

# Performance Assessment of PT. X Automotive Companies Using Performance Prism and Analytical Hierarchy Process (AHP)

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## Abstract

*The change of security and economic conditions along with globalization that occurs in Indonesia led to tight competition in the automotive industry business. Thus, it is required for them to carry out several management improvement programs and cost savings without reducing service quality in order to compete and survive. Researchers sought solutions using Performance Prism and Weighting by Analytical Hierarchy Process (AHP) Method. Based on the results of weighting using the AHP method, there were 3 KPIs that had a large influence on employee performance, namely KPI 8 of personnel violations percentage with a weight of 0.160, KPI 10 of the amount of customer complaints with a weight of 0.142 and KPI 14 of the number of violations found with a weight of 0.123. Of the 14 KPIs identified, 8 KPIs was identified as well performance (green traffic light), 5 KPIs with moderate performance (yellow) and the remaining 1 KPI was identified as poor performance (red). The highest performance score was obtained by KPI 5 which is the number of personnel who receive training with the percentage of 160%. Meanwhile, the KPI with the lowest score which is also one of the red KPIs was KPI 13 of Personnel ratio compared to personnel list with a performance score of 33.33% (in red). Overall, employees performance was in good condition. This was indicated by the value of the Employee's total performance score of 85.23% (on a scale of 0% to 100%).*

**Keywords** - Automotive, AHP, Performance Prism, Weighting, Work Load

## I. INTRODUCTION

The change of security and economic conditions along with globalization that occurs in Indonesia led to tight competition in the automotive industry business. Thus, it is required for all automotive companies to carry out several management improvement programs and cost savings without reducing service quality in order to compete and survive. So far, the performance measurement system in automotive X has not represented organizational performance in a

comprehensive and integrative manner. Therefore, it is necessary to redesign the performance measurement system. In automotive X, the performance measurement is performed as an

evaluation that can provide solutions in making decisions to improve service to customers. However, performance measurement is generally only based on financial aspects and the performance assessment is based on whether or not the target is met within a certain period.

This paper used some literatures to support the research, for example paper titled Applicability of Performance Measurement Systems in Incentivizing the Operational Level Indirect Employees: A Literature Review (Perera, 2017). A Critique of the Balanced Scorecard as a Performance Measurement Tool (Allam, 2015). Double Performance Prism: innovation performance Measurement systems for manufacturing SMEs (Gardoni, 2017). Managing With Measures: The Stakeholder Perspective (Neely A. a., 2002). Measuring Strategic Performance in State-owned Organizations: An Evaluation of Five Proposed Contemporary Metrics (Prosper Gameli Agbanu, 2016). Performance Measurement System Design: Developing and testing a process based approach (Neely A. B., 2000). Performance measurement and performance management (Lebas, 1995). Are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction (Itner, 1998). The use of the balanced scorecard in small companies. (Giannopoulos G. H., 2013). Performance measurement systems in SMEs: A review for are search agenda (Patrizia Garengo, 2005). A stakeholder approach to strategic performance measurement (Atkinson, 1997). Web enabled measurement systems-management implications (Bititci, 2002). Designing, implementing and updating performance measurement systems (Bourne, 2000). Measures that matter (Bierbusse, 1997). A scorecard for small business performance (Cook, 1995). The changing basis of performance measurement (Ghalayini A. a., 1996). An integrated dynamic performance measurement system for improving manufacturing competitiveness (Ghalayini A. N., 1997). Lean organization, management by

process and performance measurement (De Toni, 1996). The downside of the Balanced Scorecard: A case study from Norway (Antonsen, 2010). Applying the balanced scorecard for better performance of intellectual capital (Bose, 2007). The use of the balanced scorecard in small companies (Giannopoulos G. H., 2013). The performance prism in practice (A. Neely, 2001). Using the balanced scorecard as a strategic management system (R. S. Kaplan, 1996).

