

# Analysis of Supplier Selection Criteria of Corrugated Box Packaging for Item Teh Pucuk Harum with Analytical Hierarchy Process (AHP) Method (Study Case: Mayora Group)

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**Abstract:** This study aims to analyze the selection criteria of suppliers at Mayora Group, a company engaged in the Fast Moving Consumer Good Company (FMCG), with the object of research is Corrugated Box for Teh Pucuk Harum. Based on the criteria that have been used by the company, researcher develop criteria and subcriteria for supplier selection and classify suppliers and test the consistency of respondents' answers which chose based on their expertise from 5 Department that related to the process of procure Packaging Material. The determination of supplier selection criteria is calculated based on the weight of the criteria. Calculation of criteria weight applies the Analytical Hierarchy Process method. Classification of suppliers based on the level of importance of goods supplied and the level of difficulty in obtaining it. From the results of this research obtained 7 criteria for supplier selection sorted from the top priority level to the bottom are: Quality, Price, Delivery, Service, Company Condition, Document Completeness, Geographical Location. Supplier classification results in 2 supplier groups namely Critical Strategic Suppliers and Leverage Suppliers with Research Object is Corrugated Packaging Teh Pucuk Harum that is classified into the Critical Strategic Suppliers group. The value of Consistency Ratio (CR) in the pairwise comparison matrix between criteria and sub-criteria is in between the tolerance limit which stated that the answers of the respondents are included in the valid and consistent category.

**Keywords:** Fast Moving Consumer Good Company (FMCG), Supplier, Analytical Hierarchy Process

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## 1. Introduction

Supplier plays an important role in the availability of raw materials for the ongoing production activities of a company. In this case, company needs to cooperate with suppliers to continue its production activities (sustainability production). In procurement department of a company, supplier selection is a fairly important problem. The selection of suppliers for the right packaging products is not only beneficial for the company in terms of product cost and safety but also increases customer satisfaction in terms of physical quality and packaging design.

Competition is a challenge for companies to constantly provide the best for consumers. Company that is able to fulfill customer desires, develop products on time, low expense in product supply and delivery, manage industries carefully and flexibly is the company that has high competitiveness and dominate market. In response to this, a concept of Supply Chain Management (SCM) has developed. One of the key to success in SCM is the accuracy of choosing a business partner. (Rolyandy Putra 2015). Dominant factor to process the purchase of packaging at Mayora Group is based on the bid price / contract price of each supplier. This kind of Decision making can affect the operation of packaging materials during the packing process related to packaging quality. Right price with the right quality is what purchasing needs to consider before making decision to select supplier.

For this reason, the quality criteria are considered by the purchasing department to ensure that the goods purchased have met the quality standards set by the Quality Control department. Delivery is also the supplier selection criteria at Mayora Group. Thus for delivery goods must be in accordance with the delivery date specified in the PO (Purchase Order). The Performance History Criteria become the next criterion after supplier selected as the existing supplier at Mayora Group, taking consideration into performance after sales suppliers both in terms of quality and complaints.

## 2. Literature Review

### 2.1 Supply Chain Management

According to Heizer and Render (2014: 468) supply chain management describes the coordination of all supply chain activities, starting with raw materials and ending with a satisfied customer. Thus, a supply chain includes

suppliers; manufactures and/or services providers; and distributors, wholesalers, and/orretailers who deliver the produce and/or service to the final customer.

The purpose of management supply chain according to Heizerand Render (2014:468) is coordinate activities in the supply chain to maximize competitive advantage and supply chains for end consumers.

**2.2 ProcurementManagement**

Procurement management is one of the main components of supply chain management. The task of procurement management is to providegoods and services, which are needed in production activities and other activities within the company. (Pujawan and Mahendra, 2017:176).

