

Supplier Selection Using Fuzzy Analytical Hierarchy Process (FAHP) Method At PT. Gizitatapangan Sejahtera

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Abstract

The increasing demand for reliable supplier evaluation amidst economic recovery drives the need for an efficient decision-making process at PT. Gizitatapangan Sejahtera, particularly after operational disruptions during the pandemic. This study aims to identify critical criteria and prioritize suppliers for strategic collaboration using the Fuzzy Analytical Hierarchy Process (FAHP) method. Unlike traditional AHP, FAHP incorporates uncertainty in decision-making, providing a more robust evaluation framework. The research employed a mixed-method approach, combining interviews with company stakeholders and secondary data analysis. Six criteria—Quality, Cost, Delivery, Service, Long-term Relationship, and Flexibility—were evaluated through pairwise comparisons and transformed into fuzzy numbers. Results indicate Quality (0.358) and Cost (0.305) as the top priorities, with Supplier D emerging as the best choice, followed by Suppliers C, B, and A. Supplier D demonstrated superior performance in cost-effectiveness while maintaining quality standards, though its long-distance logistics posed challenges. This study underscores the importance of systematic supplier selection and provides actionable insights to enhance procurement strategies.

Keyword: Supplier Selection; Supply Chain Management; Fuzzy Model; AHP

Introduction

The spirit of this economic boom also occurs in people's purchasing power. According to business people, market desires in Bandung City change very quickly, and even the current trends in Bandung City last only a short time. This can be seen from the high level of competition and the rapid changes in Bandung City, requiring business owners to continuously create innovations in order to survive in the service industry, especially culinary (Fitriani & Satyarini, 2023). This has a direct impact on company demand, which also decreases drastically. As a result, many people are in danger. PT. Gizitatapangan Sejahtera (Gizitas) is an industrial manufacturing company founded in the city of Bandung in 1991. The company focuses on its main products, namely chocolate and wafer cones. In 2020, the Gizitas company experienced a decline in sales, even experiencing a loss. As a result, companies have to reduce company operational costs by reducing production and reducing the number of employees. The decrease in production quantities has an impact on the frequency of purchasing from suppliers which also decreases, so that the company is forced to change its relationship with

several new suppliers. However, in 2021, as the economy improves, PT Gizitatapangan Sejahtera again increased sales as in previous years. The high level of condolence for the company to resume production. Therefore, currently, PT Gizitatapangan Sejahtera needs additional suppliers because the company's needs are not being met and demand is quite high.

There are many raw materials used in PT's production. Gizitatapangan Sejahtera. These raw materials include sugar, cocoa powder, wheat flour, tapioca flour, rice crispy, synthetic flavors, and soy lecithin. These materials have a big influence on the continuity of production. One supplier and another have different characteristics, so companies also need to treat each supplier according to their respective characteristics. In this research, the author classifies the company's suppliers PT. Gizitatapangan Sejahtera is based on their respective positions and strengths which are described through the Kraljic matrix. Based on the Kraljic matrix, raw materials are used which are included in Strategic Items, namely cocoa powder. This is because the need for cocoa powder is very large, but the availability of suppliers still needs to be improved.

Supplier selection is one of the important activities in a company. This is because suppliers are the main component in logistics and production management (Viarani & Zadry, 2015). Therefore, choosing the right supplier involves more than simply comparing price lists; the choice will depend on a variety of factors, both quantitative and qualitative. Apart from that, supplier selection also involves several criteria. Decision-makers need to choose appropriate and systematic methods to evaluate alternative suppliers. A formal process that can be used to develop decision problems with many criteria is the Multi-Criteria Decision Making (MCDM) approach (Yadav & Sharma, 2015). This method can be classified into an individual approach and an integrated approach. The personal approach uses DEA, mathematical programming, AHP, case-based reasoning, fuzzy decision-making, genetic algorithms, ANP, and SMART (Ho et al., 2010). An integrated approach uses more than one technique, such as integrated AHP and DEA, integrated fuzzy and AHP, integrated AHP and objective programming, and others.

