Human Resource Scorecard (HRSC) and Objective Matrix as Performance Measurement and Performance Booster Method to Optimize Production Performance

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Abstract

The development technology is something that happens quickly and surely this is marked by the number of new manufacturing companies that are emerging and spreading throughout the world. In the manufacturing industry the most important thing that must always be maintained is production efficiency, but the majority of industries only pay attention to the efficiency aspects of their production activities without regard to the aspects of humans who work in the industry. Human resource scorecard (HRSC) is an appropriate measurement method in identifying and measuring the relationship between workers, strategy, and performance to produce a good company. This human resource performance measurement is looking at business units from four perspectives: financial perspective (F), the customer (C), internal business process (I), and learning and growth (L). Each perspective in HRSC weighted by Analytical Hierarchy process method and then calculated by Objective Matrix (OMAX) to identify which category needed an extra attention and need to be repaired. The end result of OMAX will be reviewed by management theory so the solution made in this analysis will produce the best end result that needed by the company. This measurement is very critical to the company because the competition between company is getting tougher nowadays. HRSC measurement was carried in PT OCM by describing the company's vision and mission into human resource action whose contribution can be measured using AHP analysis in 4 perspectives: financial perspective with a weight of 0.396, customer perspective (employee) with a weight of 0.118, internal business perspective with a weight of 0.240, and growth and development perspective with a weight of 0.247 after that PT OCM use that measurement in OMAX method to determine what KPI needed extra attention and repairment, management based theory will be applied in that solution to give the best result.

Keywords: Bed; AHP; HRSC; OMAX

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Introduction

Currently, the era is developing very rapidly which directly has a very big impact on modern industries (Lam & Shu-guang, 2006). These industries are required to always improvise. Continuous development in the case of improving performance and work efficiency in the majority leads to the development of work skills, work morale, work motivation, and the work environment of each employee (Noe *et al.,* 2017).

In developing the company, PT OCM experienced some work mismatches. Some cases of work incompatibility that PT OCM experienced for instance are production delays that make the company unable to meet production deadlines. According to observations that have been carried out, production delays are often caused by employees who are less serious in doing their jobs as they often joke around during the work that makes productivity worse. The following is a graph showing the production of bed, divan, backrest, and mattress for January 2015 to December 2017 period which can be seen in Figure 1.

Figure 1. Total Bed Production in January 2015 to December 2017 Period

The impact of chasing the company's production targets in January to April slowly put financial burdens and excessive mental burdens on employees because additional production requires outsourcing to other factories and requires permanent employees to work overtime. To deal with these problems the company must examine what aspects are causing the decline in employee performance and make gradual and effective improvements to it.

This discussion is divided into four main points. The first is an introduction, provides a brief overview of some important points and the conceptual framework. The second is the research method and the third is research finding and discussion. Then the last is conclusion and suggestion.

As described above that at this point includes several important points to be understood first and the conceptual framework. Those are explained as follows:

General Quesioner

General questioner is used in this research to determine what is the real employee condition in the factory floor. The result of this research is to find the basic problem that directly impact the employee in the factory floor.

Validation and Reability Test

Validation and verification of measurement methods are procedures that aim to establish realistic expectations with the analyst and confidence with the end-user that the methods are fit for their intended purposes (Schwab, 2013). The validation method used in this research is comparison of R table and R calculation and alpha cronbach calculation (Hair *et al.*, 2007).

Human Resources Scorecard

Becker *et al.,* (2001) have developed a measurement system called the Human Resource (HR) Scorecard. This measurement is the development of the Balanced Scorecard concept in which the measurement of the Human Resource Scorecard is more focused on Human Resources activities Becker *et al.,* (2001).

The Human Resources Scorecard includes the following four perspectives (Walker & Mc Donald, 2001):

1. Learning and growth perspective: quality and processes within the HR department that need to be raised, developed, or improved in order to improve performance and effectiveness and achieve departmental and organizational goals.
2. Internal process perspective: processes that must be carried out by the HR department to provide certain services according to the needs and problems faced by the customer.
3. Customer perspective: customers are people who have an interest in the existence of the HR department.
4. Financial perspective: funding and financial management needed in managing HR department activities.

