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# SUPPLY CHAIN PERFORMANCE ANALYSIS WITH SUPPLY CHAIN OPERATION REFERENCE (SCOR) AND ANALYTIC HIERARCHY PROCESS (AHP) METHODS (CASE STUDY IN THE EUROPEAN STEEL INDUSTRY)

**M.P. Dery Permana[1], Erry Rimawan[2], Sawarni[3]**

[1]**Magister Industrial Engineering, Mercu Buana University, Jakarta, Indonesia.**
[2]**Magister Industrial Engineering, Mercu Buana University, Jakarta, Indonesia.**
[3]**Magister Industrial Engineering, Mercu Buana University, Jakarta, Indonesia.**

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**Abstract**
The problem in this study is how to evaluate the performance of the Supply Chain in one of the European alloy steel companies measured using the supply chain operations reference (SCOR) model. Whereas the objective to be achieved is to analyze the performance of the company chain so that performance improvements can be carried out upstream (suppliers), in the company, and downstream (distribution channels) in the company's Supply Chain. Data collection methods used are observation and interviews with the Inventory & Supply Chain, Sales, Production, OF & Technical departments. While the data analysis method used is the SCOR Model and the AHP for weighting the importance of the supply chain performance measurement results. The results of the research that is in this company can be categorized as "Good". Improved Supply Chain Performance The company is prioritized in the Make process because it has the lowest performance. Efforts to improve performance can be done by minimizing failures in the process so that double process does not occur so that delivery to consumers becomes not timely.

**Keywords:** AHP, Industri Baja, Kinerja, SCOR, Rantai Pasok.


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## INTRODUCTION

One of the European alloy steel distributor companies from Sweden, located in Jakarta, Indonesia has a problem with the performance of their company, especially in the supply chain. In carrying out its supply chain activities, this company often experiences problems ranging from the procurement process, production, to shipping. In the procurement process, this company often experiences delays in the arrival of materials so that the stock becomes empty which affects the time delay in the production process which results in not achieving the target production volume even until the delivery is late. Resulting in an increase in the number of customer complaints. Therefore the company must be able to find the right preventive solution (corrective preventive) to deal with the complaint problem.

One method that can be used is the SCOR (Supply Chain Operation Reference) - AHP (Analytical Hierarchy Process) method. Using the SCOR method can identify, evaluate and monitor the performance of the company's supply chain using five aspects, namely Reliability, Responsiveness, Flexibility, Cost, and Assets so that the company can identify Key Performance Indicators (KPI) in detail. After identifying the KPI, KPI verification is then carried out and the KPI is weighted using the AHP method. This weighting aims to determine the level of importance of the KPI. Therefore, with the SCOR method, it is expected to know the value of performance in this company.

## LITERATURE REVIEW

### Performance Measurement

Performance measurement is comparing the actual results obtained with those planned, in other words the targets that have been targeted must be examined to what extent the achievements have been carried out to achieve the goals. Performance measurements and metrics have an important role to set goals, evaluate performance and determine actions for future programs. To improve company performance, it is necessary to implement supply chain management strategies. Information sDayng, long term relationships, cooperation and process integration are part of the factors that influence supply chain management performance. (Chotimah, et.al. 2018).

### Supply Chain

According to Hasibuan (2018) The supply chain is a network of companies that work together to make and ship products to end users. These companies usually include suppliers, manufacturers, distributors, stores or retailers, as well as supporting companies such as logistics services. The supply chain is a physical network, a company engaged in supplying raw materials, producing goods, or sending to end users, SCM is a method, tool, or management approach.

### Supply Chain Operation Reference (SCOR)

According to Hasibuan (2018) One of the way to measure supply chain performance is to use the SCOR method. This method was introduced by the Supply Chain Council (SCC) as a model of measuring supply chain performance across industries. The SCOR model is a process reference model for supply chain operations developed by SCC, Pittsburgh, PA. SCOR breaks the supply chain process into five processes including plan, source, make, deliver and return. These five elements have the following functions:

1. Plan, which is a process that balances demand and supply to determine the best course of action in meeting procurement, production and shipping needs.
2. Source, which is the process of procuring goods and services to meet demand.
3. Make, which is a process for transforming raw materials or components into products that customers want.
4. Deliver is a process to meet the demand for goods and services. Usually includes order management, transportation, and distribution.
5. Return, which is the process of returning or receiving product control for various reasons. Activities involved include identifying the condition of the product,

requesting a refund authority, scheduling a return, and making a return. (Darojat. 2017)

