Analisis Pemilihan *Supplier* Susu UHT Diamond Dengan Metode *Analytical Hierarchy Process* (AHP) Cafe Milkyway Coffe & Milk Di Kabupaten Berau Kalimantan Timur

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Article Info :	ABSTRACT
	Every business sector wants consistency in production results. This can be realized through collaboration with raw material providers or suppliers who can ensure the consistent availability of raw materials because the production of raw materials is vital. Therefore, it is necessary to have a good raw material procurement system and supplier selection so that the production process can run smoothly. Milkyway Cafe is the first pioneering UKM of beverage and food business in Berau Regency, East Kalimantan, which has a special characteristic of beverage products made from milk which are liked by many customers, especially teenagers, children, and families. There are problems experienced when selecting suppliers who provide raw materials for UHT milk because there are several factors to consider, namely price, delivery, service, and accuracy of quantities. The sample of the research is the business owner regulating the procurement of UHT milk. The results of the analysis and calculation of the Analytical Hierarchy Process (AHP) using Microsoft Excel stated that the chosen alternative, namely the Kompas with a weight value of 0.46, was superior to the Simpang Utama with a weighted value of 0.34 and the Tops Jaya with a weighted value of 0.20. The main factors prioritized in the selection of suppliers at Milkyway are service criteria with a weight value of 0.18, the accuracy of the number of goods with a weight value of 0.15, prices with a weight value of 0.08, and delivery with a weight value of 0.06.

1. INTRODUCTION

Every business certainly wants the consistency of production results as its trademark. This can be realized through cooperation with suppliers who can guarantee the availability of the raw materials needed because the production of raw materials is vital. Therefore, it is necessary to have a raw material procurement system and good supplier selection so that the material requirements can be met and the production process can run smoothly.

In the business field, of course, each has its characteristics, such as Café Milkyway Coffe and Milk, which makes its dairy products its trademark. The right supplier is needed to fulfil raw materials, especially milk. Companies often do not get the best suppliers because many companies, manufacturing and services, now determine these suppliers based on intuition and relationship relationships but are not accompanied by rational evaluation criteria and methods and solutions (Mario et al., 2015).

Currently, Café Milkyway Coffe and Milk does not yet have a permanent milk supplier, which often hinders sales, service, and maintaining the quality of existing beverage products and raw materials for UHT milk with several criteria, including the price offered, quality, delivery suitability, timeliness, and payment flexibility. But in reality, there is often a shortage and delay in the arrival of raw materials. Moreover, there is no proven method for assisting supplier selection due to the manager's ignorance as the owner in making choices. Supplier selection can use the Analytical Hierarchy Process (AHP) form, a framework for making effective decisions on complex issues by simplifying problems and arranging them in a hierarchy. Using this AHP method, the weight of each criterion will be known and used as a consideration in choosing suppliers. This research's new value is AHP applied to Café Milkyway Coffee and Milk.

The purpose of this study was to determine the analysis of the selection of the best supplier of UHT milk at Milkyway Coffee and Milk. While the benefits of research include the following:

a. For the reader, that increases the reader's insight into policy decision-making, product planning, and control.
b. For cafe business owners, namely being able to provide input so that it can be taken into account in decision-making, especially in selecting the right supplier to maintain the availability of goods, product quality and service to customers.
c. For further researchers, it can be a reference if they want to combine the Analytical Hierarchy Process (AHP) and fuzzy AHP methods.

2. RESEARCH METHOD

2.1. Research design

The initial step starts with determining the research topic, literature study, identification and formulation of problems and field studies. Then set the research objectives, and collect data. The next step is data processing and analysis, then making conclusions and suggestions. The complete steps can be seen in Figure 1 Research Flowchart.

Figure 1. Research Flowchart

2.2. Place And Time Of Research

This research was conducted at the "Milkyway Coffee and Milk" Cafe in Jalan Mangga from November 2021 to May 2022. The location of the study can be seen in Figure 2 below.