**2.3 SupplierSelectionCriteria**

Analysis of the criteria for selecting and measuring supplier performance has been the focus of attention of many procurement scientists and practitioners since the 1960s. Dickson (1966) first conducted an extensive study of identifying, determining, and analyzing what criteria were used in selecting supplier. More than 23 criteria are considered in the study,are:

1. Quality
2. Delivery
3. Performance History
4. Warranties&ClaimPolicies
5. Productionfacilities&capacities
6. Price
7. TehnicalCapabilities
8. Financial Position
9. ProceduralCompliance
10. Communication System
11. Reputation&Position
12. Desire forbusiness
13. Management&Organization
14. OperatingControl
15. Repair Service
16. Attitude
17. Impression
18. PackagingAbility
19. LaborRelationRecord
20. GeographicalLocation
21. Amountofpastbusiness
22. TrainingAids
23. ReciprovalArrangements

**2.4 SupplierClassification**

According to Pujawan and Mahendrawati (2017: 200) there are two factors used in designing relationships with suppliers:

1. The level of strategic importance of items purchased for the company.
2. The level of difficulty managing buyers of these items.

3. By using these two factors, four supplier classifications are generated as shown in figure 1 below.:

Difficulty Level	High	<b>Bottleneck Suppliers</b>	<b>Critical strategic</b>	
		- Hard to find	- Important / strategic	
		- Monopoly market	- Substitution is	
	Low	<b>Non-critical</b>		<b>Leverage Suppliers</b>
		- Sufficient availability	- Sufficient availability	
		- Fairly standard item	- Substitution is	
		- Substitution is	- Standard	
		- Value is relatively	- Value is relatively	
Low		High		
Importance Level				

Figure-1 Commodity Portofolio Matrix

Suppliers included in the non-critical category are suppliers who have low interests and difficulties

Suppliers included in the bottleneck suppliers category are those who have a high level of difficulty but have low interests.

Suppliers included in the category of Leverage Suppliers who have a high level of importance but have a low level of difficulty.

## 2.5 Analytical Hierarchy Process

The Analytical Hierarchy Process method was first discovered by Dr. Thomas L. Saaty from the Wharton School of Business in 1970. Analytical Hierarchy Process is a method used in the decision-making process of a complex problem such as problems: planning, determining alternatives, prioritizing, choosing policies, allocating resources, determining requirements, forecasting needs, planning performance, planning optimization and solving conflicts. A problem is said to be complex if the structure of the problem is unclear and the unavailability of accurate statistical data and information, so that the input used to solve this problem is human intuition. (Wirdianto and Unbersa, 2008: 08).

There are several advantages obtained by using AHP in solving complex problems: (Marimin, 2004: 77)

1. Unity
2. Complexity
3. Interdependence
4. Hierarchical structure
5. Measurement
6. Consistency
7. Synthesis
8. Bargaining
9. Assessment and Consensus
10. Process Repetition

Below are steps in AHP method :

1. Define the problem and set goals

2. Set hierarchy

Which starts with the main goal then suitable criteria to consider or assess the alternatives we provide and determine each of these alternatives.

3. Make pairwise comparison matrix

Describe the relative contribution or influence of each element to the goal or criteria above it.

4. Matrix approaches reflect multiple aspects of priority

5. Defines paired comparisons so that the total number of judgments is obtained by using the following calculation formula:

$$n \times \binom{n-1}{2} \quad (1)$$

$n$  = is the number of elements compared. The results of the comparison of each element will be a number from 1 to 9 which shows a comparison of the importance of an element. If an element in the matrix is compared to itself then the comparison results are given a value of 1.

6. Calculate eigenvalues and test its consistency, if it is not consistent, then the data retrieval is repeated.

7. Repeat the calculation process for all levels of the hierarchy.

8. Calculate the eigenvector of each pairwise comparison matrix which is the weight of each element for prioritizing elements at the lowest hierarchy level until it reaches the goal. If there are more than one respondent who gives an assessment of an alternative criterion, then the answers from those respondents must be put together first by using the Geometric Mean formula:

$$GM = \sqrt[n]{(X_1)(X_2) \dots (X_n)} \quad (2.2)$$

Where as:

GM : Geometric Mean

X1: Assessment Respondent-1

Xn: Assessment Respondent-n

n : Total Respondent

Then sum the values of each column of the matrix, dividing each value from the column by the corresponding column to obtain the normalization of the matrix and summing the values of each row and dividing it by the number of elements to get the average. The calculation formula is as follows:

$$Consistency Index (CI) = \frac{(EigenFactor - n)}{(n-1)} \quad (3)$$

(2.3)

$$ConsistencyRatio(CR) = \frac{(CI)}{(RI)}(4) \tag{2.4}$$

9. Check hierarchy consistency. What is measured in AHP is the consistency ratio by looking at the consistency index. If the consistency ratio is less than or equal to 10%, then the results of the study can be declared consistent but if it is greater than 10%, then the results of the study are declared inconsistent and the assessment process needs to be repeated.

