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Supplier Selection Decision Support System in Coffee Shops During the Covid- 19 Pandemic (Case Study: Lucky's Koffiee)

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Abstract: Enjoying a cup of coffee is one of the hobbies of most people in Indonesia in various circles, both young and old. However, since the Covid-19 outbreak, the government has asked the public to reduce activities outside the home. Lucky's Koffiee is feeling the impact of this epidemic. Experiencing a decrease in revenue and the amount of raw material remaining is an important concern for management. Using Rank Order Centroid (ROC) for weighting criteria and a decision support system using the Simple Additive Weighting (SAW)method as consideration for selecting suppliers of raw materials that are in accordance with the conditions of the Covid- 19 pandemic by using the criteria of price, quality, service, and timeliness as consideration variables.

Keywords: Simple Additive Weighting Method, Supplier Selection, Simple Additive Weighting, Decision Support System

INTRODUCTION

Drinking a cup of coffee has become one of the hobbies of most people in Indonesia, both young and old. Therefore, in the mid-2000s, young national businessmen began to look at the business as a promising venture, so coffee shops began to appear from Sabang to Merauke, from those that were just roadside coffee shops to shops that offered various types of coffee-based drinks such as coffee with flavor variants.

Since the Corona Virus Disease 2019 (Covid-19) outbreak that hit all countries in the world, governments in all countries have imposed restrictions on the activities of their citizens outside the home to break the chain of this virus. The economy in Indonesia is disrupted due to the Covid-19 pandemic, which also occurs in market mechanisms, not only affecting real economic fundamentals. Vital aspects of the economy include supply, demand, and supply chain.

The selection of raw material suppliers is one of the most important components in supply chain management where the short-term and long-term success of a company will depend on the selection of the right supplier, especially with the uncertain economic

conditions due to this outbreak. Errors in the selection of raw material suppliers will have an impact on reducing the productivity of raw material supplies for production.

The selection of the right supplier will significantly reduce the cost of purchasing materials and increase the competitiveness of the company. The first consideration is the price set by the supplier, it is important for a business to consider the price set by the supplier in order to reduce the number of business expenses. The quality of the goods purchased can be a consideration for choosing a supplier because after all, to maintain the existing market still requires suppliers who have good quality in the procurement of goods.

Services from suppliers are also a consideration for business actors, services in question such as how the supplier handles problems with buyers, how the supplier serves buyers without distinguishing new or old buyers or the quantity to be ordered. Timeliness in the delivery of goods is also an important consideration in having a supplier. With the timeliness of the delivery of goods carried out by the supplier, consumers can feel safe by estimating the order time to buy and estimating when it will arrive at its destination assuming smooth conditions without obstacles.

Lucky's Koffiee is one of the coffee shops affected by the Covid-19 virus condition. This coffee shop, located in Bandung Regency, has been established since 2014 and during the pandemic, this shop continues to run its business operations in accordance with the provisions of the government. Due to reduced income, the manager has to rack his brains so as not to go out of business. Starting from bundling the menu offered to make new menu innovations using the same raw materials so that there are no leftover raw materials that have expired.

The authors Cyntia Trimulia, Sarjon Defit, Gunadi, and Widi Nurcahyo (2018) in their research entitled Selection of the right drug supplier with the simple additive weighting method with the simple additive weighting (SAW) method analysis tool get the results that the method can assist in making optimal decisions in supplier selection, as well as being implemented easily and providing the best supplier recommendations according to the criteria specified in the supplier selection process.

While the authors Hariyanto and Siti Khotimah (2018) in their research entitled decision support system for selecting the best supplier of branded eggs using the SAW method case study: PT. Giant Pondok Kopi with the simple additive weighting (SAW) method analysis tool gets the results of the simple additive weighting (SAW) calculation method accelerating the selection process for selecting the best supplier, and reducing errors when determining it.

As well as authors Serap Akcan and Meral Guldes (2019) in their research entitled Integrated Multicriteria DecisionMaking Methods to Solve Supplier Selection Problems: A Case Study in a Hospital using AHP, TOPSIS, ELECTRE, GRA, and SAW analysis tools obtained the results that the hybrid methods presented in this study are consistent with each other and provide the same ranking for the selection of the best supplier. This can be considered a useful guideline for the house.

RESEARCH METHODS

The object of this research is CV Luckys Koffiee which has a shop with the name Lucky's Koffiee located in Bandung, precisely on Jl. Kopo Sayati No. 238, Margahayu, Bandung.

The variables used as criteria in assessing supplier selection are price, quality of goods, services, and time.