Analytical Hierarchy Process (AHP) is a multi-criteria decision-making model that can help human thinking patterns, where logical factors, experience, knowledge, emotions, and feelings are optimized in a systematic process. With this method, it is hoped that it can help in making decisions based on a priority scale. The AHP approach is used to structure problems into hierarchies. However, according to (Yadav & Sharma, 2015), AHP is considered not good at dealing with possible perceptual uncertainty and ambiguity. To cover the shortcomings of AHP, the Fuzzy Analytical Hierarchy Process (FAHP) method is used. This method changes the AHP scale into a fuzzy number or Triangular Fuzzy Number (TFN) which helps reduce uncertainty in assessing due to limited knowledge or subjectivity of assessment. The Fuzzy Analytical Hierarchy Process (FAHP) method was first introduced by Chang (1996) and is a direct extension of the AHP method created by Thomas L. Saaty, which consists of matrix elements represented by fuzzy numbers. (Doaly et al., 2019) state that the Fuzzy AHP method can minimize the uncertainty in decision descriptions resulting from conventional AHP methods.

In this research, one method is used to select suppliers that are included in the Multi-Criteria Decision-making (MCDM), namely the Fuzzy Analytical Hierarchy Process (FAHP). FAHP is an approach that developed from the AHP method. Fuzzy AHP is considered better than AHP in describing decisions with higher uncertainty or are vague. This is because Fuzzy AHP takes into account the uncertainty of human opinion mapping. It is hoped that this research can help manufacturing companies, especially PT. Gizitatapangan Sejahtera can know the criteria that need to be taken into account when selecting suppliers, the conditions for each supplier in fulfilling each criterion, and the best suppliers to collaborate with.

Literature Review

In the supply chain, a multi-vendor sourcing strategy is one of the company's choices to reduce the risk of supply delays. This strategy involves using more than one supplier to ensure the company's needs are met, although it can potentially increase operational costs (Costantino & Pellegrino 2010), 2010). This study discusses the concept of supplier selection for multi-vendors by considering several variables following the theoretical framework in Figure 1.

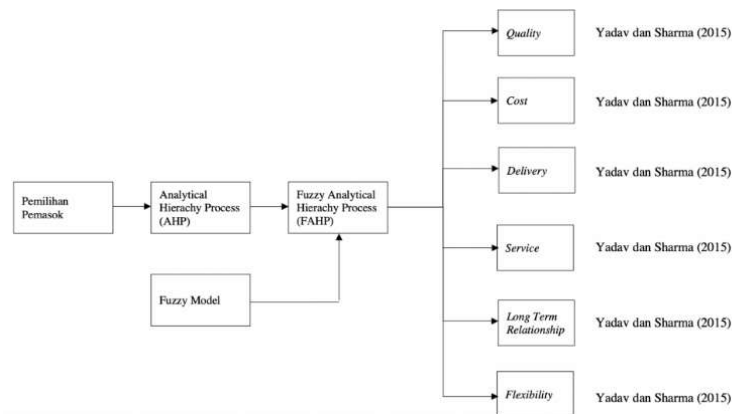


Figure 1. Theoretical Framework This Research
(Reference: Yadav & Sharma, 2015)

Figure 1 shows an overview of how theoretical thinking. The supplier selection process requires a systematic approach that considers various quantitative and qualitative criteria. The Multi-Criteria Decision Making (MCDM) approach is used to help evaluate alternative suppliers based on a structured hierarchy of criteria (Yadav & Sharma, 2015). One popular method in MCDM is the Analytical Hierarchy Process (AHP). This method allows decision-making by prioritizing based on various criteria that have been identified (Saaty, 1990). However, AHP has limitations in dealing with uncertainty, especially those arising from the subjectivity of the assessment. To overcome this, the Fuzzy Analytical Hierarchy Process (FAHP) method was developed. FAHP uses fuzzy numbers to reduce ambiguity and increase the objectivity of the evaluation process (Chang, 1996)

Supplier evaluation is often based on key criteria that include quality, cost, delivery, service, long-term relationships, and flexibility. Quality refers to the supplier's ability to produce products that meet predetermined standards. Cost includes the price of raw materials and the financial efficiency offered by the supplier. Delivery emphasizes the timeliness and quantity of goods according to the company's request. Service, including technical support and information, is a significant added value in the supplier's relationship with the company. A good long-term relationship, based on trust and partnership, is also an important factor in the sustainability of cooperation. Finally, flexibility measures the supplier's ability to deal with changing company needs (Yadav & Sharma, 2015).