Main Principles in AHP

In solving problems using explicit logical analysis, there are three principles that underlie AHP thinking: the principle of compiling a hierarchy, the principle of setting priorities, and the principle of logical consistency (Hartman & Goltz, 2001).

Calculation of Elemental Weight

Simply determine the weight of each criterion in determining alternative decisions is to determine the geometric mean.

Measurement of the Consistency of Each Comparison Matrix

Measurement of the consistency of a matrix itself is based on a maximum eigen value. The following are random indexes for matrices of sizes 3 to 10 (matrices of size 1 and 2 have inconsistencies 0). RI index table can be seen in the following Table 1:

Table 1. Random Index Values (RI)

Order of the Matrix	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

Source: Analytical Hierarchy Process (AHP) Tutorial, Teknomo (2006).

The acceptable level of inconsistency is the inconsistency level of 10% and below.

The Form and Order of the OMAX Method

The matrix model arrangement is a table whose cells are arranged according to columns and rows so that the process of reading from left to right has a different function from reading from top to bottom. This matrix arrangement also aims to facilitate the operation and reading process. OMAX with the help of the traffic light system method is an advanced data processing method that focuses on assigning categories in each assessment criterion in which the categories are divided into 3: red category where the criteria are 0 to 3, yellow category where the criteria are 4 to 7. If the criteria are green, the category is 8 to 10.

Traffic Light System

Traffic Light System is closely related to the Scoring System. The Traffic Light System serves as a sign whether or not the score of a performance indicator needs improvement or not and it is presented in three colors:

1. Green
    It means the achievement of a performance indicator has been achieved, which is indicated by the performance figures found at the level of figures eight to ten.

2. Yellow
    It means the achievement of a performance indicator has not been achieved, even though its value is close to the target. The yellow color is indicated by the performance numbers found at levels four through seven. So, the management must be careful with every possibility that will arise.

3. Red
    It means the achievement of a performance indicator is really below the target set and it requires immediate improvement. The red color is indicated by a performance number found at zero to three levels.

Job Specification and Job Description

1. Job specification is a separate document that contains information about the requirements and qualifications of a worker needed to carry out an effective job.

2. Job description is the process of mentioning the duties and responsibilities of a job.

Situational Leadership

      Situational leadership is the style of leadership of a leader which will vary depending on the level of will and level of readiness of the members.

Training and Development

1. Training is an activity designed to provide the knowledge and skills that the students need for their current learning.

2. Development is a learning activity with the aim that employees can exceed today's work targets and have a long-term development focus.
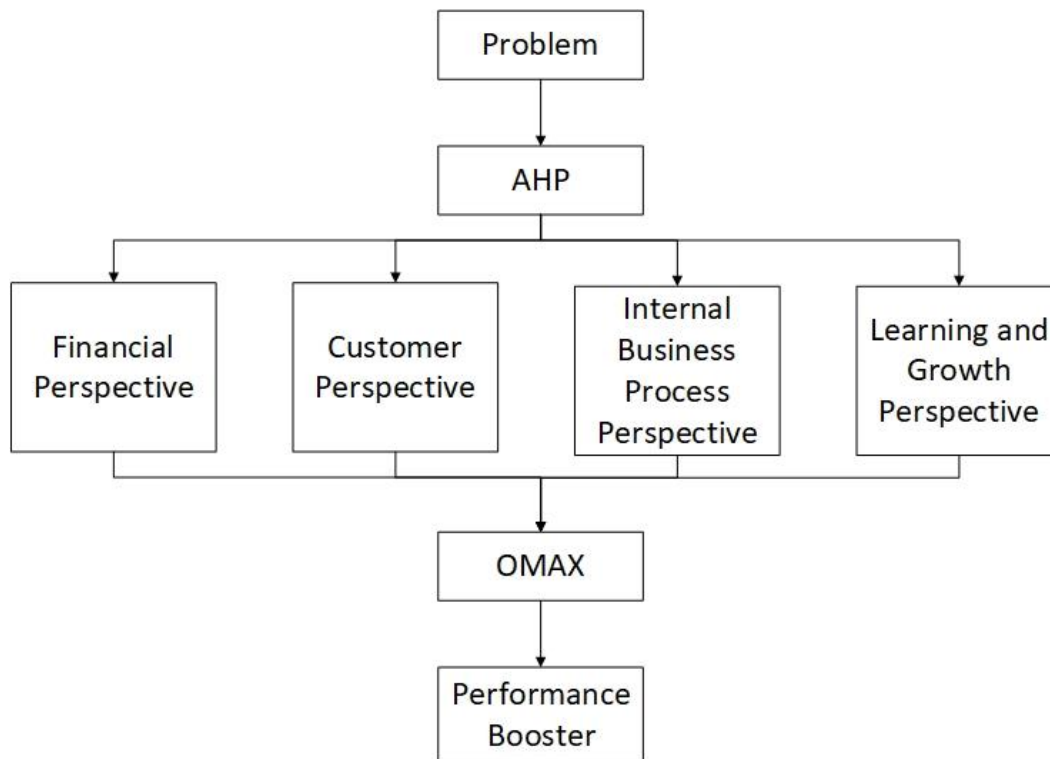
Conseptual Framework