Figure 2. Location of the "Milkyway Coffee and Milk" Café

2.3. Respondent Rating

Determination of respondents is done purposively; respondents who are taken in the study are business owners (Managers) who handle the procurement of direct raw materials for UHT milk at Milkyway Coffee and Milk.

2.4. Research Instruments

This study's data collection consisted of primary and secondary data. Preliminary data were obtained by distributing questionnaires, interviews, observations and direct surveys to respondents at the research site. Secondary data is obtained from readings such as journals, theses or books on research topics.

2.5. Data processing

Sensitivity analysis of the Analytical Hierarchy Process (AHP) method can be done manually or using the help of the Expert Choice software application to find out how far changes in the weight of the main criteria can change the results of alternative selections (Pratiwi, HAK, & Erdiyansyah, 2014). The selection of suppliers goes through several stages, starting from determining which supplier will be the choice, then choosing the supplier criteria and continuing with the calculation of the weight of the assessment of the requirements and alternative suppliers. The flow chart of the supplier selection process is shown in Figure 3.
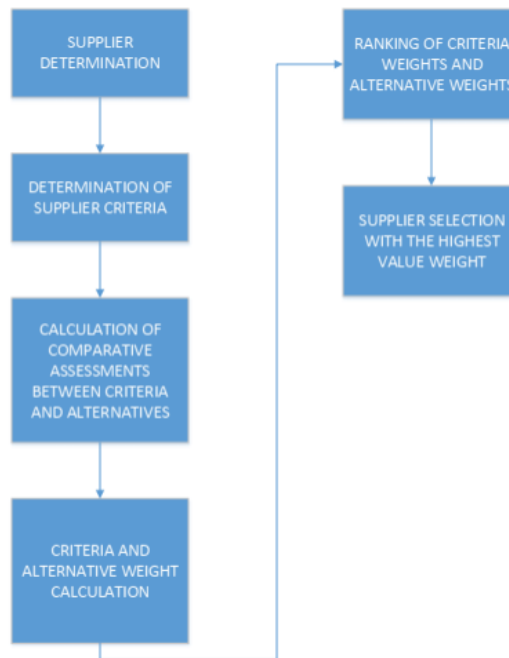
Figure 3. Supplier Selection Flowchart

The supplier who becomes the object is competent, and the criteria used are the results of interviews and respondents' assessments, as shown in Figure 4.
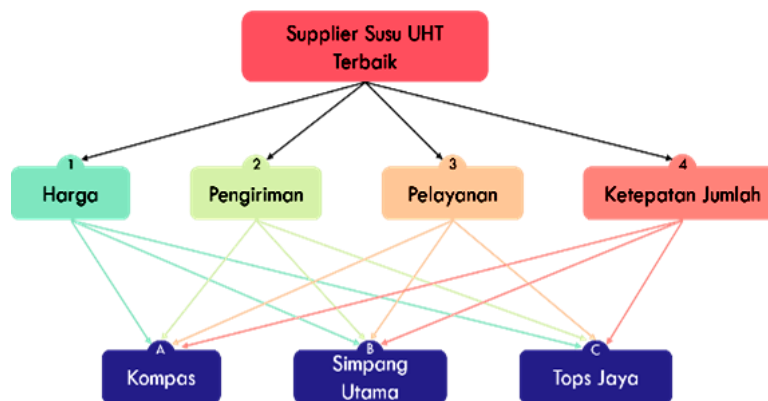

Figure 4. Results of Interviews and Respondents' Assessment

Below are the criteria for supplier selection that refer to the research of Robert L. Nydick & Ronald Paul Hill and the study of Surjasa et al.:

1. Price
2. Shipping
3. Service
4. Quantity Accuracy

The lowest level is an alternative level, which is occupied by the suppliers of Café Milkyway Coffe and Milk, namely:

1. Compass
2. CV. Main intersection
3. Tops Jaya

AHP serves to provide an assessment of the qualitative factors stated subjectively. The rating scale of 1-9 is shown in Table 1.