The solution to the above problems is using five dimensions called Performance Prism. Performance prism has five facets/aspects which are the satisfaction of stakeholders and stakeholder contributions for top and bottom facets. Meanwhile, there are strategies, processes and capabilities for the other facets. This model is not only based on strategy but also takes stakeholder satisfaction-contribution, organizational processes and capabilities into account. Understanding the cause of stakeholders' (owners and investors, suppliers, consumers, labor, government and surrounding communities) satisfaction is an important step in the Performance Prism model.

This Paper is organized as follows. Section 2 is a review about the basic ship theory. Section 3 is the result and 4 is the discussion of research. Finally, the conclusion will be presented in section 5.

## II. RESEARCH METHODOLOGY

### A. Performance Prism

Performance Prism is a model used for performance measurement that describes the performance of an organization as a 3-dimensional construct (prism) which has 5 sides. Performance assessment system in the form of Performance Prism model attempts to complete the previous models including the Balanced Scorecard. This model is not only based on strategy but also considers the satisfaction and contribution of stakeholders, the process and the capability of the company (M. Hudson, 2001). In principle, this method is carried out in two directions, namely considering satisfaction and funding needs of all stakeholders and also seeing the stakeholders' contributions to the company.

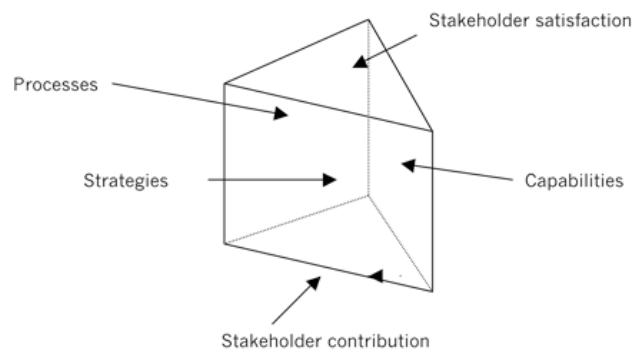


Fig. 1. Five facets of performance prism

In Figure 2.1, there are five facets of performance prism. The philosophy of performance prism comes from a prism building where the building has five sides, namely the upper and lower sides which

are satisfaction and contribution, while the other three are strategy, process, and capability.

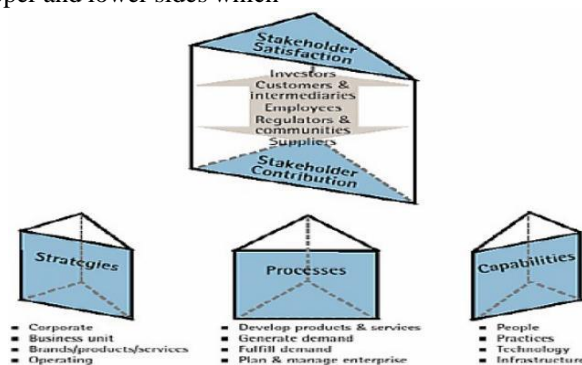


Fig. 2. The Scope of Performance Prism

Performance Prism has 5 interrelated performance perspectives, namely:

#### 1. Stakeholder's Satisfaction

Who are the organizational stakeholders and what are their wants and needs? Stakeholders considered here include consumers, labor, suppliers,

owners / investors, along with the Government and the surrounding community. It is important for companies to strive to provide satisfaction with what their stakeholders want and need and to communicate well with them so that stakeholders can carry out their roles well for the success of the company.

**2. Strategy**

What strategies are needed to give satisfaction to the wants and needs of stakeholders? The strategy in this case is very necessary to assess organizational performance because it can be used as a monitor (reference) to what extent organizational objectives have been decided to improve organizational performance.

**3. Process**

What processes are needed to achieve the strategy that has been set? The process here is likened to a machine in achieving success, so how is the organization able to obtain high income with the lowest possible expenses, for example by optimizing the procurement system.