10. Matrix multiplication

In general, the calculation method used in this iteration calculation is to multiply the sum for each column and row to get the iterated matrix. The iteration calculation is done until the results of the priority vector values between the iterations do not find changes or value differences.

### 3. Research Methodology

The stages in this study are illustrated Research Methodology Framework in Figure-2.

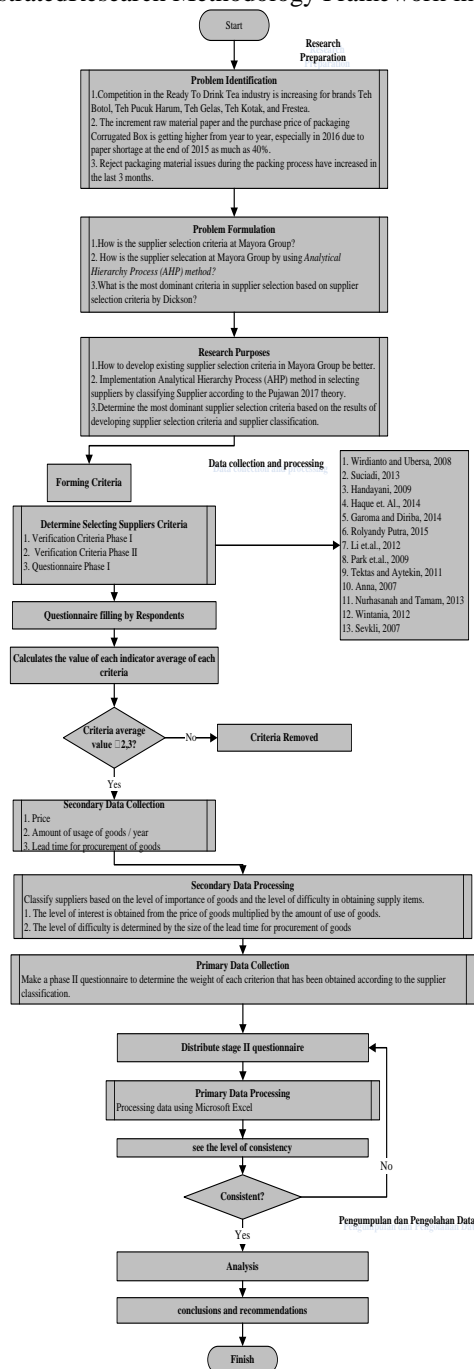


Figure-2 :Research Methodology Framework

#### 4. Research Result and Discussion

##### 4.1 Determine Supplier Selection Criteria

To determine supplier selection criteria, researcher has previously carried out initial verification with 10 respondents who are experts in their respective fields, i.e:

1. Packaging Material Purchasing Manager
2. Packaging Material Purchasing Supervisor
3. Quality Control Manager
4. Quality Control Supervisor
5. Production Planning Inventory Control (PPIC) Manager
6. Production Planning Inventory Control (PPIC) Supervisor
7. Finance Manager
8. Finance Supervisor
9. Accounting Manager
10. Accounting Supervisor

The results of this initial verification need to be stated numerically by making a phase I questionnaire viz. the questionnaire determining the supplier selection criteria. This phase I questionnaire uses a Likert scale. Criteria that have an average value of  $< 3$  are incorrect criteria used, while criteria that have an average value of  $\geq 3$  are the right criteria to use. Based on the following 10 respondents the supplier selection criteria used for this study:

Table 4.1 Supplier Selection Criteria Based on Research Respondents

No	Variabel	Nilai Rata-rata
A. Price		
	Sub-criteria	
A1	Price is competitive	4.20
A2	Negotiation	3.90
A3	Payment Terms.	4.10
A4	Breakdown Cost	3.80

No	Variabel	Nilai Rata-rata
B. Delivery		
	Sub-criteria	
B1	On-time delivery	4.70
B2	Damage Prevention	4.20
B3	Conformity Order	4.50
B4	Conformity Quantity	4.20
C. Company Condition		
C1	Experience & Background	4.20
C2	Have Certification	4.10
C3	Financial Ability	3.90
D. Document Completeness		
	Sub-criteria :	
D1	Submit all required documents for supplier registration on time.	4.00
D2	Complete COA (Certificate of Analysis)	4.40
D3	Agreed to General Terms and Condition as Supplier of Mayora Group	4.20
D4	Complete invoicing Document	4.00
D5	Bring Delivery Note on delivery.	4.20
E. Quality		

