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Marketplace Selection Based on Product, Price, and Promotion Using the Simple Additive Weighting (SAW) Method

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Abstract: The Covid-19 pandemic in Indonesia has an impact on people's spending behavior. Online shopping is an option. On the other hand, business people take advantage of this phenomenon with various marketing strategies. How to choose a marketplace that sells good quality products at low prices is an interesting study to research. The research was conducted on 10 marketplaces. The analytical method used in this research is descriptive quantitative. The analytical tool used in this study uses the Simple Additive Weighting (SAW) method. The results showed that the marketplace with the best products was Zalora. The marketplace with the lowest price is Rarali.com. The marketplace with the most interesting promotions is occupied by Blibli. The marketplace with the best product quality, fairly low prices, and attractive promotions is occupied by Lazada.

Keywords: Covid-19, *Marketplace*, Simple Additive Weighting (SAW)

INTRODUCTION

With the Covid-19 pandemic in Indonesia which was announced by President Joko Widodo on March 2 2020, it has had an impact on various sectors and areas of life, one of which is the economic sector. Many businesses have closed due to changing patterns. Under these conditions, the government also implemented a Large-Scale Social Restrictions (PSBB) policy, forcing people to limit their activities in public places. These conditions make the trend of online shopping in the marketplace growing. According to the results of research by the Central Statistics Agency (BPS), people's mobility in shopping places for their daily necessities has decreased by 46% and retail and recreational trade places have decreased by up to 70% (Central Bureau of Statistics, 2020).

Under these conditions, people's consumption behavior changes, which makes consumers pay more attention to spending, especially when it comes to shopping. Shopping online at marketplaces is a way out for people during the Covid-19 pandemic to avoid physical contact that usually occurs when shopping in person at shopping centers. Marketplace is a website that brings together sellers and buyers online. In the marketplace,

buying and selling activities can be carried out easily, quickly and cheaply, because there are no boundaries between space, distance or time in Yustiani and Yuanto, (2017).

The results of a survey conducted by We Are Social show that 88.1% of internet users in Indonesia use e-commerce services. This percentage is the highest in the world (We Are Social, 2021). Snapchart's research results regarding e-commerce shopping behavior in Indonesia show that the highest e-commerce shopping areas in Indonesia are DKI Jakarta (22%) and West Java (21%) where these areas are metropolitan areas, especially the Jabodetabek area in Bachdar, (2018).

Based on iPrice data, in the second quarter of 2021, the ten marketplaces with the highest web visitors are Tokopedia, Shopee, Bukalapak, Lazada, Blibli, Bhinneka.com, Orami, Rarali.com, JD ID, Zalora (iPrice, 2021). Tokopedia occupies the highest position in Indonesia for the number of visitors for two consecutive quarters in 2021. The number of Tokopedia monthly web visitors was 147.8 million in the second quarter of 2021. This figure has increased by 9.4% from the previous quarter which only visited 135.1 million visits. Next is Shopee which occupies the second position, with a total of 127 million web visits. In third place is Bukalapak with 29.5 million visitors. Furthermore, the fourth position is Lazada with 27.7 million and Blibli with 18.4 million. Then followed by Bhinneka with 7 million, Orami with 6.3 million, and Ralali with 5.1 million. JD ID and Zalora are in fairly late positions with 3.8 million and 3.4 million respectively (iPrice, 2021).

To determine the best marketplace that can help meet people's needs during the Covid-19 pandemic, a Decision Support System (SPK) was also created. The Decision Support System (SPK) is a system that can be used to support managerial decision makers in complex and unstructured decision conditions in Chaeruddin, Sukersih, and Respitawulan, (2021). The Decision Support System (SPK) has several methods, including: the Weighted Product (WP) method, Simple Additive Weighting (SAW), Analytic Hierarchy Process (AHP), and Analytic Network Process (ANP).

From the description above, choosing a marketplace during the Covid-19 pandemic is an interesting topic to study using the Simple Additive Weighting (SAW) method.