This research refers to important criteria in selecting suppliers, according to Yadav and Sharma (2015), including Quality, Cost, Delivery, Service, Long-term Relationship, and Flexibility:

a. Quality

Quality criteria are the supplier's ability to produce quality products. Product quality has an impact on consumer loyalty as a result of consumer satisfaction. Good quality products must meet minimum standards and customer requirements and perform efficiently, consistently, and satisfactorily. Customers may reject poor quality products or defective products, so customer rejection and defect rate are also measures of quality. So the quality of a product can be

determined by the criteria of meeting minimum standards and requirements, reliability, consumer rejection, and defect rate.

b. Cost

Raw material costs are one of the important criteria that companies always consider when choosing suppliers. This criterion includes all factors related to finance, namely the price of materials, which is also associated with quantity and discounts. In the Cost criteria, the sub-criteria are low prices, discounts given, and shipping costs.

c. Delivery

This criterion looks at suppliers in terms of delivery services, both in terms of timeliness of delivery and accuracy in the quantity of goods ordered. Suppliers must meet the criteria on time and in the right quantity so as not to affect the company's production process. In addition, good packaging is very important to protect goods from theft and damage. Thus, the Delivery criteria have sub-criteria for on-time delivery, good packaging for delivery, and lead time for order fulfillment.

d. Service

Services not only provide a competitive advantage but also make a significant contribution to generating profits. After-sales, service makes customers satisfied and influences customer purchasing intentions. Services provided by suppliers can be evaluated based on the sub-criteria of technical support, information sharing, guarantees, and claims policies and capabilities.

e. Long-term Relationship

This criterion relates to the long-term relationship between the supplier and the company. The relationship between suppliers and companies will have an impact on sub-criteria pertaining to honesty, reputation, trust and partnership, and ease of communication.

f. Flexibility

can be defined as the ability of a system to adapt to changes that occur and maintain satisfactory performance. Flexibility measures the supplier's ability to meet changes in quantity and variety requirements required by the company. Apart from that, the sub-criteria of this criterion also includes the company's way of handling conflicts and product development time.

Previous research has shown the superiority of FAHP in dealing with uncertainty compared to AHP. (Norhikmah et al., 2013). stated that FAHP is more effective in describing complex and ambiguous decisions. In addition, (Yadav & Sharma, 2015) found that quality criteria are the main priority factors in supplier selection, followed by other criteria such as delivery and cost. With these advantages, FAHP becomes a relevant approach to improving the effectiveness of the supplier selection process.

Research Method

The research method used in this study is a descriptive method to assess suppliers that are used as suggestions to the company regarding supplier needs. This study uses two types of data sources: primary and secondary. Primary data sources are obtained directly from interviews with the company to get information about the difficulties or problems faced by PT. Gizitatapangan Sejahtera with its suppliers, company profiles, and the order of priority comparison between criteria. Secondary data are obtained from literature studies and reviews to get information about problem formulation and data processing using the Fuzzy Analytical Hierarchy Process (FAHP) method and to obtain criteria adapted to the company to carry out supplier assessments.

The FAHP method uses a fuzzy ratio called Triangular Fuzzy Number (TFN) and is used in the fuzzification process. TFN consists of three membership functions, namely the lowest value (l), the middle value (m), and the highest value (u). Triangular Fuzzy Number (TFN) is a fuzzy set used in subjective assessments or measurements.

Table 1. Triangular Fuzzy Number Scale

AHP Scale	Linguistic variables	Triangular Fuzzy Number (TFN)	Reciprocal
1	Just equal (Both elements are equally important)	(1,1,1)	(1,1,1)
2	Intermediate	(1/2, 1, 3/2)	(2/3, 1, 2)
3	Moderately Important (One element is quite important than the others)	(1, 3/2, 2)	(1/2, 2/3, 1)
4	Intermediate	(3/2, 2, 5/2)	(2/5, 1/2, 2/3)
5	Strongly Important (One element is more important than the others)	(2, 5/2, 3)	(1/3, 2/5, 1/2)
6	Intermediate	(5/2, 3, 7/2)	(2/7, 1/3, 2/5)
7	Very Strong (One element is stronger in importance than the others)	(3, 7/2, 4)	(1/4, 2/7, 1/3)
8	Intermediate	(7/2, 4, 9/2)	(2/9, 1/4, 2/7)
9	Extremely Strong (One element is absolutely more important than the others)	(4, 9/2, 9/2)	(2/9, 2/9, 1/4)

(Reference: Hatta et al., 2015)

The following are the steps of the FAHP method (Talangkas & Pulansari, 2021):

1. Carrying out the Analytical Hierarchy Process (AHP) method procedure
2. Convert the weighting results into fuzzy numbers using the Triangular Fuzzy scale as in Table 2.2.
3. Calculating the Fuzzy Synthetic Extent (Si) value
4. Determining Vector Value (V)
5. Determining the defuzzification ordinate value / Fuzzy Number (d')
6. Normalizing the fuzzy vector weights (W).