The five core processes are also measured based on SCOR performance attributes which are divided into customer facing (Reliability, Responsiveness, and Agility) and internal facing (cost and assets). The performance attributes are as follows:

1. Reliability, namely supply chain performance in delivering the right product in the right conditions and packaging at the right time, and with the right quantity and documents to the right consumers.
2. Responsiveness, namely the speed of the supply chain in providing products to consumers.
3. Agility, which is agility or agility of the supply chain in responding to market changes in an effort to maintain competitive advantage.
4. Cost, namely costs associated with supply chain operations.
5. Asset, which is the effectiveness of an organization in managing its assets to support customer satisfaction, including all management of fixed assets and working capital. (Surjasa. Et.al. 2017).

**Normalization**

According to Sumiati (2012) that the level of performance fulfillment is defined by the normalization of the performance indicators. Each indicator has a different weight with a different size scale as well. Therefore, the parameter equalization process is needed namely by means of the normalization. The normalization process is carried out with the Snorm De Boer normalization formula, which are:

$$KPI = \frac{SI - S\ min}{(Smax - S\ min)} x\,100$$

Where:
Si = The value of the actual indicator that was achieved
Smin = The value of the worst performance achievement of a performance indicator
Smax = The value of the best performance achievement of performance indicators
In this measurement, each indicator weight is converted into a certain interval of values, namely 0 to 100. Zero (0) is the worst and one hundred (100) is best interpreted. Thus the parameters of each indicator are the same, after that we get a result that can be analyzed. According to Trienekens and Hvolby (2000) the standard monitoring system for supply chain performance values is as follows:

**Table 1: Performance Indicator monitoring system**

| Monitoring system | Performance indicator |
|---|---|
| < 40 | Poor |
| 40 -50 | Marginal |
| 50 -70 | Average |
| 70 -90 | Good |
| > 90 | Excellent |

Source: (Sumiati. 2012)

**Analytical Hierarchy Process (AHP)**

Analytical Hierarchy Process (AHP) is a method for solving a complex situation that is not structured in a number of components in a hierarchical arrangement, by giving a subjective value of the relative importance of each variable, and determining which variable has the highest priority to influence the outcome of the situation. (Saaty, 2012). AHP has the advantage of being able to combine objective and subjective elements of a problem. The preparation of AHP consists of three basic steps, namely:

1. The design of a hierarchy is to solve complex problems and multi criteria into a hierarchy.
2. Prioritizing procedures that is after the problem is solved into a hierarchical structure, priority procedures are chosen to get the relative significance of each element at each level.
3. Calculating the results ie after forming the preference matrix, the mathematical process begins to normalize and find the priority weights on each matrix.

**Pairwise Comparison Rating Scale**

Pairwise comparisons have a relative scale that can be seen from Table 2. The table shows several levels of importance by taking into account the ability of humans to distinguish between the number of comparison scoring scales. The more comparative rating scales, the more difficult the manager will make his choice. There are five comparison scoring scales. This amount is considered to be proportional for managers / respondents to distinguish between the existing criteria. The rating scale between the scales is shown as an even value of the two scales.

**Table 2: Pairwise Comparison Rating Scale**

| Definition | Intensely of Importance |
|---|---|
| Equally important | 1 |
| Moderately important | 3 |
| Strongly more important | 5 |
| Very strongly more important | 7 |
| Extremely more important | 9 |
| Intermediate more important | 2, 4, 6, 8 |

(Source: Nazim, et.al. 2015)

Below is an example of a pairwise comparison matrix using examples A_1, A_2, A_3, .... A_n

| C | A1 | A2 | A3 | … | An |
|---|---|---|---|---|---|
| A1 | a11 | a12 | a13 | … | An |
| A2 | a21 | a22 | a23 | … | An |
| A3 | a31 | a32 | a33 | … | An |
| … | … | … | … | … | … |
| An | an1 | an2 | an3 | … | Ann |