LITERATURE REVIEW

Decision Support System (DSS)

The Decision Support System (DSS) is an interactive system that assists in making decisions by using data to solve semi-structured and unstructured problems in Al-Hafiz, Mesran, and Suginam, (2017). SPK is made to support all stages of decision-making, starting from the stage of identifying problems, selecting relevant data, then determining the approach to be used in the decision-making process, and then evaluating the alternative choices that exist in Hartini, Ruskan, and Ibrahim, (2013). SPK has several objectives, including: supporting decision makers in solving structured problems, helping decision makers to focus on problems that cannot be structured, assisting in the decision making process by equipping the ability to process the information needed in Suhermin, (2021). The benefits of SPK are: increasing the ability of decision makers to process information and knowledge, dealing with complex, large-scale, and time-consuming problems, shortening decision-making time, encouraging exploratory implementation for decision makers, and producing solutions more quickly and with better results. reliable in Suhermin, (2021).

Decision Support Systems (DSS) can be used to select several existing alternatives, can assist decision makers in carrying out alternative selection processes, of course, quickly and precisely. SPK is also able to recommend decisions to be more objective in Hartini, Ruskan, and Ibrahim, (2012). In making decisions, there are several methods, one of which is the SAW method which is able to choose the best alternative from a number of alternatives in Novianti and Yanto, (2019). Decision Support System (SPK) has several methods, including:

1. The Weighted Product (WP) method, is the development of a system capable of providing a rational assessment in a computer system that is used by the final decision maker to inform the value of each alternative in Laila and Sindar, (2018).
2. The AHP method is a model developed by Thomas L. Saaty which is used for decision support by describing complex multi-criteria problems into one hierarchy in Suryatri, Yunita, and Junaidi, (2019).
3. The Analytic Network Process (ANP) method, which is a more general form of the Analytic Hierarchy Process (AHP), which combines feedback and interdependence relationships between decision elements and alternatives. In the research on the Implementation of the ANP Method on the Decision Support System for Choosing the Best Online Store, it was concluded that the Analytic Network Process (ANP) model was used because it was in accordance with conditions where there was a relationship between sub-criteria obtained from filling out the questionnaire distributed in Romindo and Jamaludin, (2019). The ANP method shows that the processing time using the ANP method takes a long time and it will be slower if there are more samples, so modifications are needed with other methods in Hermawan, Saptono, and Anggraeningsih, (2014).
4. The Simple Additive Weighting (SAW) method is an algorithm used in decision making, this SAW algorithm is often called the weighted sum method and there is also a percentage of the criteria. The SAW method is more efficient in terms of algorithms, and the results of manual calculations and applications using the SAW method will show the same results in Ningtyas and Suyatno, (2021). In the SAW method there is a required process, namely the process of normalizing the decision matrix (X) on a scale that can be compared with all existing alternative ratings. The SAW method is the most well-known and widely used method in Kevin, Mulyawan, and Perdana, (2019). The Simple Additive Weighting (SAW) method has several advantages as evidenced by previous research, including research which states that after calculating using the SAW and WP methods in selecting employees, the comparison results are obtained that the SAW method is more precise and accurate in making calculations than the SAW method. WP in Nardiono, (2017). The SPK which is applied to determine the best e-commerce using the SAW method, describes a more objective final result so that it can be used as a basis for the community in selecting e-commerce transactions. The SAW method is an easy method in the ranking search stage for making a decision based on the system in Ginting, (2020). The SAW method can also be compared with other methods, such as the AHP-SAW comparison which produces a higher preference value compared to the AHP-WP method comparison. This is due to the different normalization methods so that there is a very slight difference in results. The SAW method can also be calculated manually or implemented into web-based software in Mahendra and Nugraha, (2020).