Figure 2. Conceptual Framework

Research Method

Material and Methods

The type of this research is quantitative descriptive. This research conducted in four steps: a general questioner and validation, AHP analysis, OMAX Analysis, suggestion based on management theory.

1. General quesioner and validation realibility test

General quesioner can be seen in appendix and general questioner spread out to 75 worker in factory floor. The result from 75 respondent the have to be valid and reliable before getting to the next step. The question that got score below 2.9 will be used in AHP calculation as a KPI (Key Performance Indicator)

Table 2. Validation and Realibility calculation

Respondent	Indicator/Variable (X)																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
R Calculated	0.501	0.455	0.411	0.404	0.361	0.426	0.406	0.362	0.341	0.441	0.460	0.419	0.389	0.411	0.461	0.345	0.401	0.374	0.457	0.403
Result	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid	valid
R Table	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Average	2.853	2.840	2.653	3.387	2.920	2.307	2.787	2.133	2.480	3.600	2.507	3.133	2.267	2.933	3.000	2.947	3.093	3.413	3.893	2.720
	KPI	KPI	KPI	Not KPI	Not KPI	KPI	KPI	KPI	KPI	Not KPI	KPI	Not KPI	KPI	Not KPI	Not KPI	KPI	Not KPI	Not KPI	Not KPI	KPI

Information : Based on disscussion with the board directiors the average score below 2.9 will become KPI

$$\alpha = \frac{Kr}{1+(K-1)r}$$

Symbol

α: Reliability *Alpha Cronbach* Coefficient

r: Variable Correlation coefficient

k: Number of Variable

Reability test for this research:

$$\alpha = \frac{(20)(0,286)}{1+(20-1)(0,286)}$$

$$= 0,889$$

Figure 3. Alpha Cronbach Calculation

2. AHP analysis

AHP analysis will be done in 2 step that are: Pairwise comparison questioner to 5 top executives in PT OCM, normalization calculation. The end result in AHP calculation is maximum lamda, CI, RI, CR, and weight each perspective. Here is one of the perspective calculation:

Table 4. *Pairwise calculation*

Perspective	Finance	Customer (Employee)	Internal Business Process	Learning and Growth
Finance	1,00	4,00	3,00	3,00
Customer (Employee)	0,25	1,00	1,00	1,00
Internal Business Process	0,33	1,00	1,00	2,00
Learning and Growth	0,33	1,00	0,50	1,00
Total	1,92	7,00	5,50	7,00

Table 5. Normalization 1

Perspective	Finance	Customer (Employee)	Internal Business Process	Learning and Growth	Total	Weight Priority
Finance	0,522	0,571	0,545	0,429	2,067	0,517
Customer (Employee)	0,130	0,143	0,182	0,143	0,598	0,149
Internal Business Process	0,174	0,143	0,182	0,286	0,784	0,196
Learning and Growth	0,174	0,143	0,091	0,143	0,551	0,138
Total	1,000	1,000	1,000	1,000	4,000	1,000