	Sub-criteria :	
E1	GoodQuality	5.00
E2	GoodPacking	4.40
E3	Provideguarantee	4,40
E4	Design andcoloraccordancewithap provalcolorstandardbook.	4.70
F. Service		
	Sub-criteria :	
F1	ResponsivetowardsOutstan ding PO	4.40
F2	Responsivetowardscompla in.	4.70
F3	SpeedofsubmissionProofPr int	4.10
F4	Providerequested data	4.30
G. GeographicalLocation		
	Sub-criteria :	
G1	Distance	4.10
G2	Delivery Time range	4.00
G3	Transportation Cost	4.10

**4.2 SupplierClassification**

By Basedon I Nyoman Pujawan 2017 to classify suppliers, researcher use two factors,i.e:

1. The level of strategic importance of the items of goods / services purchased for the company.
2. The level of difficulty in managing the purchase of items / services purchased by the company.

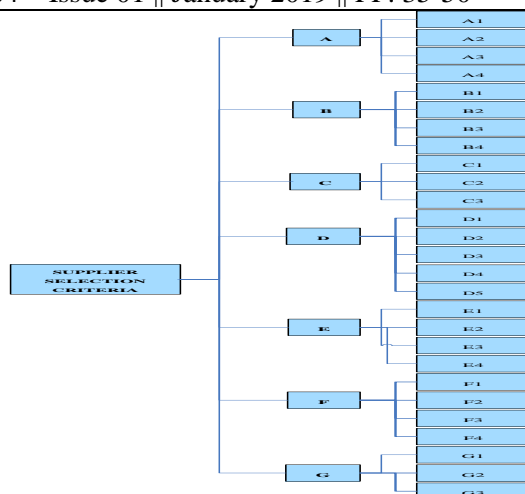
Based on the results of the questionnaire, the following are SupplierClassification at Mayora Group.

Critical Strategic Suppliers	Leverage Suppliers
	Work Stationery Manual Packing Box
Auto Packing Box	
Resins	Raw Material (Flavored Tea)
Spare Part	Shrink / Label

Figure-3 SupplierClassification Mayora Group

**4.3 Forming Hierarki**

The hierarchy starts with the goal / target, then the first level criteria, and continues with the sub-criteria. The goal / goal in this study is to determine supplier selection criteria with 7 number of criteria. Each of these criteria has several sub criteria. This hierarchy is shown in Figure 4



Gambar-4 Hierarki Kriteria Pemilihan Supplier

**4.4 Forming Pair wise comparison matrix**

After all the variables consisting of goals, criteria, sub-criteria and alternatives are arranged in an orderly manner into an appropriate hierarchy, the next step is to create a pairwise comparison matrix between criteria, between sub-criteria and between suppliers. Each paired comparison matrix that is drawn illustrates the relative contribution of the influence of each element to other elements that are located at one level above. In this study, the paired comparison matrix between criteria, sub-criteria and alternatives is illustrated in the following set of tables:

CRITERIA	A	B	C	D	E	F	G
A	1						
B		1					
C			1				
D				1			
E					1		
F						1	
G							1

**4.5 Figure-5 Pairwise comparison matrix**

Notes :

- A : Price
- B : Delivery
- C : Company Condition
- D : Completeness of Document
- F : Service
- G : Geographical Location

SUB- KRITERIA	A1	A2	A3	A4
A1	1			
A2		1		
A3			1	
A4				1

Figure-6 Pairwise comparison matrix sub-criteria (Price)

**4.6 Determine Priority**

Priority made for each element of the problem at the hierarchy level. This process will produce weights or contribute criteria to achieve goals. Priority is determined by the criteria that have the highest weight. The

weight of each criteria and sub-criteria is determined by re-inputing the results of paired assessments from the questionnaire into the existing questionnaire table with Microsoft Excel.