The steps in the SAW method are: determining the criteria that will be used as a reference in decision making, namely Ci (Criteria i), determining which criteria are included as profit or cost (cost) attributes, then determining the weight value of each criterion, determining suitability rating of each alternative on each criterion, then create a decision matrix based on criteria (Ci), carry out the process of normalizing the matrix according to the type of attribute, namely: benefits or costs so that a normalized matrix R is obtained, and the final result is obtained from the ranking process, namely the sum of the multiplication on the normalized matrix R with the weight vector, so that the largest value is selected as the best alternative (Ai) as a solution in Sidik, (2015).

The formula used is listed in Equations 1 and 2.

rij Xij/(Max (Xij))=j benefit attribute …….[1]

rij (Min (Xij))/((Xij))=j attribute cost ……..….[2]

Information:
rij = normalized performance rating value.
xij = attribute value owned by each criterion.
Maxi xij = the greatest value of each criterion i.
Mini xij = the smallest value of each criterion i.
benefit = if the greatest value is the best.
cost = if the smallest value is the best.

In using the SAW method, the criteria between one another must be interrelated, so that it can help to produce the right calculation. Besides the criteria, there are also attributes, which consist of 2 types of attributes, namely benefits and costs. Benefit and cost attributes are referred to as profit and cost attributes. It is said to be a benefit attribute if the value of the attribute is beneficial to the user when the value is higher, it is said to be a cost attribute if the attribute value is lower and considered better in Susanto and Purnomo, (2022).

It is said that the price variable includes the cost attribute, because it is expected that sales with good quality goods and are able to provide low prices of goods are then said to be the best decision in making decisions using the SAW method in Susanto and Purnomo, (2022). The price variable is not always a cost attribute, it can be adjusted based on expected conditions. The price variable is grouped under the benefit attribute, because it is expected that the product can be marketed at a high selling price, but the high price is not a problem because the seller is able to provide good quality products. The end result is being able to recommend products from several product choices in Rini, Yuliani, Sriyati, and Kusrini, (2021). In another study, the price variable also includes the benefit attribute, which states the difference in the price of the product being sold with the product available on the market. It is said to be a benefit attribute, because the high price offered by a marketplace is considered not a problem and can be compared to prices from several other marketplaces. Apart from that, apart from the price criteria, there are several other criteria to be considered, one of which is product quality. Product quality is a benefit attribute, because buyers expect good quality products from all the marketplaces they use in Sumampouw, (2016). In contrast to the price variable, in determining the attribute it can be said to be a benefit or cost, the product quality variable always includes the benefit attribute, because the product quality variable will be said to be useful if it is able to provide good quality products and according to what customers expect, because all customers definitely expect the product they buy best quality.

The product quality variable describes the product quality variable to assess the similarity of the product received by the customer with the information presented in the description of the e-commerce website, it is found that the product quality variable is a benefit attribute, because customers expect good product quality from purchases in their chosen marketplace, but it was found that many customers were disappointed with the goods they got after buying goods through the marketplace, because the goods received did not match the description presented. However, it is said that the more e-commerce visitors will further increase public confidence in the quality and quantity of a product in a marketplace (Ginting, 2020).

Next is the promotion variable which is also used in DSS using the SAW method. Promotion is said to be a benefit attribute, that is because promotional media is able to increase purchases by customers to shop on the marketplace in Pudjiarti and Tabrani, (2021). After determining the attribute criteria, then do the assessment by changing the words on the questionnaire into numbers using a Likert scale.

At the stage of filling in the weights, the values of a class with the criteria that have been described will form a matrix, then the matrix is normalized using the formulas listed in Equations 1 and 2 (Putra and Suharso, 2017).

The next stage is to determine the preference value. The preference value ( ) is obtained based on the sum of the multiplication of the normalized matrix row elements (R) with the preference weight (W) corresponding to the matrix column elements (W) (Sidik, 2015).
The formula used is listed in Equation 3.

Vi=∑_(j=1)^nwjrij …….....[3]
Information:
Vi : Ranking for each alternative.
Wj : The weight value of each criterion
Rij : Normalized value
A larger Vi value indicates that the Ai alternative is more preferred (Sidik, 2015).

