified criteria and the weighted value given, if the weight of the assessment changes then the online-shop selection decision will also change, so this is a strategy that can be used by online-shops in providing services in order to change the weight of certain criteria as an effort to win the competition.

Keywords: Criteria, online-shop, Analytical Hierarchy Process (AHP)

I. INTRODUCTION

The development of Online-Shop through internet media has grown rapidly in Indonesia, even it is very well known by the public, various attractions have been offered in shopping for various types of products and services including discounted prices and free shipping. Various strategies in offering products and services become the main attraction for consumers who will shop in choosing the online shop that will be the choice. The concept of shopping through an online-shop, provides many advantages and conveniences when compared to the concept of shopping at conventional stores. In addition to the transaction process can be faster, the online shop can cut a lot of operational costs, labor costs, courier costs, rental of land stores and so on. Thus, online-shop companies are competing to get potential market share to win the competition.

TABLE 1. Top Rank 3 online shop in Indonesia

Quarter 1 - 2019		Quarter 2 - 2019		Quarter 3 - 2019	
Online-shop	Web visitors / per month	Marketplace Online shop	Web visitors / per month	Marketplace Online shop	Web visitors / per month
Tokopedia	137,200,900	Tokopedia	140,414,500	Tokopedia	65,953,400
Bukalapak	115,256,600	Shopee	90,705,300	Shopee	55,964,700
Shopee	74,995,300	Bukalapak	89,765,800	Bukalapak	42,874,100

Sumber : https://iprice.co.id/insight.co

From the table above illustrating 3 online-shops including Tokopedia, Bukalapak and Shopee it can be seen that in Quarter 1,2,3 in 2019 the highest number of visitors was Tokopedia of 137,200,900 visitors (Quarters 1), 140,414,500 visitors (Quarters 2), and 65,953,400 visitors (Quarters 3), this illustrates that Tokopedia is the most popular online shop. This illustrates Tokopedia has advantages compared to Bukalapak and Shopee in providing services to consumers and consumers interested in whatever is the attraction to visit Tokopedia. This also applies to traders or producers who have a product wanting to market their products through an online shop, the question is which online market as the most suitable market for a product will be marketed.

As stated by Ramlan R. and Qiang LW, 2014 that making supplyer selection decisions is a complex matter considering qualitative and quantitative multi-criteria in making the best selection decisions strongly influenced by established criteria, as in the selection of the best supplyer, the decision the selection is based on 4 criteria including price, quality, logistics, and service. The decision is based on the biggest performance supplyer. (Hamed Taherdoost, 2017) states that the method that is often used in multi-criteria decision making is the Analytical Hierarchy Process (AHP) method where the problem will be formulated hierarchically by considering quantitative and qualitative criteria.

In this regard, this research will focus on choosing which online shops are suitable for marketing cosmetics products.

II.   RESEARCH METHODS

The material used in this study is the questionnaire there are 3 (three) types of questionnaires, first is questionnaire 1 to determine the criteria of online-shop assessment, and second questionnaire 2 is for paired assessment of each criterion, third questionnaire 3 is for paired assessment of each alternative for each criterion.