1. Price

   Price is the selling price of raw materials offered by suppliers to their consumers.

Tabel 1. Price

Price	Category
≤ IDR 100,000	Very cheap
IDR 100,001 - IDR 150,000	Cheap
IDR 150,001 - IDR 200,000	Medium
IDR 200,001 - IDR 250,000	Expensive
≥ Rp. 250,000	Very Expensive

2. Quality
   The quality of raw materials can be seen from the level of flavor ordered whether it is appropriate, the quality of packaging, the durability of raw materials, etc.

Table 2. Quality

Value	Category
1	Very Poor
2	Poor
3	Well enough
4	Good
5	Very good

3. Services
   Replacement of defective goods, instructions on how to use them, speed of response to customers, speed of delivery, and similar services, can be key in choosing one supplier over another.

Table 3. Services

Value	Category
1	Very Unsatisfactory
2	Unsatisfactory
3	Well-enough
4	Satisfactory
5	Very Satisfactory

4. Timeliness
   Timeliness in the delivery of raw materials starts from ordering raw materials to suppliers until the raw materials arrive at the shop.

Table 4. Timeliness

Value	Category
1	Very inappropriate
2	Inappropriate
3	Precise enough
4	Exactly
5	Very precise

The SAW method is also known as the weighted sum method.

$$R_{ij} = \begin{cases} \frac{X_{ij}}{Max\, X_{ij}} & jika\ j\ adalah\ atribut\ keuntungan\ (benefit) \\ \frac{Min\, X_{ij}}{X_{ij}} & jika\ j\ adalah\ atribut\ keuntungan\ (cost)\ X_{ij} \end{cases}$$

Picture 1. SAW Method

The basic concept of the Rank Order Centroid (ROC) method is to give weights based on the importance of the criteria.

$$W_k = \frac{1}{k} \sum_{i=1}^{k} \left(\frac{1}{i}\right)$$

FINDINGS AND DISCUSSION

Based on the results of the analysis and interviews, the author found that there are three main raw material suppliers for this shop that meet the criteria, namely coffee beans, syrup and milk. The need for raw materials changed after the Covid-19 pandemic. The existence of government regulations that tighten health protocols, requires shops not to accept on the spot so purchase transactions are only through *online* or *take away*. The sudden drastic decline in sales volume makes the *store manager rack his* brains in making money so as not to go out of business. The need for raw materials changed after the Covid-19 pandemic.

Table 5. Weighting Criteria

	Criteria	Category	Weight
C1	Price	*Cost*	0,52
C2	Quality	*Benefit*	0,27
C3	Services	*Benefit*	0,15
C4	Timeliness	*Benefit*	0,06
TOTAL			1,00

For Coffee Beans Suppliers

The need for coffee beans (Beans) in one month can reach 5kg during the pandemic while before the pandemic spent 10kg.

Table 6. Coffee Beans Suppliers

	AlternativeSuppliers	Criteria			
		C1	C2	C3	C4
A1	Nerd Koala Coffee & Roastery	1	5	5	5
A2	Hungry Bird Coffee	5	5	5	5

Perform normalization with the following equation:

1. Matrix X for Price Criteria

$$R1_{.1} = \frac{\text{Min } (1; 5)}{1} = 1$$

Etc..

2. Matrix X for Quality Criteria

$$R1_{.2} = \frac{5}{\text{Max } (5;5)} = 0{,}20$$

Etc..

Table 7. Rij For Coffee Beans

Alternative	Criteria			
	C1	C2	C3	C4
A1	1	1	1	1
A2	0,20	1	1	1

V1 = (1.00 x 0.52) + (1.00 x 0.27) + (1.00 x 0.15) + (1.00 x 0.06) = 1
V2 = (0.20 x 0.52) + (1.00 x 0.27) + (1.00 x 0.15) + (1.00 x 0.06) = 0.58

Table 8. Vij For Coffee Beans

Alternative	Criteria				Total
	C1	**C2**	**C3**	**C4**	
A1	0,52	0,27	0,15	0,06	1,00
A2	0,10	0,27	0,15	0,06	0,58

Based on the calculation results for coffee bean suppliers, alternative 1 or Nerd Koala Coffee & Roastery is recommended.

For Syrup Suppliers

In one month, the need for syrup use can reach 1 bottle per variant every month during the pandemic while before the pandemic 2 bottles per variant.

