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PAIRWISE COMPARISON METHOD IMPLEMENTATION FOR CHICKEN SUPPLIER SELECTION DECISION MAKING AT CV. GATSU JAYA PERKASA ABADI

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ABSTRACT

The results show that the recommended chicken supplier from three chicken suppliers based on the score calculated from Pairwise Comparison method is supplier C with a score of 0.4251, followed by supplier B (2nd rank, with a score of 0.2994) and supplier A (3rd rank, with score 0.2755). The recommendation is based on eight criteria: on-time delivery, raw material quality, competitive price, raw material availability, transportation cost, capacity for volume, customer service (communication), and lead time. The Consistency Index (CI)= 0.0416, with a value CI/RI= 0.0295. Since the value of CI/RI is below 0.1, thus the conclusion is that the data consistency is satisfactory.

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1. INTRODUCTION

Food and Beverage is one of the most growing businesses in Medan. With many businesses offering different ranges of food and beverage, it will result in an increase in customers' choice in café and food & beverage place choices in Medan. Thus, the competition among the food and beverage business is getting more and more competitive.

One of aspects of winning the competition is by delivering good quality food, at an affordable price. Good quality food is relied heavily on the supply of raw material quality from suppliers and also the delivery service and time are crucial for responsiveness of demand. The cost of raw materials, and transportation, on the other hand, will also affect the price of food. Supply chain management is crucial and supplier selection decision-making also needs to be accurate and properly done. Some criteria that affect supplier performance such as timely delivery, raw material quality, competitive price, raw material availability, transportation cost, capacity for volume, customer service (communication), and lead time will determine the decision-making and affect the food and beverage business operation.

Finding good and reliable supplies of raw materials is important to have a competitive edge for the company. But deciding on which suppliers, depending on certain criteria that management will use and prioritize. Each criterion can be different in terms of importance. Based on previous research [1] pairwise comparison implemented in Analytical Hierarchy Process (AHP) is used to determine and recommend which alternative is the best by determining the weight of criteria related to the alternatives. The result from this system is the best alternatives based on the best score. Research by [2] and [3] uses pairwise comparison to choose the best location for business and testing the consistency using Consistency Index (CI). The contribution of this research is to give the systematical approach and method for management to make a decision based on the criteria that are important. The same method can be used for other decision-making purposes as well.

2. METHOD

2.1 Data Source

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This research plan is based on the problem that management has in vendor selection. Through literature study, observation, and interviews with management, we decide on the criteria/ factors that will contribute to the selection of the suppliers. There are eight criteria that contribute to the supplier selection, which are on-time delivery, raw material quality, competitive price, raw material availability, transportation cost, capacity for volume, customer service (communication), and lead time. There are three chicken suppliers to be chosen. From the interview with management, the criteria are selected and ranked by importance, continued by giving scores to the suppliers within each criterion. Using the pairwise comparison method, the ranking/ importance is calculated and analyzed and the best selection is based on the best score.

Table 1. Criteria Importance Rank

	on time delivery	raw material quality	competitive price	Raw Material Availability	transportation cost	Capacity for volume	customer service (communication)	lead time
on time delivery	1	1/4	1/3	3	2	4	3	1/2
raw material quality	4	1	2	6	5	8	7	3
competitive price	3	1/2	1	5	4	7	6	2
Raw Material Availability	1/3	1/6	1/5	1	1/2	3	2	1/4
transportation cost	1/2	1/5	1/4	2	1	4	3	1/3
Capacity for volume	1/4	1/8	1/7	1/3	1/4	1	1/2	1/5
customer service (communication)	1/3	1/7	1/6	1/2	1/3	2	1	1/5
lead time	2	1/3	1/2	4	3	5	5	1
SUM	11.4167	2.7179	4.5929	21.8333	16.0833	34.0000	27.5000	7.4833

Table 2. Pairwise Comparison Matrix for Criteria

on time delivery	A	B	C
A	1	1/5	1/2
B	5	1	3
C	2	1/3	1
SUM	8	1.5333	4.5

raw material quality	A	B	C
A	1	1/3	1/6
B	3	1	1/4
C	6	4	1
SUM	10	5.3333	1.4167

competitive price	A	B	C
A	1	3	6
B	1/3	1	2
C	1/6	1/2	1
SUM	1.5	4.5	9

Raw Material Availability	A	B	C
A	1	2	1/3
B	1/2	1	1/5
C	3	5	1
SUM	4.5	8	1.5333

transportation cost	A	B	C
A	1	1/3	1/2
B	3	1	4
C	2	1/4	1
SUM	6	1.5833	5.5

Capacity for volume	A	B	C
A	1	4	5
B	1/4	1	2
C	1/5	1/2	1
SUM	1.45	5.5	8

customer service (communication)	A	B	C
A	1	4	3
B	1/4	1	1/2
C	1/3	2	1
SUM	1.5833	7	4.5

Lead time	A	B	C
A	1	1/3	1/5
B	3	1	1/2
C	5	2	1
SUM	9	3.3333	1.7

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2.2 Analysis Method

This study uses quantitative methods, namely analyzing data relating to numbers or calculation formulas used to analyze vendor selection. From the observation and interview with management, criteria are listed and ranked based on their importance. The suppliers are assessed and given a score based on the criteria listed and using the pairwise comparison method, the ranking/ importance is calculated and analyzed. The best selection is recommended based on the best score. The criteria ranks are tested using the consistency index (CI) to check for consistency and validity of multiple pairwise comparisons.