Based on the results of the assessment of each respondent, the overall results of the respondents' opinions are averaged using the Geometric Mean calculation method. Geometric calculation mean need to be done because in the Analytic Hierarchy Process method, only one answer will be raised in the comparison matrix so that the results of the Geometric Mean calculation can be said as a representative of the results of the overall answers of respondents to a choice.

After the Geometric Mean results are obtained from all respondents' answers, the next step is to calculate the priority vector and eigen factor then test consistency. Priority vectors are obtained by dividing according to the number of criteria, sub-criteria or alternatives that calculated. Eigen factor is the total sum result of multiplication of priority vector with a total in the pairwise comparison matrix. The next step is to do a consistency test by calculating consistency index (CI) from the results of the previous eigen factor calculation. After obtaining the consistency index (CI) value, continue with the calculation of the consistency ratio (CR).

The consistency ratio is the parameter used to check whether the paired comparison in the questionnaire are consistent or not. The results consistent if they have consistency ratio less than 0.1. If a consistency ratio value above 0.1 is obtained, the questionnaire must be revised again. The revision is carried out until consistency less than 0.1 is obtained. The following in table 4.2 below shows the results of calculating pairwise comparison matrices until the results of consistency tests at the criteria level:

Table 4.2 Hasil Perhitungan Matriks Perbandingan Berpasangan Kriteria

CRITERIA	A	B	C	D	E	F	G	PRIORITY
A	1	1.72	3.68	3.35	0.76	2.98	8.95	0.245
B	0.58	1	3.50	3.08	1.00	2.83	10.57	0.217
C	0.27	0.29	1	1.72	0.21	0.90	3.09	0.072
D	0.30	0.32	0.58	1	0.26	0.52	4.42	0.065
E	1.31	1.00	4.38	3.53	1	4.17	13.94	0.281
F	0.34	0.35	1.11	1.92	0.15	1	5.83	0.086
G	0.22	0.19	0.45	0.35	0.16	0.29	1	0.034
TOTAL	4.01	4.87	14.70	14.95	3.53	12.70	47.80	1
E								7.766
CI								0.128
RI								1.320
CR								0.097

Based on the table above :

1. Result 1.72 is results of geometric mean which is the average of the overall answers of respondents for the comparison. In this case the number 1.72 is obtained from the calculation stage as follows :

$$\sqrt[10]{(3)(1)(3)(3)(\frac{1}{3})(\frac{1}{3})(1)(3)(5)(5)} = 1.72.$$

2. Result 0.245 in Priority Vector obtained by dividing pairwise matrix values with the total of the pairwise matrix for one element comparison. In this case the number 0.245 is obtained from the results of the calculation as follows:

$$\frac{1}{(4.01)} \frac{1.72}{(4.87)} \frac{3.68}{(14.70)} \frac{3.35}{(14.95)} \frac{0.76}{(3.53)} \frac{2.98}{(12.70)} \frac{8.95}{(47.80)} = 0.245$$



3. Result 7.766 in eigenfactor obtained from the sum of the multiplication for each priority vector with a total value that is in each element. In this case 7,766 is obtained as follows:

$$(4,01 * 0,245) + (4,87 * 0,217) + (14,70 * 0,072) + (14,95 * 0,065) + (3,53 * 0,281) + (12,70 * 0,086) + (47,80 * 0,034) = 7.766$$

4. Result 0,128 in consistency index obtained by using the calculation formula (3) using the following formula:

$$\begin{aligned} \text{Consistency Index (CI)} &= (\text{EigenFactor} - n) / (n-1) \\ &= (7.766-7) / (7-1) \\ &= 0.128 \end{aligned}$$

5. Result 0,097 in consistency ratio obtained by using the calculation formula (4) using the following formula:

$$\begin{aligned} \text{Consistency Ratio (CR)} &= \text{CI} / \text{RI} \\ &= 0.128 / 1.320 \\ &= 0.097 \end{aligned}$$

Where RI value which is the index ratio value adjusts to the number of criteria that exist in the study. The following below is a table of RI value for each number of criteria:

Table 4.3 Table Ratio Index Value

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

The consistency ratio (CR) obtained for the pairwise comparison matrix between criteria is 0.097, which means that the value of the pairwise comparison matrix has been declared consistent and acceptable.