Based on the description above, for selecting these criteria, it is included in the main component of the Marketing Mix. The 4 main components of the marketing mix include product, price, promotion and distribution, which have very important competition in achieving profits and competitiveness. The four components in the marketing mix are interconnected and influence one another in Mas'ari, Hamdy, and Safira, (2019).

RESEARCH METHODS

This research uses objects, namely consumers from ten marketplaces (Tokopedia, Shopee, Bukalapak, Lazada, Blibli, Bhinneka.com, Orami.co.id, Rarali.com, JD ID, Zalora). This research is to find out which marketplace is the choice of consumers during the Covid-19 pandemic with the components contained in the marketing mix that refer to the 4Ps (product, price, place, and promotion) as the selected variables. The population in this study are consumers who make purchases through one of these marketplaces. The sample criteria in this study are consumers who have shopped at least once. The data calculation method used in this study is the Simple Additive Weighting (SAW) method. The SAW method is one of the methods in the Decision Support System (SPK). The SAW method has several steps that must be carried out, namely calculating alternative data, in this study with data from consumers who shop at one of the 10 marketplaces as a sample with a random sampling system, the next step is to obtain data which is then normalized based on criteria, then the results normalization which is then calculated and ranked in order from the highest value to the lowest value by calculating the SAW method.

SAW (Simple Additive Weighting) Method

Summary Average Score

Table 1 presents a summary of the average value of 10 marketplaces including Tokopedia, Shopee, Bukalapak Lazada, Blibli, Bhineka.com, Orami, Rarali.com, JD.ID, and Zalora.

Table 1. Results Summary Average Score

Results Summary Average Score				
No	**Alternative**	**Product**	**Price**	**Promotion**
1	TOKOPEDIA	4,44	4,26	4,2
2	SHOPEE	4,16	4,05	4,01
3	BUKALAPAK	4,32	4,25	4,38
4	LAZADA	4,42	4,47	4,46
5	BLIBLI	4,5	4,62	4,63
6	BHINEKA.COM	4,48	4,30	4,24
7	ORAMI	4,39	4,21	3,88
8	RARALI.COM	4,25	3,95	3,84
9	JD ID	4,42	4,47	4,42
10	ZALORA	4,61	4,55	4,47

Max Xij	**4,61**		**4,63**
Min Xij		**3,95**	

From Table 1 it is known that Tokopedia's average value in terms of products is 4.44; price 4.26; and promotion 4,2. Shopee's average value in terms of products is 4.16; price 4.05; and promotion 4.01. Bukalapak's average value is 4.32; price 4.25; and promotion 4.38. Lazada's average score from the product side is 4.42; price 4.47; promotion 4.46. Blibli's average score in terms of products is 4.5; price 4.62; and promotion 4.63. The average value of Bhineka.com in terms of products is 4.48; price 4.3; and promotion 4.24. Orami's average score from the product side is 4.39; price 4.21; and promotion 3.88. The average value of rarali.com in terms of product is 4.25; price 3.95; and promotion 3.84. The average value of JD.ID in terms of products is 4.42; price 4.47; and promotions 4.42. Zalora's average score from a product perspective is 4.61; price 4.55; and promotion 4.47.

From the results of the average value of each marketplace listed in Table 1.1, it can be concluded that the largest value of each criterion which is the ten marketplaces, namely in terms of products occupied by the Zalora marketplace, is equal to 4.61. The smallest value of each criterion is the ten marketplaces, namely in terms of prices in Table 1.1, the Rarali.com marketplace is 3.95. The biggest value for each criterion in terms of promotion is the Blibli marketplace, which is 4.63.

Normalization Calculation

The SAW (Simple Additive Weighting) method requires a normalization process. The normalization process is to compare the average value of each criterion in each marketplace. The Max Xij or Min Xij values obtained from Table 4.1 are in accordance with Equations 4 and 5. The calculation results are shown in Table 2.