Result And Discussion

Comparison Matrix Between Criteria using the AHP Method

Comparisons between criteria on the AHP scale were obtained through interviews with PT. Gizitatapangan Sejahtera. By referring to Table 3, attached are the comparison results between the requirements for PT. Gizitatapangan Sejahtera.

Table 2. Comparison Table Between Criteria with AHP Scale

Criteria	<i>Quality</i>	<i>Cost</i>	<i>Delivery</i>	<i>Service</i>	<i>Relationship</i>	<i>Flexibility</i>
<i>Quality</i>	1	2	3	6	5	7
<i>Cost</i>	1/2	1	2	5	4	6

<i>Delivery</i>	1/3	1/2	1	2	3	4
<i>Service</i>	1/6	1/5	1/2	1	2	3
<i>Relationship</i>	1/5	1/4	1/3	1/2	1	3
<i>Flexibility</i>	1/7	1/6	1/4	1/3	1/3	1

(Reference: Processed by the author, 2023).

A comparison between the criteria and the AHP scale in Table 2 has calculated the consistency and obtained a CR value of 0.044. This number is less than 0.1, so the pairwise comparison matrix in Table 4.1 is considered consistent and can be used and transformed into a TFN scale to calculate the order of criteria for PT. Gizitatapangan Sejahtera.

Transformation of AHP Scale Comparison Matrix into TFN Scale

Table 3. Comparison Between Criteria in the TFN Scale

Criteria	<i>Quality</i>			<i>Cost</i>			<i>Delivery</i>			<i>Service</i>			<i>Long-term Relationship</i>			<i>Flexibility</i>		
	<i>l</i>	<i>m</i>	<i>n</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>l</i>	<i>m</i>	<i>n</i>
<i>Quality</i>	1	1	1	0.50	1	1.50	1	1.50	2	2.50	3	3.50	2	2.50	3	3	3.50	4
<i>Cost</i>	0.67	1	2	1	1	1	0.50	1	1.50	2	2.50	3	1.50	2	2.50	2.50	3	3.50
<i>Delivery</i>	0.50	0.67	1	0.67	1	2	1	1	1	0.50	1	1.50	1	1.50	2	1.50	2	2.50
<i>Service</i>	0.29	0.33	0.40	0.33	0.40	0.50	0.67	1	2	1	1	1	0.50	1	1.50	1	1.50	2
<i>Relationship</i>	0.33	0.40	0.50	0.40	0.50	0.67	0.50	0.67	1	0.67	1	2	1	1	1	1	1.50	2
<i>Flexibility</i>	0.25	0.29	0.33	0.29	0.33	0.40	0.40	0.50	0.67	0.50	0.67	1	0.50	0.67	1	1	1	1

(Reference: Processed by the author, 2023).

The AHP scale converted to a TFN scale will then be processed to calculate the Fuzzy synthesis value for each criterion.

Calculating Fuzzy Synthesis Values for Each Criteria

To obtain fuzzy synthesis values, several steps are carried out. The first step is done by adding each TFN for all criteria. Table 5 shows the summation obtained from Table 4

Table 4. Triangular Fuzzy Number

	<i>l</i>	<i>m</i>	<i>u</i>
Quality	10.00	12.50	15.00
Cost	8.17	10.50	13.50
Delivery	5.17	7.17	10.00
Service	3.79	5.23	7.40
Relationship	3.90	5.07	7.17
Flexibility	2.94	3.45	4.40
Total	33.95	43.92	57.47

(Reference: Processed by the author, 2023).

Calculating Fuzzy Synthesis Values for Each Criteria

To calculate the degree of membership, a Fuzzy Synthesis Value is needed, which will be used to obtain the Vector Value (V). The results of calculating the Fuzzy Synthesis Value are attached in Table 6.

Table 6. Synthetic Fuzzy Number

	<i>l</i>	<i>m</i>	<i>u</i>
Quality	0.17	0.28	0.44
Cost	0.14	0.24	0.40
Delivery	0.09	0.16	0.29
Service	0.07	0.12	0.22
Relationship	0.07	0.12	0.21
Flexibility	0.05	0.08	0.13

(Reference: Processed by the author, 2023).

Calculating Vector Values (V) and Defuzzification Ordinate Values (d')

Calculation of Vector Values and Defuzzification Ordinate Values are calculated referring to equation 4.1 and take the smallest number from the comparison results. Please note that VQ symbolizes Quality criteria, VC symbolizes cost criteria, VD symbolizes delivery criteria, VS symbolizes service criteria, VR symbolizes Long-term Relationship criteria, and VF symbolizes Flexibility criteria.