6. The next stage is to do priority weighting through iteration calculations (matrix multiplication). This is done to find out the priority order chosen from all subjects compared. The iteration calculation is done by multiplying the sum for each column to get the new iterated matrix. The following below shows how to calculate iterations in the criteria level:

Iteration - 0

SUB-CRITERIA	A1	A2	A3	A4
A1	1	2.81	0.94	2.09
A2	0.36	1	0.43	1.00
A3	1.06	2.35	1	1.90
A4	0.48	1.00	0.53	1

Iterasi - 1

SUB-KRITERIA	A1	A2	A3	A4
A1	4	9.92	4.18	8.78
A2	1.64	4	1.71	3.55
A3	3.87	9.58	4	8.37
A4	1.87	4.58	1.93	4

$$\begin{aligned} 8,78 &= (1 * 2,09) + (2,81 * 1,00) + (0,94 * 1,90) + (2,09 * 1) \\ &= 2,09 + 2,81 + 1,79 + 2,09 \\ &= 8,78 \end{aligned}$$

Figure-7 Iteration Calculation Pattern

Based on Figure 7, it can be seen that the iteration calculation pattern can bring up a new matrix with a new weight value for each subject. The iteration calculation continues until between one matrix and the matrix after the next iteration does not change the priority vector value.

#### 4.7 Priority Weighting and Consistency Test of Sub-criteria Levels

Stages carried out at the sub-criteria level are exactly the same as all priority weighting stages and consistency tests at the previous criteria level. Differentiation is only found in comparison subjects. Following below, the author presents the results of priority weighting and consistency tests for each sub-criteria level.

Table 4.4 Priority Weighting Results and Consistency Test (Price)

SUB-CRITERIA	A1	A2	A3	A4	PRIORITY VECTOR
A1	1	2.81	0.94	2.09	0.35
A2	0.36	1	0.43	1.00	0.14
A3	1.06	2.35	1	1.90	0.34
A4	0.48	1.00	0.53	1	0.16
TOTAL	2.90	7.16	2.89	5.99	1.00
EF					4.02
CI					0.01
IR					0.9
CR					<b>0.01</b>
STATUS					<b>CONSISTENT</b>

From Table 4.4 above For weighting priority Sub-criteria price obtained results that Sub-criteria A1 has the highest priority weight which is 0.35. After testing consistency, the priority weighting results of the sub-criteria price is declared consistent.

Table 4.5 Priority Weighting Results and Consistency Test (Delivery)

SUB-CRITERIA	B1	B2	B3	B4	PRIORITY VECTOR
B1	1	2.03	1.00	1.12	0.30
B2	0.55	1	0.42	0.40	0.14
B3	0.85	1.72	1	1.25	0.28
B4	0.90	2.24	0.90	1	0.28
TOTAL	3.30	6.99	3.32	3.76	1.00
EF					3.94
CI					(0.02)
IR					0.9
CR					(0.02)
STATUS					<b>CONSISTENT</b>

From Table 4.5 above For weighting priority Sub-criteria delivery obtained results that Sub-criteria B1 has the highest priority weight which is 0.30. After testing consistency, the priority weighting results of the sub-criteria price is declared consistent.

Table 4.6 Priority Weighting Results and Consistency Test (Company Condition)

SUB-CRITERIA	C1	C2	C3	PRIORITY VECTOR
C1	1	0.74	1.05	0.30
C2	1.36	1	1.57	0.42
C3	0.95	0.64	1	0.28
TOTAL	3.30	2.38	3.62	1.00

<i>EF</i>		3.00
<i>CI</i>		0.00
<i>IR</i>		0.58
<i>CR</i>		0.00081
STATUS		CONSISTENT

From Table 4.6 above For weighting priority Sub-criteria company condition obtained results that Sub-criteria C1 has the highest priority weight which is 0.30. After testing consistency, the priority weighting results of the sub-criteria price is declared consistent.

Table 4.7 Priority Weighting Results and Consistency Test (Completeness Document)

SUB-CRITERIA	D1	D2	D3	D4	D5	PRIORITY VECTOR
D1	1	1.37	0.76	1.00	1.68	0.22
D2	0.73	1	0.91	0.93	1.12	0.18
D3	1.31	1.10	1	0.90	1.63	0.228
D4	1.00	1.08	1.12	1	1.78	0.229
D5	0.60	0.90	0.61	0.56	1	0.14
TOTAL	4.64	5.44	4.40	4.38	7.20	1
<i>EF</i>						5.03
<i>CI</i>						0.01
<i>IR</i>						1.12
<i>CR</i>						0.007
STATUS						CONSISTENT

From Table 4.7 above For weighting priority Sub-criteria completeness document obtained results that Sub-criteria D4 has the highest priority weight which is 0.229. After testing consistency, the priority weighting results of the sub-criteria price is declared consistent.