**Figure 1: Pairwise Comparison Matrix**

In this matrix, compare the element A_1 in the column on the left with elements A_1, A_2, A_3, and so on in the top row with respect to the C property in the upper left corner. Then repeat with column A_2 and so on. To fill the pairwise comparison matrix, we use numbers to illustrate the relative importance of an element over another, with respect to that property. In the AHP method, the most important thing to consider is the problem of inconsistency. The comparison decision taken is said to be "Erfectly Consistent" if and only if it's cool. akj = aij, where I, j, k = 1, 2, ... .., n. But this consistency cannot be forced. However, the high inconsistency is indeed undesirable if the reciprocal matrix is consistent then λ max = n. Prof. Saaty defines a measure of consistency as a Consistency Index.

$$CI = \frac{\lambda\ max - n}{n-1} \qquad (2.2)$$

Ket : λ maximum = largest eigenvalue of order metric n
n = number of criteria

For each n matrix size, a random matrix is created and the mean CI value is calculated where:

$$R = \frac{CI}{RI} \qquad (2.3)$$

Ket : CI = Consistency Index
CR = Consistency Ratio
RI = Random Index

Here are random indices for several matrix sizes:

| 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 | 1,49 |

If the CR value ≤ 0.1, then it can still be tolerated but if the CR> 0.1 then it needs to be revised. CR value = 0, it can be said "Perfectly Consistent" (Sumiati, 2012).

## METHODOLOGY

Research conducted included in the type of descriptive research that describes a number of data later by using certain methods processed, analyzed, and interpreted based on ongoing reality. The first stage that must be carried out in this research is the study of literature, field studies, identification of problems, formulation of the problems encountered, and determination of research objectives. Then the stage of data collection and processing. The method used at this stage is company documentation, interviews, and observations. This research requires data such as demand data, production data, demand forecasting, product or material returns, and product or material delivery data.

Data processing is done after getting the required data using methods that are relevant to the problem. The first steps in data processing are identification of the supply chain. Identification of the supply chain is done by observing the company's supply chain and then using the SCOR model approach, the observations are arranged into the company's supply chain framework. The second determination of performance indicators is to design performance indicators (KPI) using the SCOR approach based on the main perspective of the supply chain, namely plan, source, make, deliver and return. The third is weighting for each perspective, dimension, and Performance Indicator using AHP. And the last is the discussion and conclusion stages. (Darojat. 2017).

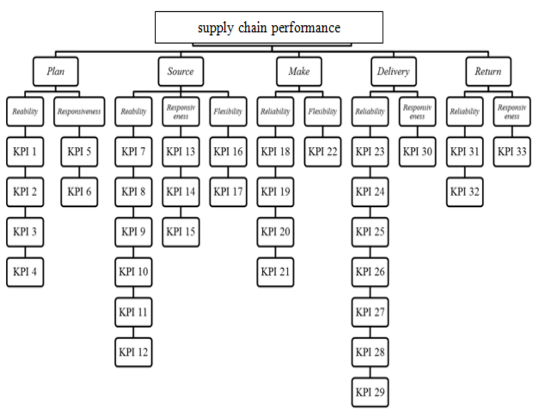


**Figure 2: Hierarchy of Supply Chain Performance Measurement**

## RESULTS

### 1. Plan

Calculation of the plan process in the SCOR model is done by calculating the dimensions of reliability and responsiveness. For example, the calculation is as follows:

Forecast Inaccuracy =

$$\frac{\text{(Request forecasting- Actual request)x 100\%}}{\text{Actual Request}}$$

= (145 ton – 125 ton) / 120 ton x 100%

= 20 %/Year

Summaries for other matrix calculations are provided in the following tables:

**Table 3: Calculation of Actual Value Plans (Reliability and Responsiveness)**

| Plan | | | | | |
|---|---|---|---|---|---|
| No. | Variable | KPI | | Actual Value | Unit |
| 1 | Reliability | KPI1 | Forecast Inaccuracy | 20 | Percent |
| 2 | | KPI2 | Inventory Level | 90 | Percent |
| 3 | | KPI3 | Internal Meeting | 4 | x/Month |
| 4 | | KPI4 | Number of trainee | 2 | Person |
| 5 | Responsiveness | KPI5 | Time To New Product Knowledge & Specifications | 3 | Day |
| 6 | | KPI6 | Planning Cycle Time | 1 | Day |