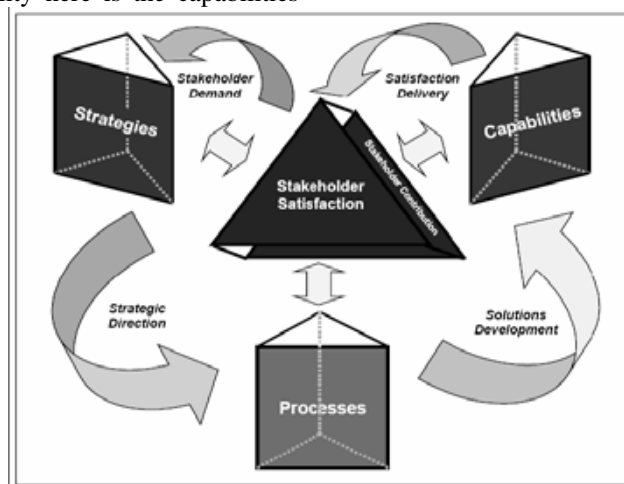
**4. Capability**

What capabilities are needed to carry out the existing process? Capability here is the capabilities

possessed by the organization include its expertise, business practices, technology utilization, and supporting facilities. This organizational capability is the most basic foundation that an organization must possess to be able to compete with other organizations.

**5. Stakeholder’s Contribution**

What contribution does the company need and want from stakeholders to develop their capabilities? Determining what should be assessed, which is the ultimate goal of performance measurement with this Performance Prism model, means that the organization must consider what things are desired and needed from its stakeholders. It is because organizations are considered to have good performance if they are able to convey what they want from stakeholders that greatly affect the survival of their organization.



**Fig. 3. Relationship between Performance Prism perspectives**

**B. Key Performances Indicator (KPI)**

According to (J. Alegre, 2006), Key Performance Indicator (KPI) is a measuring tool that is used to facilitate management or even stakeholders in knowing information about a company's performance level. KPI provides a clear strategy and helps to monitor and improve company performance. KPIs must be chosen clearly to identify performance indicators that are important for the company. Inappropriate selection of KPIs can lead to inefficient and counterproductive performance measurement. Here is the flow of determining KPI: (Freeman, 2010).

- a. Identification of KPI and determination of selected KPI
- b. Weighting of KPIs and ratification of contracts with management
- c. Assessment and reporting of KPI achievements
- d. Ratification of KPI achievement, evaluation and feedback

**C. Weighting with Analytical Hierarchy Process (AHP) Method**

The Analytical Hierarchy Process (AHP) method was first developed in the 1970s (Saaty, 1999) from the Wharton School of Business which was useful for organizing information and judgment on the selection of the most preferred alternatives. The mechanism principle of the AHP method is to simplify unstructured problems and arrange them in a hierarchy. Each variable is compared one by one with other variables based on certain values. Then, the determination of variables with the highest priority is carried out and has a considerable impact on a system (Anthony, 2009).

In making AHP method decisions, the following steps are needed:

- a. Identifying the problem and determine the solution expected from the previous observation process.
- b. Determining the hierarchical structure of the process which consists of the desired goals, criteria for achieving goals, and possible alternatives. Here is an overview of the hierarchical structure of the AHP method:

- c. Making a pair wise comparison matrix by setting the inverse value, provided that if A is preferred to B with an x scale, then B is preferred than A to a 1/ x scale. Here is the matrix
- d. Calculate priority weights, with the following stages:
  - a) Changing the value of the matrix in decimal form.
  - b) Summing each column and dividing elements in each column with the sum of the criteria for the column in question. The following is a table of basic pair wise comparisons:
- e. Determining the maximum Eigen value ( $\lambda_{max}$ ) by adding up the multiplication of the number of columns from the pair wise comparison matrix with the normalized vector Eigen.

$$\lambda_{maks} = \sum \frac{\text{Matriks C}}{n}$$

1

**Table 1. Random Index (RI)**

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0,58	0,90	1,12	1,24	1,32	1,41	1,45	1,49

**D. Scoring**

Assessment by scoring method was used to equalize the scale of each indicator, so as to find out the achievement of each parameter. The data used was divided into 2 types, namely: (Wongrassamee, 2003).

