SUPPLIER SELECTION OF 40th CONTAINER IN PT TRIBUDHI PELITA INDONESIA USING ANALYTICAL HIERARCHY PROCESS (AHP) METHOD

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ABSTRACT

Supplier selection is one of the most important things in business. The pattern of selecting suppliers that is not right at this time will affect business continuity; therefore this study was conducted to analyze problems related to supplier selection. Data collection was carried out by interview to related department, observation and literature study. The location and focus of this research are at PT Tribudhi Pelita Indonesia, the first company in Jakarta. PT Tribudhi Pelita Indonesia is engaged in buying and selling container 40th. From the data collection, it was obtained several alternative suppliers, namely "A", "B" and "C". Meanwhile, the criteria include delivery quality, product quality and cost. Data processing uses one of the MCDM (Multi Criteria Decision Making) methods, namely AHP (Analytic Hierarchy Process), so that the supplier "B" is determined to be the best supplier. It is hoped that this research can be an alternative in choosing a 40th container supplier, so that the business can sustainably be maintained.

Keywords: Supplier Selection, Analytic Hierarchy Process (AHP), Multi Criteria Decision Making MCDM), Marketing Management, Financial Management

INTRODUCTION

Supplier selection is very important for companies to be able to improve a good supply chain and get good quality product quality. The problem with suppliers so far is that they have not been able to meet all the criteria set by the company (Silalahi, 2017). A supplier is a company or individual capable of providing resources, either in the form of goods or services needed by other companies. The role of the supplier is very important in the operationalization of company activities (Chang et al., 2005)

Suppliers are an important component in logistics and production management (Taufik et al., 2014). To obtain a supplier that is able to meet the goods or services on demand, a good supplier selection process is needed (Untari et al., 2020). The purpose of selecting suppliers is to find the right supplier so as to reduce the cost of purchasing goods or services. The wrong supplier selection can harm the company. For this reason, supplier selection is an important component that must be carried out in a company (Wibowo, 2010).

The things that cause supplier selection tasks include important needs, namely; Typically the current business environment is unstable, due to rapid changes in market conditions, customer needs, and the actions of competitors, then the increasing globalization of world trade and the availability of communication facilities *via* the internet provide opportunities for buyers to source materials abroad, and suppliers need to judged based on several criteria that sometimes contradict each other (Dharmanro et al., 2019; Shin, 2012). Comparison between several of these criteria is sometimes necessary because each supplier usually has different performance (Tahriri, et al., 2008)

PT Tribudhi Pelita Indonesia is a company whose core business is traiding 40 ft containers. The problem faced is the limited time available in selecting suppliers so that the container frames being sold do not match the specifications expected by consumers. So based on

these problems, it is important to make a 40 ft container supplier selection model using the AHP method. The working principle of AHP is to simplify a complex problem that is not structured, strategic, and dynamic into its parts, as well as arranging a hierarchy (Saghafian & Hejazi, 2001; Hussain, Hassan, Rafiq & Quddus, 2019). The basic idea of AHP's working principle as is; hierarchical arrangement the problem is broken down into elements that have criteria and alternatives which are then compiled into a diagram presenting the decision and scoring criteria where alternative criteria are assessed through a peer wise comparison system. Then do priority determination where each criterion and alternative needs to be compared pairwise which will be processed to determine the relative rank of all alternatives and finally all elements are grouped logically and ranked consistently according to a logical criterion. It is hoped that the results of the research can become a model for further business management.

RESEARCH METHODS

Data collection methods used in this study include direct observation of the object under study to obtain data, question and answer to the staff in charge and collect data or company archives that support data collection (Untari & Satria, 2019; Hussain, Quddus, Pham, Rafiq & Pavelková, 2020). This research on supplier selection using the AHP method uses the following data; Fulfillment of requirements to become a supplier are delivery quality (X1), product quality (X2) and cost (X3) (Nurhalimah, 2015). The data that has been collected will be processed in the form of determining the hierarchy of supplier selection, criteria and sub-criteria for supplier selection, then comparing the interests for the criteria using the AHP method. The number of suppliers to be assessed in this study were 3 companies, then called A, B and C

RESULT AND DISCUSSION

For each criterion and alternative, pairwise comparisons were made, namely comparing each element with other elements (Lee, 2009). At each level of the hierarchy in pairs so that the value of the level of importance of the elements is obtained in the form of a qualitative opinion (Ali et al., 2019; Untari, 2020; Hussain, Rafiq, Quddus, Ahmad & Pham, 2021) The pairwise comparison is carried out by the decision maker, namely the administration & general manager. To quantify the qualitative opinion the (Saaty, 2013) rating scale is used so that the opinion value will be obtained in the form of numbers. Relative comparison values are then processed to determine the relative rank of all alternatives.