Table 7. Recapitulation of vector values (V) and defuzzification ordinate values (di') between criteria

<i>Quality</i>		<i>Cost</i>		<i>Delivery</i>		<i>Service</i>		<i>Long-Term Relationship</i>		<i>Flexibility</i>	
VQ ≥ (VC, VD, VS, VR, VF)		VC ≥ (VQ, VD, VS, VR, VF)		VD ≥ (VQ, VC, VS, VR, VF)		VS ≥ (VQ, VC, VD, VR, VF)		VR ≥ (VQ, VC, VD, VS, VF)		VF ≥ (VQ, VC, VD, VS, VR)	
VQ ≥ VC	1	VC ≥ VQ	0.852	VD ≥ VQ	0.5	VS ≥ VQ	0.238	VR ≥ VQ	0.2	VF ≥ VQ	0
VQ ≥ VD	1	VC ≥ VD	1	VD ≥ VC	0.652	VS ≥ VC	0.4	VR ≥ VC	0.368	VF ≥ VC	0
VQ ≥ VS	1	VC ≥ VS	1	VD ≥ VS	1	VS ≥ VD	0.765	VR ≥ VD	0.75	VF ≥ VD	0.333
VQ ≥ VR	1	VC ≥ VR	1	VD ≥ VR	1	VS ≥ VR	1	VR ≥ VS	1	VF ≥ VS	0.6
VQ ≥ VF	1	VC ≥ VF	1	VD ≥ VF	1	VS ≥ VF	1	VR ≥ VF	1	VF ≥ VR	0.6

(Reference: Processed by the author, 2023).

From the table 7, we get the smallest value, which is the vector weight value of the Quality Criteria, which is 1, Cost Criteria is 0.852, Delivery Criteria is 0.5, Service Criteria is 0.238, Long-term Relationship Criteria is 0, 2, and the Flexibility Criteria is 0.

Normalization of Fuzzy Vector Weight Values

The normalization value is obtained by dividing each component's defuzzification ordinate value by the total sum of the defuzzification ordinate values of all criteria. The normalization results for each criterion are presented in Table 8.

Table 8. Criteria Weight Value

	<i>Quality</i>	<i>Cost</i>	<i>Delivery</i>	<i>Service</i>	<i>Long-Term Relationship</i>	<i>Flexibility</i>	Total
W'	1	0.852	0.5	0.238	0.2	0	2.79
W	0.358	0.305	0.179	0.085	0.072	0.000	1

(Reference: Processed by the author, 2023).

Based on the calculations table 8, it can be interpreted that Quality, Cost, Delivery, Service, and Long-term Relationships influence PT. Gizitatapangan Sejahtera in selecting suppliers. Quality criteria are the first criterion with a value of 0.358. Then followed by the Cost criteria with a value of

0.305, Delivery criteria with a value of 0.179, Service criteria with a value of 0.085, and Relationship criteria with a value of 0.72. Meanwhile, the Flexibility criterion is not important in selecting suppliers for PT. Gizitatapangan Sejahtera because it has a weight value of 0. According to PT. Gizitatapangan Sejahtera, the Flexibility criterion is considered unimportant because cocoa powder is a commodity item, so the variety of raw materials required by the company does not change and the company does not require fast product development time by suppliers. Apart from that, quantity fulfillment tends to be constant, and there is only a spike in demand during the High Season, so it has to be prepared beforehand. Therefore, the company and its suppliers never experience conflicts regarding fulfilling the quantity or variety of raw materials. The same steps are taken to determine the order of suppliers based on each criterion so that the results of calculating the weights of criteria and suppliers are obtained as follows.

Table 9. Criteria and Supplier Weight Calculation Results

Criteria	Weight Results	Supplier							
		A		B		C		D	
		Weight Results	Supplier Global Weights	Weight Results	Supplier Global Weights	Weight Results	Supplier Global Weights	Weight Results	Supplier Global Weights
Quality	0.358	0.250	0.090	0.250	0.090	0.250	0.090	0.25	0.090
Cost	0.305	0.030	0.009	0.213	0.065	0.277	0.085	0.480	0.147
Delivery	0.179	0.138	0.025	0.100	0.018	0.413	0.074	0.350	0.063
Service	0.085	0.000	0.000	0.500	0.043	0.000	0.000	0.500	0.043
Relationship	0.072	0.225	0.016	0.355	0.025	0.139	0.010	0.282	0.020
Flexibility	0.000	0.000	0.000	0.417	0.000	0.000	0.000	0.583	0.000
Skor Total		0.140		0.241		0.258		0.362	

(Reference: Processed by the author, 2023).