Table 2 presents the calculations and normalization results for ten marketplaces including: Shopee, Tokopedia, Lazada, Blibli, JD.ID, Orami, Rarali.com, Bhineka.com, Bukalapak, and Zalora. The categories in the following normalization process are: product, price, and promotion.

Table 2. Normalization Calculation

		Normalization					
No	**Alternative**	**Product**		**Price**		**Promotion**	
1	TOKOPEDIA	4,44 ÷ 4,61	**0,9631236**	3,95 ÷ 4,26	**0,92723004**	4,20 ÷ 4,63	**0,9071274**
2	SHOPEE	4,16 ÷ 4,61	**0,9023861**	3,95 ÷ 4,05	**0,97530864**	4,01 ÷ 4,63	**0,8660907**
3	BUKALAPAK	4,32 ÷ 4,61	**0,1999802**	3,95 ÷ 4,25	**0,92941176**	4,38 ÷ 4,63	**0,9460043**
4	LAZADA	4,12 ÷ 4,61	**0,9761388**	3,95 ÷ 4,47	**0,88366890**	4,46 ÷ 4,63	**0,9632829**
5	BLIBLI	4,50 ÷ 4,61	**0,9587852**	3,95 ÷ 4,62	**0,85497835**	4,63 ÷ 4,63	**1**
6	BHINEKA.COM	4,48 ÷ 4,61	**0,9370932**	3,95 ÷ 4,30	**0,91860465**	4,24 ÷ 4,63	**0,9157667**
7	ORAMI	4,39 ÷ 4,61	**0,9522776**	3,95 ÷ 4,21	**0,93824228**	3,88 ÷ 4,63	**0,8380129**
8	RARALI.COM	4,25 ÷ 4,61	**0,9219088**	3,95 ÷ 3,95	**1**	3,84 ÷ 4,63	**0,8293736**
9	JD ID	4,42 ÷ 4,61	**0,9587852**	3,95 ÷ 4,47	**0,88366890**	4,42 ÷ 4,63	**0,9546436**
10	ZALORA	4,61 ÷ 4,61	**1**	3,95 ÷ 4,55	**0,86813186**	4,47 ÷ 4,63	**0,9654427**

In the product category normalization process, the value used is the average of each marketplace divided by the highest score from the marketplace, while the one with the highest score is the Zalora marketplace, amounting to 4.61. In the normalization of the price category used, the lowest value of the ten marketplaces is used, while the lowest score is the Rarali.com marketplace of 3.95 divided by the average value of each marketplace. The promotion category normalization process uses the same calculation formula as the product category, namely the average value of each marketplace divided by the highest score from a marketplace, while the one that gets the highest score is the Blibli marketplace of 4.63.

Weighting and Ranking

This process is multiplying the normalized values in Table 1.2 with the weight values of the three criteria. The weighting of product quality, price and promotion is considered the same, namely 33.33% each. The ranking results for the three marketplace criteria are shown in Table 1.3.

Table 3. Process of Weighting and Ranking

WEIGHTING AND RANKING							
		Product		Price		Promotion	Rangking
	Weight	A		B		C	
No	Alternative		Rangking		Rangking		
1	TOKOPEDIA	0,321009111	**3**	0,309045775	**5**	0,3023456	**7**
2	SHOPEE	0,300765293	**9**	0,32507037	**2**	0,288668	**8**
3	BUKALAPAK	0,19998024	**10**	0,30977294	**4**	0,315303	**5**
4	LAZADA	0,325347072	**2**	0,294526846	**7**	0,3210622	**3**
5	BLIBLI	0,319563124	**4**	0,284964286	**10**	0,3333	**1**
6	BHINEKA.COM	0,31233319	**7**	0,30617093	**6**	0,305225	**6**
7	ORAMI	0,31739414	**6**	0,31271615	**3**	0,27931	**9**
8	RARALI.COM	0,30727223	**8**	0,3333	**1**	0,27643	**10**
9	JD ID	0,31956312	**5**	0,29452685	**8**	0,318183	**4**
10	ZALORA	0,3333	**1**	0,28934835	**9**	0,321782	**2**