Source: Data from interviews

**Source**

**Table 4: Calculation of Actual Value Source (Reliability, Responsiveness and Flexibility)**

| Source | | | | | |
|---|---|---|---|---|---|
| No. | Variable | KPI | | Actual Value | Unit |
| 1 | Reliability | KPI7 | Defect Rate | 0,001 | Percent |
| 2 | | KPI8 | Source Fill Rate | 100 | Percent |
| 3 | | KPI9 | Meeting With Project Client | 2 | x/Month |
| 4 | | KPI10 | Number of trainee in procurement | 2 | Person |
| 5 | | KPI11 | Incorrect quantity deliveries for product | 0 | Percent |
| 6 | | KPI12 | Training for procurement Employee | 1 | x/Year |
| 7 | Responsiveness | KPI13 | Purchase Order Cycle Time | 1 | Day |
| 8 | | KPI14 | Source Lead Time | 30 | Day |
| 11 | | KPI15 | Source Responsivennes | 10 | Day |
| 10 | Flexibilty | KPI16 | Source Flexibility | 1 | Supplier |
| 11 | | KPI17 | Minimum Order Quantity | 1,25 | Ton/Matl |

Source: Data from interviews

**Make**

**Table 5: Calculation of Actual Value Make (Reliability and Flexibility)**

| Make | | | | | |
|---|---|---|---|---|---|
| No. | Variable | KPI | | Actual Value | Unit |
| 1 | Reliability | KPI 18 | Failure In Process | 2,4 | x/Month |
| 2 | | KPI 19 | Machine Material Efficiency | 100 | Percent |
| 3 | | KPI 20 | Number Of Trainee For Production | 2 | Person |
| 4 | | KPI 21 | Training For Production Employee | 3 | x/Year |
| 5 | Flexibilty | KPI 22 | Production Item Flexibility | 1,25 | Ton/Material |

Source: Data from interviews

**Delivery**

**Table 6: Calculation of Actual Value Delivery (Reliability and Responsiveness)**

| Delivery | | | | | |
|---|---|---|---|---|---|
| No. | Variable | KPI | | Actual Value | Unit |
| 1 | Reliabilit | KP | Fill Rate | 95 | Percent |

| | | | | | |
|---|---|---|---|---|---|
| | y | I23 | | | |
| 2 | | KP I24 | Stockout Probability | 0,9 | x/Mont h |
| 3 | | KP I25 | Orders Ready To Pick By Customer | 98 | Percent |
| 4 | | KP I26 | Number Of Visit To Customer | 2 | x/Mont h |
| 5 | | KP I27 | Number of meeting with customer | 1 | x/Mont h |
| 6 | | KP I28 | Number of trainee in marketing | 2 | Person/ Month |
| 7 | | KP I29 | Training for marketing employee | 10 | Person |
| 8 | Responsi veness | KP I30 | Deliver Deadline | 1 | Day |

Source: Data from interviews

**Return**

**Table 7: Calculation of Actual Value Return (Reliability and Responsiveness)**

| Return | | | | | |
|---|---|---|---|---|---|
| N o. | Variable | KPI | | Actual Value | Unit |
| 1 | Reliability | KPI 31 | Customer Complain | 7 | x/Mo nth |
| 2 | | KPI 32 | Return Rate | 2 | x/Ye ar |
| 3 | Responsiv eness | KPI 33 | Product replacement time | 1 | Day |

Source: Data from interviews

**Normalization Calculation**

**Table 8: Calculation of the Plan Normalization score**

| Plan | | | | | | | |
|---|---|---|---|---|---|---|---|
| N o. | Variable | KPI | Bes t | Valu e | Wor st | 10 0 | Scor e |
| 1 | Reliability | KPI 1 | 0 | 20 | 100 | 10 0 | 80 |
| 2 | | KPI 2 | 10 0 | 90 | 0 | 10 0 | 90 |
| 3 | | KPI 3 | 4 | 4 | 0 | 10 0 | 100 |
| 4 | | KPI 4 | 4 | 2 | 0 | 10 0 | 50 |
| 5 | Responsiven ess | KPI 5 | 1 | 3 | 5 | 10 0 | 50 |
| 6 | | KPI 6 | 1 | 1 | 3 | 10 0 | 100 |