After calculating the Supplier Global Weights, the final score was obtained from the PT supplier. Gizitatapangan Sejahtera. Based on Table 9, it is found that the highest score was obtained by Supplier D with a score of 0.362, followed by Supplier C with a score of 0.258, Supplier B with a score of 0.241, and Supplier A with a score of 0.140. It can be concluded that Supplier D has the best performance based on consideration of all aspects of the criteria. The criterion with the highest priority is the Quality criterion. However, all suppliers have the same Quality criteria weight value because cocoa powder is a commodity item, so all suppliers comply with the standards required by the company. Moreover, supplier D excels on the Cost criterion and the Cost criterion is the criterion that occupies the second most important position after the Quality criterion. Even though supplier D can provide a low price because the cocoa powder produced is not 100% from cocoa beans but is a mixture of other ingredients, supplier D is still able to provide the same quality compared to other suppliers.

Apart from that, even though Supplier D is located outside the city, namely Garut City, the Supplier can provide raw material prices that are up to half the price compared to other Supplier, even though there are more shipping costs than Supplier C in Bandung, supplier D is still superior with the lowest price. So, PT. Gizitatapangan Sejahtera collaborates with Supplier D. However; Supplier D has a greater risk during delivery because the delivery is made from outside the city. Therefore, companies can also consider selecting supplier C because supplier C has a lower risk of damaged goods during delivery.

Conclusion

Based on the results and discussion in the previous chapter, the researcher concluded that the criteria were considered when selecting PT suppliers. Gizitatapangan Sejahtera is sorted according to weight: Quality, Cost, Delivery, Service, Long-term Relationship, and Flexibility. Quality criteria are the most important criteria for companies in selecting suppliers with a weight of 0.358. The better the product quality, the higher the level of the purchasing decision process (Bagus & Tjahjaningsih, 2021). Then followed by the Cost criterion in the second position with a weight of 0.305, the Delivery criterion in the third position with a weight of 0.179, the Service criterion in the fourth position with a weight of 0.085, the Long-term Relationship criterion in the fifth position with a weight of 0.072. The Flexibility criterion is a criterion with a weight value of 0, so this criterion is considered not important for PT. Gizitatapangan Sejahtera in selecting suppliers. The results of the calculation in order of suppliers for each criterion showed that all suppliers had the same weight value for the quality criteria. In fulfilling the Cost criteria, supplier D is superior to other suppliers. In fulfilling Delivery criteria, supplier C is superior to other suppliers. In fulfilling the Service criteria, supplier B and supplier D are superior to supplier A and supplier C. In fulfilling the Long-term Relationship criteria, supplier B is superior to the other suppliers. Meanwhile, in fulfilling the Flexibility criteria, supplier B and supplier D are superior to supplier A and supplier C. In addition, the calculation results in the order of suppliers show that PT. Gizitatapangan Sejahtera collaborates with supplier D with a weight of 0.362. Then the second supplier to fulfill each criterion is Supplier C with a weight of 0.258, the third is Supplier B with a weight of 0.241, and the last order is Supplier 0.140.

Based on interviews, processing results, and data interpretation, the author provides suggestions to PT. Gizitatapangan Sejahtera so that companies always ensure suppliers have a Certificate of Analysis (COA) for every shipment of raw materials, considering that Quality criteria are the most important criteria for the company. In this way, companies can reduce the risk of goods arriving not meeting standards which could hamper the production process. Apart from that, the company also needs to remember that supplier D is a supplier that has just collaborated with the company, so the shortcomings of supplier D still need to be clearly visible. Therefore, PT. Gizitatapangan Sejahtera also needs to establish good cooperative relationships with other suppliers, such as suppliers A, B, and C, so that they still have backup suppliers if undesirable things happen from supplier D. The last suggestion that the author can convey to the company is regarding the criteria Flexibility. Flexibility criteria are not considered in selecting PT suppliers. Gizitatapangan Sejahtera. However, this criterion should be addressed and should also be taken into consideration when choosing suppliers because the company may receive emergency requests, especially now that the company also exports abroad. By considering the Flexibility criteria, it is hoped to reduce the risk of suppliers being unable to meet sudden company needs due to limited availability of goods.

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