- a. Qualitative data: Non-numerical data obtained from interviews, field observations, existing documents.
- b. Quantitative data: Data in the form of numbers which was obtained from calculations and can be an integer/decimal, such as: the number of bacteria in a lake, etc.

**E. The making of Performance Assessing Tool (Template)**

The performance assessment in a company triggers the competitiveness (Yadav, 2013). Underlying factors are an increase in the work ethic of company employees. In order to obtain data on company performance assessment, a assessing

- f. Calculating the value of Consistency Index (CI):

$$CI = \frac{(\lambda_{maks} - n)}{(n - 1)}$$

2

- g. calculating the Consistency Ratio (CR) to find out the consistency of assessments made by management. The value of CR is accepted when 0.10. Calculations use the following formula:

$$CR = \frac{CI}{RI}$$

3

Here is the random index value for some matrix sizes according to Saaty:

instrument (template) is needed as standard and standard form. The form of the template that has been designed, can be changed and adjusted to the state of the company in the future. The filling of the template is carried out by the superior in charge in the field.

**III. RESULT AND DISCUSSION**

**A. Identification of Stakeholder’s Satisfaction and Contribution**

The designing of performance assessment system was using Performance Prism method. It started with identification of aspects that can meet stakeholder satisfaction along with identifying the contribution that will be given by each stakeholder to employees if employees can satisfy the needs of the stakeholders. The processing of the results of the questionnaire distribution was described in the following table:

**Table 2. Questionnaire Results of Consumer and Personnel Stakeholders**

STAKE HOLDER	STAKEHOLDER’S SATISFACTION	NUMBER OF RESPONDENT										MEAN
		1	2	3	4	5	6	7	8	9	10	
Consumer	a. Maintained Security	4	4	4	4	5	5	5	5	5	5	4.6
	b. Complaint handling well	4	5	5	5	5	5	5	5	5	5	4.9
	c. Good quality work	4	5	5	5	5	5	5	5	5	5	4.9
	d. Fast work completion	4	5	5	5	5	5	5	5	5	5	4.9
	e. Adequate work equipment	-	5	-	-	-	-	-	-	-	-	0.5
	f. Members are trained	-	-	5	-	-	-	-	-	-	-	0.5
	g. Low price	-	-	-	-	-	-	-	-	5	-	0.5
a. Personal protective equipment	5	5	4	5	5	5	5	4	5	5	4.8	

Staff Personnel	b. There are courses/training	5	5	5	5	5	4	5	5	5	5	4.9
	c. Promotion or welfare	5	5	5	5	5	5	5	5	5	5	5
	d. Additional personnel	4	5	4	5	5	5	5	4	4	4	4.5
	e. Additional/regeneration of work equipment	5	5	5	5	5	5	5	5	5	5	5
STAKE HOLDER	STAKEHOLDER'S CONTRIBUTION	NUMBER OF RESPONDENT										MEAN
		1	2	3	4	5	6	7	8	9	10	
Consumer	a. Being a loyal customer	4	4	4	4	4	5	4	5	5	4	4.3
	b. Assist in promotion	4	4	3	3	4	5	5	4	5	4	4.1
	c. Contribute to the Security	4	4	4	5	4	5	5	4	5	4	4.4
Staff Personnel	a. Work better	5	5	5	5	5	5	5	5	5	5	5
	b. Skill increases lead to the increase of quality work	5	5	5	5	5	5	5	5	5	5	5
	c. Working hard	5	5	5	5	5	5	5	5	5	5	5