Table 6. Normalization 2

Perspective	Finance	Customer (Employee)	Internal Business Process	Learning and Growth	Total	Lamda
Finance	0,517	0,598	0,588	0,413	2,116	4,094
Customer (Employee)	0,129	0,149	0,196	0,138	0,612	4,097
Internal Business Process	0,172	0,149	0,196	0,275	0,793	4,045
Learning and Growth	0,172	0,149	0,098	0,138	0,557	4,050

Table 7. Consistency Test Result

Lamda max	4,0788
CI	0,0263
RI	0,9000
CR	0,0292
Result	Consistent

3. OMAX Analysis

    OMAX analysis will be done in 2 step that are:

    a. calculating current company performance using KPI scoresheet
        Example KPI Scoresheet:

Table 8. KPI Scoresheet

Achieved Target Production		
Data	Score	Scale
Unit Failed to Produce	3,687.00	Unit
Target Unit Production	27,137.00	Unit
Percentage of Failed Production	13.59	%

    b. setting the company maximum goal, current goal, and minimum goal after that calculating incremental decrease in value by calculating score 9-4 and 2-1
        Example Calculation:

Table 9. OMAX Calculation

Perspective	Weight	Maximum Goal	Minimum Goal	Current Goal	Current Performance	score 9-4	score 2-1
Achieved Target Production	0.066	0	20	10	13.59	1.43	3.33

Results and Discussions

AHP Analysis

Here is the result of calculating all perspective of KPI

Table 10. Variable, Indicator, and Organization Performance Measurement Scale

Comparison Between Perspectives	Weight	Consistency Ratio
Finance	0.396	
Customer (Employee)	0.118	0.0198
Internal Business Process	0.240	
Learning and Growth	0.247	
Financial Perspective	**Weight**	**Consistency Ratio**
Providing Effective Production/ Sales Targets	0.396	0
Human Resources Perspective	**Weight**	**Consistency Ratio**
Improving Employee Welfare	0.048	
Increase Company Awareness toward its Employees	0.014	0.0157
Increasing Firmness in Enforcement of Regulations	0.056	
Internal Business Process Perspective	**Weight**	**Consistency Ratio**
Providing Effective Leave	0.074	
Leadership Process	0.032	0.0027
Career Path	0.133	
Learning and Growth Perspective	**Weight**	**Consistency Ratio**
Human Resource Development	0.080	0
Improving Open Communication between Employees	0.167	

Objective Matrix (OMAX)

Here are the result calculating the score of all perspective

Table 11. OMAX Result

No	KPI	Scale	Weight	Performance	Maximum Goal	Minimum Goal	Current Goal	Polarity	Score	Value
	Financial Perspective		0.396						3.85	1.52
1	Achieved Target Production	%	0.396	13.59	0	20	10	Negative	1.92	0.13
	Customer Perspective (Employee)		0.118						4.78	0.56
2	Employee Satisfaction Index	Skala 1-5	0.048	3.1	5	3	4	Positive	0.36	0.02
3	Company Awareness Index	Skala 1-5	0.014	3.00	5	3	4	Positive	0.01	0.00
4	Employees who receive punishment	Orang	0.056	4.00	0	10	5	Negative	4.40	0.25
	Internal Business Process Perspective		0.24						18.89	4.53
5	Employee Attendance Rate	Orang	0.074	117.00	125	50	90	Positive	8.40	0.62
6	Leadership Index	Skala 1-5	0.032	2.91	5	2	4	Positive	1.36	0.04
7	Employees who get Promotions	Orang	0.133	14.00	15	2	7	Positive	9.13	1.21
	Growth and Learning Perspective		0.247						4.53	1.12
8	Human resource training	%	0.08	28.00	100	25	50	Positive	0.36	0.03
9	Communication Support Facilities	%	0.167	66.67	100	50	60	Positive	4.17	0.70
	Performance of the Production Department of PT. OCM									7.74