Table 4.8 Priority Weighting Results and Consistency Test (Quality)

SUB-CRITERIA	E1	E2	E3	E4	PRIORITY VECTOR
E1	1	3.14	3.06	1.31	0.42
E2	0.32	1	0.72	0.39	0.12
E3	0.31	1.18	1	0.66	0.16
E4	0.76	2.53	1.69	1	0.30
TOTAL	2.39	7.85	6.46	3.37	1.00
<i>EF</i>					4.00
<i>CI</i>					(0.00)
<i>IR</i>					0.9
<i>CR</i>					(0.0017)
STATUS					CONSISTENT

From Table 4.8 above For weighting priority Sub-criteria quality obtained results that Sub-criteria E1 has the highest priority weight which is 0.42. After testing consistency, the priority weighting results of the sub-criteria price is declared consistent.

Table 4.9 Priority Weighting Results and Consistency Test (Service)

SUB-CRITERIA	F1	F2	F3	F4	PRIORITY VECTOR
F1	1	1.31	1.57	0.62	0.25
F2	0.85	1	1.39	0.66	0.22
F3	0.54	0.55	1	0.46	0.14
F4	1.81	1.69	2.45	1	0.39
TOTAL	4.20	4.55	6.41	2.73	1.00
EF					4.03
CI					0.01
IR					0.9
CR					0.01
STATUS					CONSISTENT

From Table 4.9 above For weighting priority Sub-criteria service obtained result that Sub-criteria F4 has the highest priority weight which is 0.39. After testing consistency, the priority weighting results of the sub-criteria price is declared consistent.

Table 4.10 Priority Weighting Results and Consistency Test (Geographical Location)

SUB-CRITERIA	G1	G2	G3	PRIORITY VECTOR
G1	1	0.99	2.47	0.42
G2	1.01	1	2.02	0.40
G3	0.40	0.49	1	0.18
TOTAL	2.41	2.49	5.49	1.00
EF				3.01
CI				0.00
IR				0.58
CR				0.005
STATUS				CONSISTENT

From Table 4.10 above For weighting priority Sub-criteria geographical location obtained result that Sub-criteria G1 has the highest priority weight which is 0.42. After testing consistency, the priority weighting results of the sub-criteria price is declared consistent.

**4.8 Determine Global Weight**

The overall results of each weight gained by each alternative are summed so that the result of the sums is the overall priority value (global) for each alternative. Below, is the priority weighting in table 4.11

Table 4.11 Global Weight Priority

Goal	Criteria	Weight	Priority	Sub-Criteria	Weight	Priority
Selection Supplier Criteria	A	0.245	II	A1	0.350	I
				A2	0.140	IV

				A3	0.340	II
				A4	0.160	III
	B	0.217	III	B1	0.300	I
				B2	0.140	IV
				B3	0.284	II
				B4	0.282	III
	C	0.072	V	C1	0.300	II
				C2	0.420	I
				C3	0.280	III
	D	0.065	VI	D1	0.220	III
				D2	0.183	IV
				D3	0.228	II
				D4	0.229	I
				D5	0.140	V
E	0.281	I	E1	0.420	I	
			E2	0.120	IV	
			E3	0.160	III	
			E4	0.300	II	
F	0.086	IV	F1	0.250	II	
			F2	0.220	III	
			F3	0.140	IV	
			F4	0.390	I	
G	0.034	VII	G1	0.420	I	
			G2	0.400	II	
			G3	0.180	III	

Notes :

Priority I
Priority II
Priority III
Priority IV
Priority V
Priority VI
Priority VII

#### 4.9 Discussion

Based on the overall results of the analysis, it can be seen that out of the seven criteria used by Mayora Group in selecting Supplier, the criteria of **Quality** are the highest priority with the weighted **0.281**. The next criteria is **price** with weighted **0.245** and followed by **delivery** with weighted **0.217**, then followed by **service** with weighted **0.086**, then **company condition** with weighted **0.072**, then **completeness of the document** weighted **0.065** and **geographical location** with weighted **0.034**.