Columns A, B, C are the multiplication values of the normalized results with 33.33%. Ranking is determined based on the highest value in each column. In terms of product criteria, the first place is occupied by the Zalora marketplace, the second place is occupied by the Lazada marketplace, and the third place is occupied by the Tokopedia marketplace. In terms of price criteria, the first place is occupied by the Rarali.com marketplace, the second place is occupied by the Shopee marketplace, and the third place is occupied by the Orami marketplace. In terms of promotion criteria, the first rank is occupied by the Blibli marketplace, the second rank is occupied by the Zalora marketplace, and the third rank is occupied by the Lazada marketplace.

This finding illustrates that consumers value products in the Zalora marketplace as having better quality compared to other marketplaces. Prices are considered cheap on the Rarali.com marketplace, while promotions that are considered attractive are on the Blibli marketplace.

Discussion

Zalora and Lazada in terms of product quality are considered good, but in terms of price Zalora and Lazada are considered high according to the findings of Rini, Yuliani, Sriyati, Kusrini, (2019). Even though the price is high, promotions are considered attractive, this is considered positive to increase sales according to the findings of Pujiati and Tabrani, (2020). Tokopedia in terms of product quality is considered good besides that in terms of prices Tokopedia is considered low in accordance with the findings of Susanto and Pornomo, (2022). Even though from a promotional standpoint it is considered less attractive, on the price side it is considered low, this is considered positive to be able to increase sales. However, with good product quality and low prices the product should be able to improve the quality of the promotion so as to attract customers.

On the Rarali.com marketplace, Shopee and Orami are considered low in terms of price so they can increase sales, even though product quality is considered to be poor and promotions are considered unattractive. In the Blibli, Zalora, and Lazada marketplaces, from a promotional standpoint, they are considered attractive, from a product quality standpoint, they are considered good, although from a high price point of view, this is considered positive to increase sales.

The results of this study provide parameters for consumers in using the marketplace, especially for product quality, price, and promotion categories. If consumers prioritize product quality, consumers can choose the Zalora marketplace, because they sell products with good quality, good functionality, high durability, and can be used for a long time, and are equipped with complete application features. However, with high price offers, and attractive promotions.

CONCLUSION AND SUGGESTION

Conclusion

The results show that the marketplace with the best products is Zalora, the Zalora marketplace sells products with good quality, good functionality, high durability, complete features, and can be used for a long time. The marketplace with the lowest price is Rarali.com, the Rarali.com marketplace sells goods at affordable prices and has the best price competitiveness than other marketplaces. The marketplace with the most attractive promotions is occupied by Blibli, the Blibli marketplace displays attention-grabbing advertisements and provides various discount vouchers.

The marketplace with the best product quality, fairly low prices, and attractive promotions is occupied by Lazada. Product quality on the Lazada marketplace ranks second out of the 10 marketplaces with the best products. Prices on the Lazada marketplace rank seventh and can still be said to be quite affordable compared to other marketplaces that have the best product quality on par with Lazada. Promotions on the Lazada marketplace rank third out of ten other marketplaces, this shows that Lazada has promotions that attract customers' attention to shopping.

Suggestion

This finding, from a consumer's point of view, has not been able to inform about the best marketplace that meets the three criteria, namely the best product quality, the lowest price, and attractive promotions. From the point of view of business actors, they still have to choose a marketplace as a place to sell, choose a marketplace that is able to sell products from producers with the best price competitiveness and lower than market prices in other marketplaces. In government policy, it is necessary to have rules regarding shopping in the marketplace, namely setting standard market prices for goods in the marketplace for each type and product category, so that there are no significant price differences for products of the same quality. This is government support in increasing sales through the marketplace.

The limitation of this research is to present the same weighting of product quality, price, and promotion. Further research can be carried out by involving consumers in giving weight to these criteria. In addition to weighting, further research can also pay attention to the marketplace based on the similarity of the types of products sold.

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