The initial step of this research is to determine the alternative online shop, in this case the name of the online shop is online shop A (AL.A), online shop B (AL.B) and online shop C (AL. C), then determine the population and sample using the Bernoulli formula, then distribute questionnaire 1 to get the criteria needed in online-shop assessment, then spread questionnaire 2 to get the criterion value using a scale of 1-9, then process the data using the Analytical Hierarchy Process (AHP) Method , then distributing questionnaire 3 to get an alternative assessment for each criterion and then processed using the AHP method (Saaty, TL, 1980), then summing the results of the combination of criteria weights and alternative weights and choose the highest weights. (Waris. Et al, 2019) stated that in the effort of Sustainable Procurement of Construction Equipment requires the determination of appropriate criteria in sustainable efforts and sub-criteria.
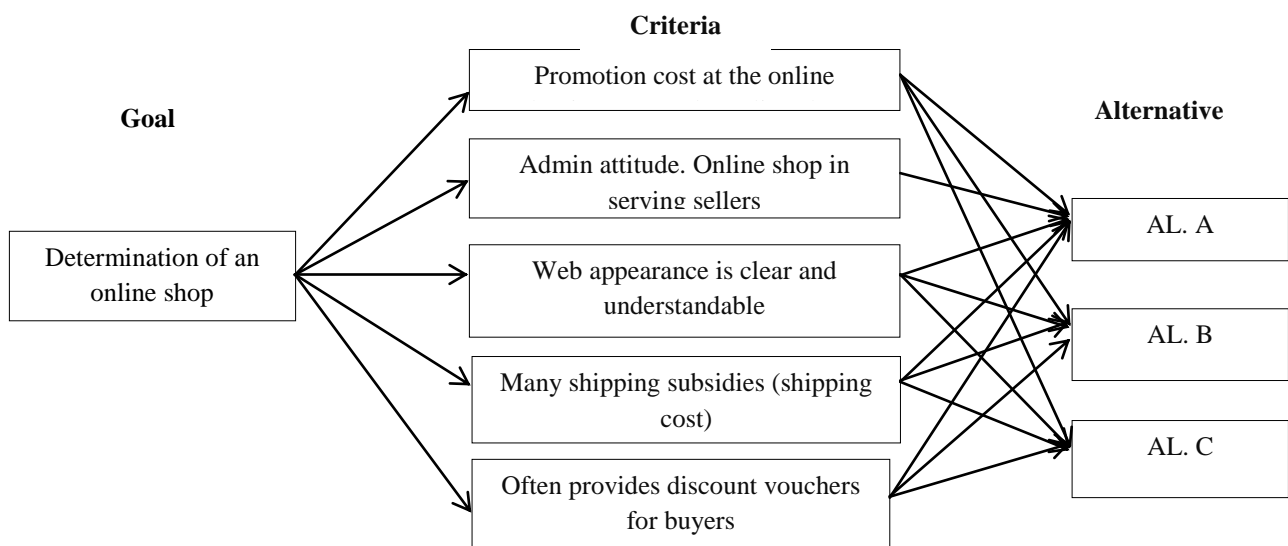
FIGURE 1. Hierarchical Structure of Online-Shop Alternative Selection

III.   RESULTS AND DISCUSSION

Of the 300 questionnaires distributed, 14 questionnaires were not returned, 4 were considered incorrect because the answers were incomplete, and 11 were considered error because the store that received the questionnaire was found to be not selling cosmetic products.

Based on the Bernoulli formula, where is the minimum number of samples needed.

$$n = \frac{(Z_a/2)^2 p \cdot q}{e^2}$$

- ▪ Where :
  n = number of samples
  $(Z_a/2)$ = normal distribution value with a 95% confidence level
  e = The predetermined error rate is 10% or 0.1
  p = Proportion of the number of questionnaires that are considered correct.
  q = Proportion of the number of questionnaires that are considered wrong.
- ▪ So that :

$$n = \frac{(Z_a/2)^2 p \cdot q}{e^2}$$
$$n = \frac{1.96^2 (282/300)(11/300)}{0.1^2}$$
$$n = 13.54 \text{ or the same as } 14$$

Then obtained a minimum sample size of 14 respondents

TABLE 2. Online-shop Assessment Criteria results from the Questionnaire

No.	Criteria
1.	Promotion fee at the online shop
2.	Admin online-shop attitude in establishing relationships
3.	Web appearance is clear and understandable
4.	Many shipping costs subsidies
5.	Often provides Discount Vouchers

TABLE 3. *Pairwise Comparison* Between Criteria
Results from the Expert Choice Application (Respondent 1)

Criteria	1	2	3	4	5
1		5.000	3.000	5.000	1.000
2			4.000	6.000	9.000
3				5.000	3.000
4					2.000
5	Incon:0.06				

CR= 0,06 ☐ 0,1 (consistent)

In Table 3. The results of the paired assessment for respondent 1, obtained the value of Consistency Ratio (CR) = 0.06, because it is less than 0.1 then the results are consistent and can be used in the next step.

TABLE 4. *Pairwise Comparison Between Results Criteria from the Expert Choice Application*
(Combined Respondents 1 through 14 use geometric averages)

Kriteria	1	2	3	4	5
1		2.104	1.239	3.280	2.110
2			1.787	1.160	1.098
3				2.288	1.648
4					1.003
5	Incon:0.08				

CR= 0,08 ☐ 0,1 (consistent)

In Table 4. Is the result of a combined pair assessment of 14 respondents where the value is obtained from the calculation of the geometric mean, and the CR value = 0.08 is smaller than o, 1 then the data is consistent and can be used for further processing.