<table>
<tr><th colspan="10">Table1 1
PAIRED COMPARISON TABLE TO THE CRITERIA</th></tr>
<tr><th></th><th>X1</th><th>X2</th><th>X3</th><th rowspan="5">Normalization</th><th>X1</th><th>X2</th><th>X3</th><th>∑</th><th>EigenVector</th></tr>
<tr><th>X1</th><td>1,000</td><td>3,000</td><td>5,000</td><td>0,59</td><td>0,62</td><td>0,59</td><td>1,80</td><td>0,60</td></tr>
<tr><th>X2</th><td>0,333</td><td>1,000</td><td>2,000</td><td>0,20</td><td>0,21</td><td>0,24</td><td>0,65</td><td>0,22</td></tr>
<tr><th>X3</th><td>0,200</td><td>0,500</td><td>1,000</td><td>0,20</td><td>0,10</td><td>0,12</td><td>0,43</td><td>0,12</td></tr>
<tr><th>∑</th><td>1,333</td><td>4,500</td><td>8,000</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="10">Source: Data processed, 2020</td></tr>
</table>

After determining and evaluating the criteria, next is to compare the existing alternatives. An alternative consisting of 3 suppliers is assessed based on these criteria, the evaluation factors for each of the criteria in Table 2. Delivery quality, table 3 product quality and table 4 cost.

Table 2
PAIRED COMPARISON TABLE TO THE OPTIONS ACCORDING TO DELIVER QUALITY

	Y1	Y2	Y3	Normalization	Y1	Y2	Y3	∑	EigenVector
A	1,00	0,33	0,33		0,13	0,14	0,09	0,36	0,16
B	3,00	1,00	2,00		0,40	0,43	0,52	1,35	0,41
C	3,00	0,50	1,00		0,40	0,22	0,26	0,88	0,29
∑	5,00	1,83	3,33						
$\propto max$ = 4,12									
CI=0,06									
CR=0,07									
Source: Data processed, 2020									

Table 3
PAIRED COMPARISON TABLE TO PRODUCT QUALITY

	Y1	Y2	Y3	Normalization	Y1	Y2	Y3	∑	EigenVector
A	1,00	2,00	5,00		0,53	0,53	0,39	1,14	0,38
B	0,50	1,00	4,00		0,26	0,27	0,31	0,84	0,19
C	0,20	0,25	1,00		0,11	0,07	0,08	0,26	0,05
∑	1,70	3,25	10,00						
$\propto max$ =4,01									
CI=0,05									
CR=0,05									
Source: Data processed, 20									

	Y1	**Y2**	**Y3**	N o r m a l i z a t i o n	**Y1**	**Y2**	**Y3**	**∑**	**Eigenvector**
					Table 4				
					PAIRED COMPARISON TABLE TO THE OPTIONS ACCORDING TO COST				
A	1,00	5,00	5,00		0,65	0,73	0,60	1,98	0,41
B	0,20	1,00	2,00		0,13	0,17	0,24	0,54	0,18
C	0,20	0,50	1,00		0,13	0,07	0,12	0,32	0,09
∑	1,40	6,50	8,00						

(Table 4 header)

Table 4
PAIRED COMPARISON TABLE TO THE OPTIONS ACCORDING TO COST

	Y1	**Y2**	**Y3**	Normalization	**Y1**	**Y2**	**Y3**	**∑**	**Eigenvector**
A	1,00	5,00	5,00		0,65	0,73	0,60	1,98	0,41
B	0,20	1,00	2,00		0,13	0,17	0,24	0,54	0,18
C	0,20	0,50	1,00		0,13	0,07	0,12	0,32	0,09
∑	1,40	6,50	8,00						
$\propto max$ =4,09									
CI=0,07									
CR=0,07									
Source: Data processed, 2020									

Table 5
MATRIX OF RELATIONSHIPS BETWEEN CRITERIA AND ALTERNATIVES

	Eigen Vector		
	Delivery Quality	**Product Quality**	**Cost**
A	0,16	0,38	0,41
B	0,41	0,19	0,18
C	0,29	0,05	0,09
Resource: Data processed, 2020			

And the last, to find the total by multiplying the evaluation factors of all alternative by the weight factor, can see in table 6 below,

Table 6
THE WEIGHT MATRIX OF OPTIONS ACCORDING TO THE CRITERIA TABLE

	A	**B**	**C**
X1	0,10	0,25	0,17
X2	0,12	0,06	0,02
X3	0,08	0,02	0,02
Total	0,30	0,33	0,21
Resource: Data process, 2021			

Based on table 6, it can be seen that the final value is obtained, it can be seen that the supplier "B" received the highest final score and was ranked 1st with a value of 0.30, then "A" was in the 2nd rank with a final value of 0.30, then the 3rd rank was supplier "C" with a final value of 0.21. From the results of the calculation of the value of each supplier, it can be seen that there is no significant difference in the value obtained between one supplier and another. This is because the judgment given by the decision maker when conducting the interview is subjective and is a one-sided decision.

CONCLUSION

The result of data processing and analysis that has been done by the author, it can the conclusion is that the analysis results from the Analytical Hierarchy Process calculation state that the alternative selected and most suitable with the criteria is Supplier B. Analytical Hierarchy Process method can help companies especially for determine supplier selection using Expert Choice and MS tools. Excel.

RESEARCH LIMITATION

This research is only conducted at one company, so the results of the research cannot be generalized. So that further research that will be carried out is to make research on several different companies and compare the similarities and differences in patterns between companies, so as to get more comprehensive results and can be generalized in general and produce research results that can be used more widely.

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