**Table 9: Calculation of Source Normalization Score**

| Source | | | | | | | |
|---|---|---|---|---|---|---|---|
| N o. | Variable | KPI | Be st | Val ue | Wor st | 10 0 | Scor e |
| 1 | Reliability | KPI 7 | 0 | 0,00 1 | 100 | 10 0 | 99,9 99 |
| 2 | | KPI 8 | 10 0 | 100 | 0 | 10 0 | 100 |
| 3 | | KPI 9 | 3 | 2 | 0 | 10 0 | 66,6 7 |
| 4 | | KPI 10 | 3 | 2 | 0 | 10 0 | 66,6 7 |
| 5 | | KPI 11 | 0 | 0 | 100 | 10 0 | 100 |
| 6 | | KPI 12 | 3 | 1 | 0 | 10 0 | 33,3 3 |
| 7 | Responsive ness | KPI 13 | 1 | 1 | 3 | 10 0 | 100 |
| 8 | | KPI 14 | 20 | 30 | 60 | 10 0 | 75 |
| 9 | | KPI 15 | 7 | 10 | 20 | 10 0 | 76,9 2 |
| 10 | Flexibilty | KPI 16 | 2 | 1 | 0 | 10 0 | 50 |
| 11 | | KPI 17 | 1,2 5 | 1,25 | 0 | 10 0 | 100 |

**Table 10: Calculation of Make Normalization Score**

| Make | | | | | | | |
|---|---|---|---|---|---|---|---|
| No . | Variable | KPI | Bes t | Valu e | Wors t | 10 0 | Scor e |
| 1 | Reliabilit y | KPI1 8 | 0 | 2,4 | 4 | 10 0 | 40 |
| 2 | | KPI1 9 | 100 | 100 | 0 | 10 0 | 100 |
| 3 | | KPI2 0 | 4 | 2 | 0 | 10 0 | 50 |
| 4 | | KPI2 1 | 6 | 3 | 0 | 10 0 | 50 |
| 5 | Flexibilt y | KPI2 2 | 1,2 5 | 1,25 | 0 | 10 0 | 100 |

**Table 11: Calculation of Delivery Normalization Score**

| Delivery | | | | | | | |
|---|---|---|---|---|---|---|---|
| No . | Variable | KPI | Bes t | Valu e | Wor st | 10 0 | Scor e |
| 1 | Reliability | KPI2 3 | 10 0 | 95 | 0 | 10 0 | 95 |
| 2 | | KPI2 4 | 0 | 0,9 | 4 | 10 0 | 77,5 |
| 3 | | KPI2 5 | 10 0 | 98 | 0 | 10 0 | 98 |
| 4 | | KPI2 6 | 4 | 2 | 0 | 10 0 | 50 |
| 5 | | KPI2 7 | 2 | 1 | 0 | 10 0 | 50 |
| 6 | | KPI2 8 | 7 | 2 | 0 | 10 0 | 28,5 7 |
| 7 | | KPI2 9 | 14 | 10 | 0 | 10 0 | 71,4 3 |
| 8 | Responsiven ess | KPI3 0 | 1 | 1 | 3 | 10 0 | 100 |

**Table 12: Calculation of Return Normalization Score**

| Return | | | | | | | |
|---|---|---|---|---|---|---|---|
| No . | Variable | KPI | Bes t | Valu e | Wor st | 10 0 | Scor e |
| 31 | Reliability | KPI3 1 | 0 | 7 | 10 | 10 0 | 30 |
| 32 | | KPI3 2 | 0 | 2 | 5 | 10 0 | 60 |
| 33 | Responsiven ess | KPI3 3 | 1 | 1 | 5 | 10 0 | 100 |

**Calculation of Supply Chain Performance values**

**Table 13: Calculation of Plan Performance Values**

| Plan | | | | | | |
|---|---|---|---|---|---|---|
| N o. | Variable | KPI | Scor e | Weig ht | Score x Weight | Tot al |
| 1 | Reliability | KPI 1 | 80 | 25% | 20 | 80 |
| 2 | | KPI 2 | 90 | 25% | 22,5 | |
| 3 | | KPI | 100 | 25% | 25 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 3 | | | | |
| 4 | | KPI 4 | 50 | 25% | 12,5 | |
| 5 | Responsiveness | KPI 5 | 50 | 50% | 25 | 75 |
| 6 | | KPI 6 | 100 | 50% | 50 | |