Table 1. Pairwise Comparison Rating Scale (saaty & Vargas, 2012)

Level of Interest	Definition
1	Equally Important
3	Somewhat more important one over the other
5	Quite important
7	Very important
9	Absolute more important
2,4,6,8	The middle value between two adjacent decision values

3.   RESULTS AND ANALYSIS

The data used to measure the priority importance of the sub-criteria for each criterion in selecting suppliers is obtained from a questionnaire given to business owners who handle the procurement of raw materials, one of which is UHT milk at Milkyway Coffee and Milk. Then the data from the questionnaire will be processed, where Microsoft Excel is used to process the data. The following are the steps for processing data using Microsoft Excel.

3.1. Performing Eigen Vector Calculations

Eigen Vector is a step used to determine the priority results of each basic element which will determine the final priority results from alternatives to determine the best supplier. At this stage, the eigenventor calculations are carried out for each criterion and alternative. The eigenvector calculation is done by dividing the total weight matrix by the total of the total weight matrix.

1.   Pairwise Comparison Matrix Eigen Vector Results For Criteria

Table 2. Pairwise Comparison Matrix Eigen Vector Results For Criteria

Criteria	Price	Delivery	Service	Quantity Determination	Eigenvalue				Amount	Priority Vector
Price	1,00	5,00	1,00	0,33	0,19	0,67	0,31	0,04	1,21	0,30
Delivery	0,20	1,00	1,00	2,00	0,04	0,13	0,31	0,24	0,72	0,18
Service	1,00	1,00	1,00	5,00	0,19		0,31	0,60	1,24	0,31
Quantity Determination	3,00	0,50	0,20	1,00	0,58		0,06	0,12	0,83	0,21
Amount	5,20	7,50	3,20	8,33	1,00	1,00	1,00	1,00	4,00	1,00

2.   Eigen Vector Result Criteria Value

Table 3. Eigen Vector Result Value Criteria Price

MILK SUPPLIER	Compass	Main intersection	Tops Jaya	Eigenvalue			Amount	Priority Vector
Compass	1,00	0,20	5,00	0,16	0,14	0,45	0,75	0,25
Main intersection	5,00	1,00	5,00	0,81	0,71	0,45	1,97	0,66
Tops Jaya	0,20	0,20	1,00	0,03	0,14	0,09	0,26	0,09

Amount	6,20	1,40	11,00				2,98	1,00

3. Result of Eigen Vector Value of Delivery Criteria

Table 4. Eigen Vector Results Criteria Value

MILK SUPPLIER	Compass	Main intersection	Tops Jaya	Eigenvalue			Amount	Priority Vector
Compass	1,00	5,00	0,33	0,24	0,56	0,20	1,00	0,33
Main intersection	0,20	1,00	0,33	0,05	0,11	0,20	0,36	0,12
Tops Jaya	3,00	3,00	1,00	0,71	0,33	0,60	1,64	0,55
Amount	4,20	9,00	1,66				3,00	1,00

4. Eigen Vector Results Service Criteria Value

Table 5. Eigen Vector Results Service Criteria Value

MILK SUPPLIER	Compass	Main intersection	Tops Jaya	Eigenvalue			Amount	Priority Vector
Compass	1,00	3,00	3,00	0,60	0,69	0,43	1,72	0,57
Main intersection	0,33	1,00	3,00	0,20	0,23	0,43	0,86	0,29
Tops Jaya	0,33	0,33	1,00	0,20	0,08	0,14	0,42	0,14
Amount	1,67	4,33	7,00				3,00	1,00

5. Result of Eigen Vector Value of Quantity Accuracy Criteria

Table 6. Eigen Vector Results Values for Supplier Decision Making Criteria

MILK SUPPLIER	Compass	Main intersection	Tops Jaya	Eigenvalue			Amount	Priority Vector
Compass	1,00	5,00	5,00	0,71	0,71	0,71	2,13	0,71
Main intersection	0,20	1,00	1,00	0,14	0,14	0,14	0,43	0,14
Tops Jaya	0,20	1,00	1,00	0,14	0,14	0,14	0,43	0,14
Amount	1,40	7,00	7,00				3,00	1,00