Disscussion based on OMAX Result

Based on OMAX calculation on PT OCM there are 9 KPI that have the possibility of having a bad influence on company production performance, these 9 KPI will be made into diagram to make the company easier to solve the problem they currently facing.
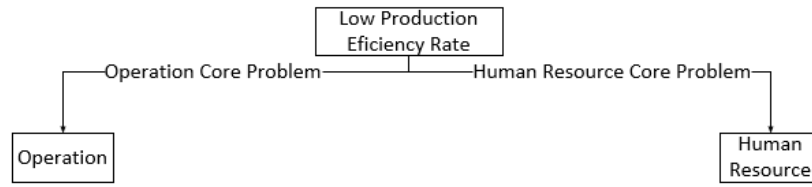
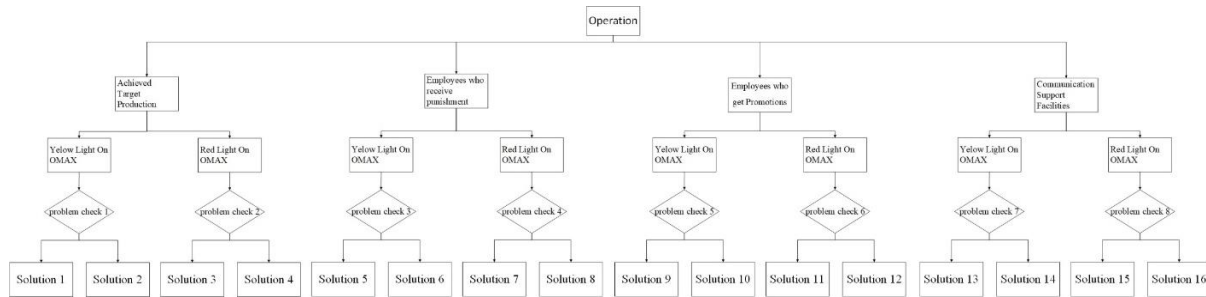**Figure 4. Problem Solving Diagram (Core Problem)**

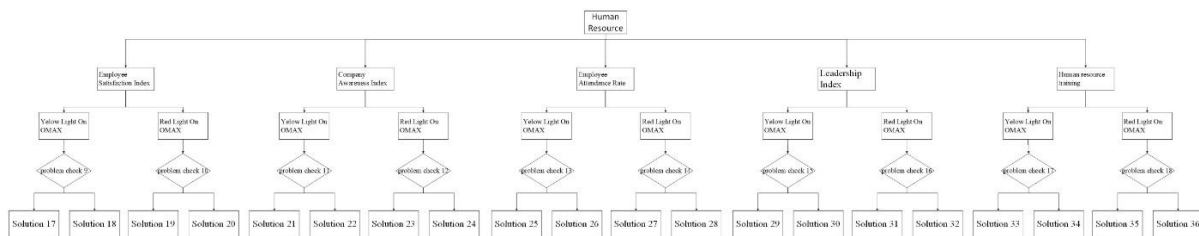**Figure 5. Problem Solving Diagram (Operation Problem)**

Figure 6. Problem Solving Diagram (Human Resource Problem)

Diagram content :

Table 12. Problem Check Question Content

Number	Problem Check Question
1	Is the failure to achieve the target due to the ineffectiveness of the machine?
2	Is the failure to achieve the target due to an error in making a production plan?
3	Is the problem in the work environment of the employee?
4	Is the problem within the employee?
5	Does the problem come from within the company?
6	Did the problem come from the leader of each division?
7	Is the problem coming from the company?
8	Did the problem come from the employee?
9	Is the problem coming from the company?
10	Did the problem come from the employee?
11	Does the problem come from the leader chosen by the company?
12	Did the problem come from the employee?
13	Is the Problem from the Company?
14	Did the problem come from the employee?

15	Does the problem come from the Company (the maker of the training plan)?
16	Did the problem come from the employee (who attended the training)?
17	Is the Problem from the Company? (Provider of communication facility)
18	Did the problem come from the employee (the user of the communication facility)?