**Table 14: Calculation of Source Performance Value**

| Source | | | | | | |
|---|---|---|---|---|---|---|
| No. | Variable | KPI | Score | Weight | Score x Weight | Total |
| 1 | Reliability | KPI7 | 99,99 | 16,67 % | 16,67 | 77,79 |
| 2 | | KPI8 | 100 | 16,67 % | 16,67 | |
| 3 | | KPI9 | 66,67 | 16,67 % | 11,11 | |
| 4 | | KPI10 | 66,67 | 16,67 % | 11,11 | |
| 5 | | KPI11 | 100 | 16,67 % | 16,67 | |
| 6 | | KPI12 | 33,33 | 16,67 % | 5,56 | |
| 7 | Responsiveness | KPI13 | 100 | 33,33 % | 33,33 | 83,96 |
| 8 | | KPI14 | 75 | 33,33 % | 24,998 | |
| 9 | | KPI15 | 76,92 | 33,33 % | 25,64 | |
| 10 | Flexibilty | KPI16 | 50 | 50% | 25 | 75 |
| 11 | | KPI17 | 100 | 50% | 50 | |

**Table 15: Calculation of Make Performance Value**

| Make | | | | | | |
|---|---|---|---|---|---|---|
| No. | Variable | KPI | Score | Weight | Score x Weight | Total |
| 1 | Reliability | KPI18 | 40 | 25% | 10 | 60 |
| 2 | | KPI19 | 100 | 25% | 25 | |
| 3 | | KPI20 | 50 | 25% | 12,5 | |
| 4 | | KPI21 | 50 | 25% | 12,5 | |
| 5 | Flexibilty | KPI22 | 100 | 100% | 100 | 100 |

**Table 16: Calculation of Delivery Performance Value**

| Delivery | | | | | | |
|---|---|---|---|---|---|---|
| No. | Variable | KPI | Score | Weight | Score x Weight | Total |
| 1 | Reliability | KPI23 | 95 | 14,29% | 13,58 | 67,23 |
| 2 | | KPI24 | 77,5 | 14,29% | 11,07 | |
| 3 | | KPI25 | 98 | 14,29% | 14,004 | |
| 4 | | KPI26 | 50 | 14,29% | 7,15 | |
| 5 | | KPI27 | 50 | 14,29% | 7,15 | |
| 6 | | KPI28 | 28,57 | 14,29% | 4,08 | |
| 7 | | KPI29 | 71,43 | 14,29% | 10,21 | |
| 8 | Responsiveness | KPI30 | 100 | 100% | 100 | 100 |

**Table 17: Calculation of Return Performance Value**

| Return | | | | | | |
|---|---|---|---|---|---|---|
| No. | Variable | KPI | Score | Weight | Score x Weight | Total |
| 31 | Reliability | KPI31 | 30 | 50% | 15 | 45 |
| 32 | | KPI32 | 60 | 50% | 30 | |
| 33 | Responsiveness | KPI33 | 100 | 100% | 100 | 100 |

**Weighting with AHP**

**Table 18: Pair 1 Comparative Data Matrix Level 1**

| Criteria | Plan | Source | Make | Delivery | Return |
|---|---|---|---|---|---|
| Plan | 1,00 | 5,00 | 3,00 | 5,00 | 2,00 |
| Source | 0,20 | 1,00 | 0,25 | 4,00 | 0,50 |
| Make | 0,33 | 4,00 | 1,00 | 5,00 | 1,00 |
| Delivery | 0,20 | 0,25 | 0,20 | 1,00 | 0,50 |
| Return | 0,50 | 2,00 | 1,00 | 2,00 | 1,00 |
| Amount | 2,23 | 12,25 | 5,45 | 17,00 | 5,00 |

It is known that the above recapitulation value is normalized by dividing the Value in columns by the number of each column.