TABLE 5. Criteria Weight Results from Expert Choice Applications

No.	Criteria	Weight
1.	Promotion fee at the online shop	0.291
2.	Admin online-shop attitude in establishing relationships	0.205
3.	Web appearance is clear and understandable	0.256
4.	Many shipping costs subsidies	0.125
5.	Often provides Discount Vouchers	0.122

TABLE 6. Aggregate Paired Comparison Results (Geometric Average)
each Alternative for the 14 Criteria 1 Respondents

Criteria 1	Respondents														
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Weight
AL. A -AL. B	3	2	2	2	1	2	4	2	2	2	2	2	3	5	2.2467
AL. A -AL.C	4	3	3	3	3	2	3	3	8	9	4	7	4	4	3.3367
AL. B -AL.C	1	1	2	3	2	2	1	1	3	3	4	2	2	2	3.1374

In Table 6. Describe the aggregate pair value of 14 respondents for alternative pairs.

TABLE 7. Alternative Weight Calculation Results for Criteria 1 of the Expert Choice Application

Alternative online-shop	Weight
AL. A	0,528
AL. B	0,333
AL. C	0,140

In Table 7. Describe alternative weight values for only one criterion, namely for criterion 1, each alternative values are A = 0.528, B = 0.333 and C = 0.140.

TABLE 8. Results of Calculation of Alternative Weights for Criteria 1 of the Expert Choice Application

Alternative	Criteria	Weight Comparison of Factors Between Criteria	Weight of Pairwise Comparisons Between Alternative Online Stores	*Aggregate*
AL. A	1. Promotion fee at the online shop	0.291	0.528	0.153
AL. B			0.333	0.096
AL. C			0.140	0.040
AL. A	2. Admin online-shop attitude in establishing relationships	0.205	0.327	0.067
AL. B			0.260	0.053
AL. C			0.413	0.084
AL. A	3. Web appearance is clear and understandable	0.256	0.614	0.157
AL. B			0.117	0.029
AL. C			0.268	0.068
AL. A	4. Many shipping costs subsidies	0.125	0.327	0.040
AL. B			0.260	0.032
AL. C			0.413	0.051
AL. A	5. Often provides Discount Vouchers	0.122	0.740	0.090
AL. B			0.167	0.020
AL. C			0.094	0.011

Table 8. Describes the Multiplication of the Weights of each alternative and each criterion in the aggregate, which will be used to determine the Weight of each alternative.

TABLE 9. Results of Adding Weights to Each Alternative online shop for all Criteria

Alternative *Online-shop*	Aggregate Calculation Results for Each Criteria					Count
	1. Promotion fee at the online shop	2. Admin online-shop attitude	3. Web appearance	4. Many shipping costs subsidies	5. Often provides Discount Vouchers	
A	0.153	0.067	0.157	0.040	0.090	**0.507**
B	0.096	0.053	0.029	0.032	0.020	**0.230**
C	0.040	0.084	0.068	0.051	0.011	**0.254**

Based on Table 9. The biggest alternative weighting results obtained are Alternative A with a weight value of 0.507. Here illustrates that alternative A excels at Promotional Costs with a weight of 0.153, so Al's online-shop competitors. B and AL. C can compete with AL. A must increase promotion costs greater than 0.153, also for criteria 2, 3, 4 and 5 must be greater than 0.067, 0.157, 0.040 and 0.090. So the chosen online shop is alternative shop A as a place for marketing cosmetic products. (Balubaid, M. and Alamoudi, R. 2015) also stated in the results of his research that in the selection of contractors based on the score, the contractor with the highest score was considered the best contractor. (Haw et al, 2016) stated that important findings in the ranking of priorities obtained from AHP can be used to manage and overcome obstacles in implementing material efficiency strategies and other sustainable manufacturing activities.

IV.   CONCLUSION

Criteria weights as a determining factor in decision making, decision preference is determined by the highest weighting criteria. In online-shop selection as a marketing place is also determined by the value of the weight given by the consumer, if the weight of the assessment changes then the online-shop selection decision will also change, the value of the weight can also be used as a strategy in providing services which means which criteria need to be improved services in order to be able to change the weight of the criteria assessment as an effort to win the competition.

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