Table 13. Problem Check Question Content

Number	Solution Content
1	the company should analyze what processes are facing bottlenecks in the production process
2	company should analyze which divisions are experiencing a decline in productivity and conduct an analysis of production elasticity.
3	The company should use forecasting calculations so that it can predict when production will increase and carry out an outsourcing strategy or increase employees
4	the company should review the leaders of each division to test their understanding of the production process and what causes the production failure of their division.
5	companies should conduct a survey using the hygiene theory proposed by Herzberg to detect any work environment that needs to be improved by the company such as salaries, benefits, company regulations, physical working conditions, interpersonal relationships, and job security.
6	the company should detect any aspects that can affect job satisfaction of employees outside the work environment such as the situation of workers 'households which can directly affect workers' mentality.
7	By using Herzberg's theory, companies must establish a motivational factor and a hygiene factor that is effective in employing employees.
8	The company should use a survey to check the relation of each employee because 1 bad influencer in the company can lead to bad work ethos.
9	Companies are required to conduct 360 degree peer review
10	The company should examine the company's external auditors because of poor awareness results that can be caused by bad auditors
11	The company must establish a clear and simple job description and organizational structure so that it is easy for employees to understand and implement
12	Companies can consult with business consultants. This is in order to avoid the company's blind spot
13	Companies must conduct benchmarks or comparative studies with other companies
14	The company can ask employees directly on random occasions whether the punishment made by the company is fair or not.
15	The company must guarantee the punishment given to employees must be in accordance with the consequences of mistakes made by employees.
16	Companies must be able to ensure employees can perform well and constantly so that employees do not make mistakes.
17	Company rules and punishment must be checked again
18	Workload analysis from employees is needed
19	Companies must act more firmly against absences but based on situational factor analysis
20	a counseling committee needs to be formed which is tasked with analyzing the reasons for the large number of absent employees

21	Companies need to know what kind of leadership is currently needed by using the concept of situational leadership and looking for leaders that fit the required characteristics
22	Companies need to analyze at what stage the current state of the company and determine the appropriate situational leadership to be applied to the company
23	companies can analyze why employees do not fit into the type of leadership that has occurred
24	Problems can come from leaders who cannot read the conditions that occur in employees and circumstances at certain moments. training should be done immediately
25	The company needs to have a clear system for raising the level and the company needs to have clear terms and conditions if the employees have done their job what they will get in the end
26	Companies through leaders must be able to communicate the terms and clear references so that they can motivate employees to work optimally and be able to follow the career paths available at the company.
27	Motivation and communication are two vital things that cause employees to be maximally or not. Therefore companies need to fulfill both of the above so that employees can follow the available career paths.
28	Companies need to analyze whether the available career path system is optimal or not, otherwise employees will find it difficult to get promotions and move to the next level.
29	The company needs to analyze what training activities are suitable for employees and when is the right time to realize them.
30	Companies need to find a third party who is already experienced in providing the desired training material
31	the company can find out and help create the ideal environment for employees to develop
32	Problems may come from not attracting the material provided or unqualified teaching staff. Keep in mind that the search for quality third parties is the key to the success of the training as well
33	Companies must be able to think long term. Investment in communication support facilities is indeed not cheap, but the benefits will be very large in the future
34	Improve communication tools that are not working effectively
35	there is counseling for employees to maintain company communication facilities
36	making maintenance schedules for communication support facilities

Conclusion

Based on the processing and analysis that has been carried out before, conclusions can be drawn which later can be recommendations that help the company or to the next researcher. The results of the study obtained Human Resources Scorecard design of PT OCM based on interviews regarding company's vision and mission. It forms 9 KPIs as a reference in measuring employee performance which includes: effective production/ sales targets, employee satisfaction index, company awareness index, number of employees affected, sanctions, number of employees getting effective leave, leadership index͵ employees who get promotions, human resource training, and communication support facilities.

The results of the Human Resource performance measurement process with OMAX measuring devices and traffic light systems are divided into 3 indicators: green, red, yellow. On the red indicator, the

points that still need improvement are: achievement of the company's production/ sales targets, employee satisfaction index, company awareness index, leadership index, and human resource training. It can be solved by situasional leadership and Herzberg theory.

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