**Table 19: Results of Normalized Matrix Value for Each Column**

| Criteria | Plan | Source | Make | Delivery | Return | Amount | Weight |
|---|---|---|---|---|---|---|---|
| Plan | 0,45 | 0,41 | 0,55 | 0,29 | 0,4 | 2,10 | 0,420 |
| Source | 0,09 | 0,08 | 0,05 | 0,24 | 0,1 | 0,55 | 0,110 |
| Make | 0,15 | 0,33 | 0,18 | 0,29 | 0,2 | 1,15 | 0,231 |
| Delivery | 0,09 | 0,02 | 0,04 | 0,06 | 0,1 | 0,31 | 0,061 |
| Return | 0,22 | 0,16 | 0,18 | 0,12 | 0,2 | 0,89 | 0,178 |

**Consistency Test**

**Table 20: Variable Level 1 Consistency Test**

| Variable | value weights |
|---|---|
| Plan | 0,420 |
| Source | 0,110 |
| Make | 0,231 |
| Deliver | 0,061 |
| Return | 0,178 |
| CR | 0,07 |

Because the Consistency Value Ratio <0.1 then Weight Value Variable level 1 above is consistent.

**Table 21: Uji Konsistensi Variable Level 2**

| Variable | value weights |
|---|---|
| Realiability | 0,4286 |
| Responsiveness | 0,4286 |
| Flexibility | 0,1429 |
| CR | -1,515 |

Because the Consistency Value Ratio <0.1 then Weight Value Variable level 2 above is consistent.

**Table 22: Level 2 Variable Consistency Test**

| Variable | value weights |
|---|---|
| Realiability | 0,50 |
| Responsiveness | 0,50 |
| CR | -1 |

Because the Consistency Value Ratio <0.1 then Weight Value Variable level 2 above is consistent.

**Table 23: Variable Level 2 Consistency Test**

| Variable | value weights |
|---|---|
| Realiability | 0,75 |
| Flexibility | 0,25 |
| CR | -0,88 |

Because the Consistency Value Ratio <0.1 then Weight Value Variable level 2 above is consistent.

**Calculation of Total Value of Company Supply Chain Performance**

Of all the calculations that have been carried out starting from calculating Actual Value, calculating normalization, weighting KPIs, up to the consistency test, it can be determined the total value of the company's supply chain performance. The calculations are presented in the following table:

**Table 24: Total Value of Company Supply Chain Performance**

| Variable | | performance value | Weighting AHP Level 2 | Value xWeight | Amount | Weighting AHP Level 1 | Amount xWeight |
|---|---|---|---|---|---|---|---|
| Plan | Reliability | 80,00 | 0,50 | 40,00 | 77,50 | 0,42 | 32,55 |
| | Responsiveness | 75,00 | 0,50 | 37,50 | | | |
| Source | Reliability | 77,79 | 0,43 | 33,34 | 80,04 | 0,11 | 8,80 |
| | Responsiveness | 83,96 | 0,43 | 35,98 | | | |
| | Flexibility | 75,00 | 0,14 | 10,71 | | | |
| Make | Reliability | 60,00 | 0,75 | 45,00 | 70,00 | 0,231 | 16,17 |
| | Flexibility | 100,00 | 0,25 | 25,00 | | | |
| Delivery | Reliability | 67,23 | 0,50 | 33,62 | 83,62 | 0,061 | 5,10 |
| | Responsiveness | 100,00 | 0,50 | 50,00 | | | |
| Return | Reliability | 45,00 | 0,50 | 50,00 | 72,50 | 0,178 | 12,91 |
| | Responsiveness | 100,00 | 0,50 | 25,00 | | | |
| Total Supply Chain Performance of the Company | | | | | | | 75,54 |

**CONCLUSION**

According to the Supply Chain Council (2012) in the Performance Indicator Monitoring System, the Total Supply Chain Performance in European alloy steel companies is 75.54 which can be categorized as "good". there is a finding on the lowest Variable Performance Value, that is, Variable make with a Performance value of 70. In Variable make, there is a low KPI pling, that is, KPI 18 with the Normalized calculation value that is 40. The intended KPI 18 is the Failure In Processor % of failures occurred in the production process with a failure rate of 2.4 times / Month. Failures that occur in the production process with a failure rate of 2.4 times / Month. It can be concluded that the cause of product or material delivery has been delayed, namely because there is a workmanship (make) that is more than once in one process so that the process that can be done once must be repeated again from the beginning which eventually causes the material to be late in the hands of consumers.

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