**Table 3. Stakeholder's Satisfaction and Stakeholder's Contribution**

STAKEHOLDER	STAKEHOLDER'S SATISFACTION	STAKEHOLDER'S CONTRIBUTION
Investor	a. Readiness of equipment technical conditions	a. Giving reward and punishment
	b. Personnel readiness	
	c. High productivity of work	
	d. There are no work accidents	
Supplier	a. Disciplined personnel	a. Giving reward and punishment
	b. Pay attention to work safety	
	c. There is no law violation	
Consumer	a. Maintained Security	a. Become a loyal customer
	b. Handling complaints properly	b. Assist in promotion
	c. Good quality of work	c. Contribute to the security
	d. Fast completion of work	
Staff Personnel	a. Personal protective equipment	a. Work better
	b. There are courses/training	b. Skill increases lead to the increase of quality work
	c. Promotion or welfare	c. Working hard
	d. Additional personnel	
	e. Additional/regeneration of work equipment	
Government/Community	a. Obey PNPB procedures	a. Licensing Process
	b. Tax compliance	
	c. Orderly reporting SIMAK	

**Table 4. Key Performance Indicator (KPI)**

STAKEHOLDER	NUMBER OF KPI	KPI
Investor	1	Percentage of Production equipment conditions
	2	Percentage of Mechanical equipment conditions
	3	Percentage of Automotive equipment conditions
	4	Percentage of electrical equipment conditions
	5	Number of trained personnel
	6	Number of cars in repairing state
Supplier	7	Personnel Attendance
	8	Percentage of personnel violations
Consumer	9	Number of reports lost

	10	Number of customer complaints
Staff Personnel	11	Occupational accident rate
	12	The ratio rose to rank compared to the proposal
	13	Personnel ratio compared to personnel list
Government/Community	14	Number of violations findings

**Table 5. Weighting of KPI**

STAKEHOLDER	STAKEHOLDER WEIGHT	KPI	KPI WEIGHT	TOTAL WEIGHT
Investor	0.329	Percentage of Production equipment conditions	0.080	0.026
		Percentage of Mechanical equipment conditions	0.080	0.026
		Percentage of Automotive equipment conditions	0.080	0.026
		Percentage of electrical equipment conditions	0.080	0.026
		Number of trained personnel	0.080	0.026
		Number of cars in repairing state	0.160	0.053
Supplier	0.213	Personnel Attendance	0.250	0.053
		Percentage of personnel violations	0.750	0.160
Consumer	0.213	Number of reports lost	0.333	0.071
		Number of customer complaints	0.667	0.142
Staff Personnel	0.123	Occupational accident rate	0.600	0.074
		The ratio rose to rank compared to the proposal	0.300	0.037
		Personnel ratio compared to personnel list	0.100	0.012
Government/Community	0.123	Number of violations findings	1.000	0.123

Based on the total weight value above, it is known that KPIs that had a large influence on the overall performance of the Employees were:

- a. KPI 8 of Personnel violations percentage with a total weight of 0.160.
- b. KPI 10 of Number of customer complaints with a total weight of 0.142.
- c. KPI 14 of Number of Violation findings with a total weight of 0.123.

While other KPIs had a relatively small influence on the overall performance of employees. This means that employees should prioritize attention on KPIs with a large total weight value in improving employee performance, without ignoring other KPIs.

**IV. DISCUSSION**

Employee performance achievement value categories are represented by the following colors:

- a. Green, the KPI score is between 76% and 100%. This means that the achievement of the KPI has approached the target, the same or even exceeded the target. Thus, this achievement must be maintained and improved.
- b. Yellow, the KPI score is between 51% and 75%. This category indicates that the achievement of the KPI has not yet reached the specified target, but the value is quite close to the target. Employee management must be careful about the achievement of this KPI and need to take steps to improve it.
- c. In red, the KPI score is between 0% and 50%. This category indicates that the achievement of KPI is far below the target. So it requires serious and immediate handling steps to improve its performance.