3.2. Supplier Decision Making

     The alternative weight evaluation value is a value that supports decision making, the value is obtained from the multiplication of each criterion eigenvector and the alternative eigenvectors which are then added together. For example, to get the weight evaluation alternative value for the Kompas alternative, it is obtained from:

a. a. Alt. Wight Evaluation = (Priority Vector Prices in table 2 x Vector Priority Prices in table 3) + (Priority Vector Prices in table 2 x Vector Priority Prices in table 4) + (Priority Vector Prices in table 2 x Vector Priority Prices in table 5) + (Priority Vector Prices in table 2 x Vector Priority Prices in table 6)

b. Alt. Wight Evaluation $= (0,30 \text{ x } 0,25) + (0,30 \text{ x } 0,33) + (0,30 \text{ x } 0,57) + (0,30 \text{ x } 0,71)$

$= 0,08 + 0,06 + 0,18 + 0,15$

$= 0,46$

Table 7. Decision Making Results

CRITERIA	Price	Delivery	Service	Quantity Determination	Final Priority Value	Rank
COMPASS	0,08	0,06	0,18	0,15	0,46	1
MAIN INTERSECTION	0,20	0,20	0,09	0,03	0,34	2
TOPS JAYA	0,03	0,10	0,04	0,03	0,20	3

From the table above, it can be seen that Kompas is the chosen supplier, because Kompas has the highest Alternative Wight Evaluation value compared to the others. Meanwhile, based on the direct survey results obtained data that, the vendors used by Milkyway Coffee and Milk in supplying UHT milk there are 3 suppliers according to the alternatives above.

4. CONCLUSION

Based on the data processing and analysis above, the following conclusions can be drawn:

a. The results of the analysis and calculation of the Analytical Hierarchy Process (AHP) using Microsoft Excel state that the chosen alternative is the Kompas Supplier with a weight value of 0.46, which is superior to the Simpang Utama Supplier with a weight value of 0.34 and the Tops Jaya Supplier with a weighted value. of 0.20. The magnitude of the weight value of the three Main Suppliers of UHT Milk at Milkyway Coffee and Milk can be seen in Figure 5 below.
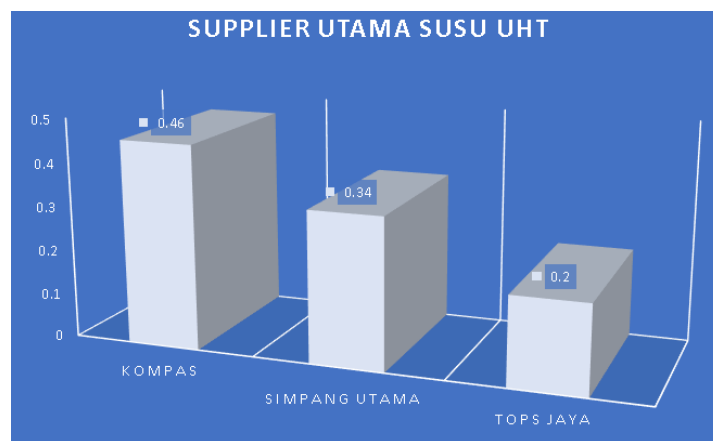

Figure 5. Main Suppliers of UHT Milk

b. The main factors that are prioritized in supplier selection at Milkyway are service criteria with a weight value of 0.18, the accuracy of the number of goods with a weight value of 0.15, price with a weight value of 0.08, and delivery with a weight value of 0.06. The value of the weight of the criteria which is the Main Factor in the selection of UHT milk at Milkyway Coffee and Milk can be seen in Figure 6. below.

Figure 6. Main Priority Factors

5. ACKNOWLEDGEMENTS

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