Table 9. Xij Decision Matrix for Supplier Syrup

AlternativeSuppliers		**Criteria**			
		C1	**C2**	**C3**	**C4**
A1	Monin	5	4	4	4
A2	Teisseire	2	2	2	2
A3	Toffin	1	5	5	5
A4	Toppico	1	3	4	2
A5	Denali	1	5	4	3

Next, perform normalization with the following equation:

1. Matrix X for Price Criteria R11

$$R1.1 = \frac{\text{Min}(5; 2; 1; 1; 1)}{5} = 0.20$$

Etc..

1. Matrix X for Quality Sub Criteria

$$R1.2 = \frac{4}{\text{Max}(5 ; 2 ; 5 ; 3 ; 5)} = 0.80$$

Etc..

Table 10. Rij For Supplier Syrup

Alternative	**Criteria**			
	C1	**C2**	**C3**	**C4**
A1	0,20	0,80	0,80	0,80
A2	0,50	0,40	0,40	0,40
A3	1,00	1,00	1,00	1,00
A4	1,00	0,60	0,80	0,40
A5	1,00	1,00	0,80	0,60

V1 = (0.20 x 0.52) + (0.8 x 0.27) + (0.8 x 0.15) + (0.8 x 0.06) = 0.49
V2 = (0.50 x 0.52) + (0.4 x 0.27) + (0.4 x 0.15) + (0.4 x 0.06) = 0.45
V3 = (1.00 x 0.52) + (1.00 x 0.27) + (1.00 x 0.15) + (1.00 x 0.06) = 1.00
V4 = (1.00 x 0.52) + (0.6 x 0.27) + (0.8 x 0.15) + (0.4 x 0.06) = 0.83
V5 = (1.00 x 0.52) + (1.00 x 0.27) + (0.8 x 0.15) + (0.6 x 0.06) = 0.95

Table 11. Vij Syrup Supplier

Alternative	**Criteria**				**Total**
	C1	**C2**	**C3**	**C4**	
A3	0,52	0,27	0,15	0,06	1,00
A5	0,52	0,27	0,12	0,036	0,95
A4	0,52	0,16	0,12	0,024	0,83

A1	0,26	0,22	0,12	0,05	0,49
A2	0,26	0,11	0,06	0,02	0,45

The candidate supplier who has the greatest final points is the one suggested as the selected supplier. Based on the calculation results for syrup suppliers, alternative 3 or Toffin Syrup is recommended.

For Milk Suppliers

The average monthly milk requirement is 3 cartons of milk.

Table 12. Xij Decision Matrix for Milk Suppliers

Alternative	Criteria			
	C1	C2	C3	C4
A1	1	5	4	5
A2	3	4	2	4
A3	5	5	5	2

Perform normalization with the following equation:

1. Matrix X for Price Criteria

$$R11 = \frac{Min(1 ; 3 ; 5)}{1} = 1,00$$

Etc..

1. Matrix X for Quality Criteria

$$R12 = \frac{5}{Max\ (5 ; 4 ; 5)} = 1,00$$

Etc…

Table 13. Rij For Supplier Syrup

Alternative	Criteria			
	C1	C2	C3	C4
A1	1,00	1,00	0,80	1,00
A2	0,33	0,80	0,40	0,80
A3	0,20	1,00	1,00	0,40

V1 = (1.00 x 0.52) + (1.00 x 0.27) + (0.8 x 0.15) + (1.00 x 0.06) = 0.97
V2 = (0.33 x 0.52) + (0.80 x 0.27) + (0.40 x 0.15) + (0.8 x 0.06) = 0.50
V3 = (0.20 x 0.52) + (1.00 x 0.27) + (1.00 x 0.15) + (0.40 x 0.06) = 0.55

Table 14. Vij Milk Supplier

Alternative	Criteria				Total
	C1	C2	C3	C4	
A1	0,52	0,27	0,12	0,06	0,97
A3	0,17	0,22	0,06	0,05	0,55
A2	0,10	0,27	0,15	0,02	0,50

The candidate supplier that has the greatest final points is the one suggested as the selected supplier. Based on the calculation results for milk suppliers, alternative 1 or Cimory Fresh Milk is recommended.

CONCLUSION

1. Choosing suppliers for raw materials is one way for management to deal with it, by considering the costs and benefits that are deemed most suitable for the current market and financial conditions of management.
2. Priority factors that influence supplier selection according to shop management are the price of raw materials from suppliers, then the quality of raw materials offered, the services provided by suppliers, and the timeliness of suppliers in distributing their goods
3. Results for raw material suppliers of coffee beans (beans) are recommended to use Nerd Koala coffee & roastery, for syrup suppliers as a supporting raw material it is recommended to use Toffin. milk suppliers as another supporting raw material are recommended to use Cimory Fresh Milk.

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