**Table 6. Category of Employee Performance Achievement Value**

ACHIEVEMENT VALUE	NOTES	
	ASSESSMENT	COLOR
76% - 100%	Good	Green

ACHIEVEMENT VALUE	NOTES	
	ASSESSMENT	COLOR
51% - 75%	Moderate	Yellow
0% - 50%	Bad	Red

**Table 7. Actual Value and Target of Each Employee KPI**

STAKE HOLDER	KPI	YEAR 2017		UNIT
		ACTUAL	TARGET	
Investor	Percentage of Production equipment conditions	52.35%	100%	%
	Percentage of Mechanical equipment conditions	61.74%	100%	%
	Percentage of Automotive equipment conditions	73.63%	100%	%
	Percentage of electrical equipment conditions	69.23%	100%	%
	Number of trained personnel	16	10	Person/People
	Number of cars in repairing state	41	72	Piece
Supplier	Personnel Attendance	0	0	Person/People
	Percentage of personnel violations	0.93%	0%	%
Consumer	Number of reports lost	0	0	Piece
	Number of customer complaints	0	0	Piece
Staff Personnel	Occupational accident rate	0	0	Piece
	The ratio rose to rank compared to the proposal	100%	100%	%
	Personnel ratio compared to personnel list	33.33%	100%	%
Government/Community	Number of violations findings	0	0	Times

**Table 8. Assessment Result of Employee’s Performance**

STAKE HOLDER	KPI	TOTAL WEIGHT	PERFORMANCE	ABSOLUTE PERFORMANCE	TRAFFIC LIGHT
Investor	1 Percentage of Production equipment conditions	0.026	52.35%	1.38%	Moderate
	2 Percentage of Mechanical equipment conditions	0.026	61.74%	1.62%	Moderate
	3 Percentage of Automotive equipment conditions	0.026	73.63%	1.94%	Moderate
	4 Percentage of electrical equipment conditions	0.026	69.23%	1.82%	Moderate
	5 Number of trained personnel	0.026	160.00%	2.63%	Good
	6 Number of cars in repairing state	0.053	56.94%	3.00%	Moderate

Supplier	7	Personnel Attendance	0.053	100.00%	5.33%	Good
	8	Percentage of personnel violations	0.160	99.07%	15.83%	Good
Consumer	9	Number of reports lost	0.071	100.00%	7.09%	Good
	10	Number of customer complaints	0.142	100.00%	14.21%	Good
Staff Personnel	11	Occupational accident rate	0.074	100.00%	7.38%	Good
	12	The ratio rose to rank compared to the proposal	0.037	100.00%	3.69%	Good
	13	Personnel ratio compared to personnel list	0.012	33.33%	0.41%	Bad
Government/Community	14	Number of violations findings	0.123	100.00%	12.30%	Good
TOTAL SCORE OF EMPLOYEES 'S PERFORMANCE					85.23%	GOOD

## V. CONCLUSION

Based on the research of performance assessment system design, the Employees used the Performance Prism method, then the assessment were implemented using the data in year 2017. Based on the weighting results and AHP method, there were 3 KPIs that had a high impact on employees' performance, namely KPI 8 of Percentage of personnel violations with the weight of 0,160, KPI 10 of Number of customer complaints with a weight of 0.142 and KPI 14 of Number of violation findings with a weight of 0.123. Of the 14 KPIs identified, 8 KPIs were performed well (green traffic light), 5 KPIs had moderate performance (yellow) and the remaining 1 KPI performing poorly (in red). The highest performance score was obtained by KPI 5 of the number of personnel who trained/courses with the percentage of 160%. Meanwhile the KPI with the lowest score which was also one of the red KPIs was KPI 13 of personnel ratio compared to personnel list with a performance score of 33.33% (in red). Overall performance of employees was in good condition. This was indicated by the value of the Employee's total performance score of 85.23% (on a scale of 0% to 100%).

## VI. ACKNOWLEDGEMENTS

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