This result can be the basis that quality is the most important indicator for Mayora Group in selection suppliers. The object of this research categorized into the Critical Strategic supplier, the Corrugated Box which operated automatically wrapping in the packing process. So that quality assurance is needed in order to reduce the potential of jamming in the machine because the uncomformity of quality.

The Criteria price used in this reserach include 4 sub-criterias. Based on the results of calculations using the Analytic Hierarchy Process (AHP) method, the **A1** sub-criteria (**Price is competitive**) is the highest priority with weighted **0.350**.

The Criteria delivery used in this research include 4 sub-criterias. Based on the results of calculations using the Analytic Hierarchy Process (AHP) method, the **B1** sub-criteria (**On-time delivery**) is the highest priority with weighted **0.300**.

The Criteria company condition used in this research include 3 sub-criterias. Based on the results of calculations using the Analytic Hierarchy Process (AHP) method, the **C2** sub-criteria (**Have Certification**) is the highest priority with weighted **0.420**.

The Criteria completeness document used in this research include 5 sub-criterias. Based on the results of calculations using the Analytic Hierarchy Process (AHP) method, the **D4** sub-criteria (**Complete invoicing Document**) is the highest priority with weighted **0.229**.

The Criteria quality used in this research include 4 sub-criterias. Based on the results of calculations using the Analytic Hierarchy Process (AHP) method, the **E1** sub-criteria (**Good Quality**) is the highest priority with weighted **0.420**.

The Criteria service used in this research include 4 sub-criterias. Based on the results of calculations using the Analytic Hierarchy Process (AHP) method, the **F4** sub-criteria (**Provider requested data**) is the highest priority with weighted **0.390**.

The Criteria geographical allocation used in this research include 3 sub-criterias. Based on the results of calculations using the Analytic Hierarchy Process (AHP) method, the **G1** sub-criteria (**Distance**) is the highest priority with weighted **0.420**.

The following in table 4.12 show summarized consistency test. Overall results of consistency test shows that all respondents' answers are consistent, so that the results of the study can be declared valid.

Table 4.12 Consistency Test Result

Matriks Berpasangan	CR	Keterangan
Intercriteria	0.097	Consistent
InterSub-criteria (Price)	0.006	Consistent
InterSub-criteria (Delivery)	-0.024	Consistent
InterSub-criteria (Company Condition)	0.001	Consistent
InterSub-criteria (Completeness Document)	0.007	Consistent
InterSub-criteria (Quality)	-0.002	Consistent

InterSub-criteria (Service)	0.009	Consistent
InterSub-criteria (GeographicalLocation)	0.005	Consistent

### 5. Conclusion

Based on the results of the overall data processing and assessment analysis carried out on the selection of corrugated box packaging supplier at Mayora Group by using the Analytic Hierarchy Process (AHP) method, Below are points or conclusions of research results:

1. The selection of suppliers at Mayora Group has a general criteria in general such as price, quality and delivery time but is more likely to choose suppliers with the lowest price offer. This needs to be adjusted to the functional of the goods purchased. Based on literature studies and discussions with respondents who related to the procurement activity, 7 criteria are developed which are suitable for use in selecting Mayora Group suppliers for carton packaging materials. The criteria are Price, Delivery, Company condition, Document completeness, Quality, Service, Geographical location.
2. Researcher classify Mayora Group suppliers based on the level of strategic importance of items and the level of difficulty managing the purchase of items purchased by the company. This grouping produces 2 supplier classifications namely Critical strategic suppliers and Leverage suppliers. The object of this research is an item with the Critical Strategic suppliers category.
3. Based on the results of weighting criteria supplier selection using AHP is known as follows: The highest criteria indicator in supplier selection which is classified as a Critical strategic supplier is a quality with weighted 0.281 with subcriteria indicator:
  - a. Good Quality with weighted 0.420
  - b. Good Packing with weighted 0.120
  - c. Provide guarantee with weighted 0.160
  - d. Design and color accordance with approval color standard book with weighted 0.300
4. This research does not reach the alternative level, next step for sub-criteria for each supplier. To make a right decision in selecting supplier the Analytical Hierarchy Process (AHP) method is effective to use.

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