Table 3. Preference Vector for Criteria

	Preference Vector for Criteria
on time delivery	0.1009
raw material quality	0.3288
competitive price	0.2292
Raw Material Availability	0.0507
transportation cost	0.0746
Capacity for volume	0.0255
customer service (communication)	0.0354
lead time	0.1549

Table 4. Consistency Index Calculation

Consistency Index (CI):

STEP 1

on time delivery	0.8466
raw material quality	2.7848
competitive price	1.9492
Raw Material Availability	0.4084
transportation cost	0.6095
Capacity for volume	0.2088
customer service (communication)	0.2865
lead time	1.3122

STEP 2

on time delivery	8.3876
raw material quality	8.4703
competitive price	8.5047
Raw Material Availability	8.0608
transportation cost	8.1691
Capacity for volume	8.1842
customer service (communication)	8.0812
lead time	8.4733
average	8.2914

STEP 3

CI	0.0416

STEP 4

n	2	3	4	5	6	7	8	9	10
RI	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.51

CI/RI	0.029522	***satisfactory***	*** Degree of consistency is satisfactory if CI/RI < 0.10*

Table 5. Preference Vectors for Suppliers

Suppliers	on time delivery	raw material quality	competitive price	Raw Material Availability	transportation cost	Capacity for volume	customer service (communication)	lead time
A	0.1222	0.0934	0.6667	0.2299	0.1560	0.6806	0.6232	0.1096
B	0.6479	0.2213	0.2222	0.1222	0.6196	0.2014	0.1373	0.3092
C	0.2299	0.6853	0.1111	0.6479	0.2243	0.1179	0.2395	0.5813
Preference Vector for Criteria	0.1009	0.3288	0.2292	0.0507	0.0746	0.0255	0.0354	0.1549

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3. RESULT AND DISCUSSION

3.1 Consistency Index (CI)

As per the analysis and calculation above with eight criteria (n= 8) and three suppliers to be analyzed, the result of the Consistency Index (CI)= 0.0416, with a value CI/RI= 0.0295. Since the value of CI/RI is below 0.1, thus the conclusion is that the data consistency is satisfactory.

3.2. Supplier Selection Recommendation

Table 5 shows the preference vector for criteria and for suppliers. From table 5, the score for each supplier is calculated.

Table 6. Score and Rank of Suppliers

Supplier	score	Ranking
A	0.2755	3rd
B	0.2994	2nd
C	0.4251	1st

Table 6 calculation result is supplier C is the most recommended with a score of 0.4251, followed by supplier B (2nd rank, with a score of 0.29,94), and supplier A (3rd rank, with score of 0.2755) is the least preferred. The recommendation for the best score supplier based on eight criterion-time delivery, raw material quality, competitive price, raw material availability, transportation cost, capacity for volume, customer service (communication), and lead time) is supplier C.

4. MANAGERIAL IMPLICATION

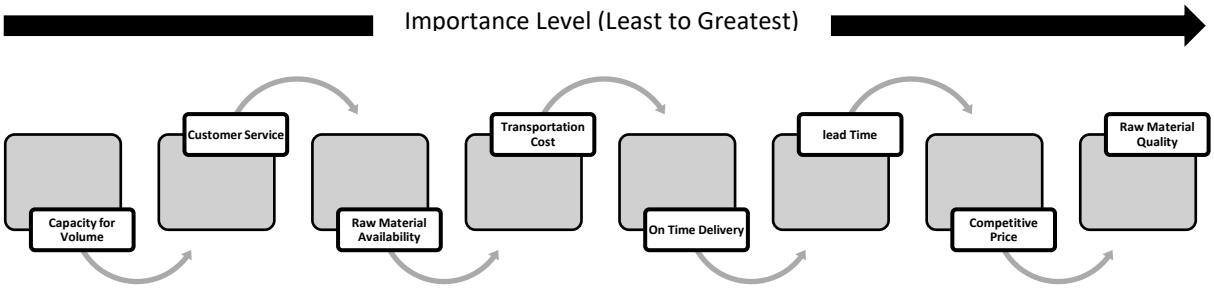

Figure 1. Managerial Implication

There are eight criteria that contribute to the supplier selection, which are taken from the discussion and interview session with the company owner. The criteria are as follows, on-time delivery, raw material quality, competitive price, raw material availability, transportation cost, capacity for volume, customer service (communication), and lead time. The Pairwise Comparison Matrix for Criteria then calculated and eventually used to develop the importance level in choosing supplier from the least to the greatest. The importance level can be seen through figure 1 above. The managerial implication can be utilized to solve the problem of supplier selection especially with similar business nature.

5. CONLUSION

Based on the results of the research and discussion that have been described previously, it is concluded that the best supplier to be recommended is chicken supplier C with the highest score (0.4251). The recommendation is based on the calculation using the pairwise comparison method, where eight criteria are listed and ranked, which are on-time delivery, raw material quality, competitive price, raw material availability, transportation cost, capacity for volume, customer service (communication), and lead time. Each criterion is given an importance rank based on interviews with management and observation. With the consistency index (CI), the conclusion is the data of criteria rank consistency is satisfactory.

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