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Analysis of hospital performance measurement using performance prism method

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Abstract. A good performance measurement should measure all aspects of the stakeholders, including investors, customer, employees, suppliers, regulators and communities. Performance prisms are one of performance measurement methods that assess all aspects of stakeholders. A hospital which has established in Makassar is such organization that used conventional performance measurement. It conducted performance measurement based on only the financial aspect, while the others less noticed. This study applies performance prism that supported by Analytical Hierarchy Process (AHP) as weighting system and integrated of objectives matrix (OMAX) and traffic light systems as scoring systems. The results obtain 99 KPIs consists of 17 investor aspects, 35 customer aspects, 16 employee aspects, 15 supplier aspects and 16 regulator and community aspects. Overall performance index is 7.9 in the yellow category that needs some improvements.

1. Introduction

The more developed the times, the competition in the business world is getting tighter. This is evidenced by increasingly emerging competitors in the manufacturing and service industries. Responding to market growth like this, every company is required to develop its strategy. One way to determine the right strategy is to make improvements in a better direction through measuring and improving the performance that has been done by the organization within a certain period. In this case it starts by first measuring the company's current performance. Performance measurement needs to be done because basically all companies need to evaluate and improve their performance, so that company performance can be improved. There are two types of performance measurement, namely traditional performance measurement and integrated performance measurement. Traditional performance measurement is only based on financial aspects, while integrated performance measurement not only measures financially but non-financially is part of this measurement [1]. One hospital in Makassar is one example of an organization that performs performance measurement traditionally. By assessing the company's performance solely from the financial side, it is not good, because the use of performance measurement systems has traditionally been considered not able to measure intangible assets owned by companies such as human resources, customer satisfaction, or customer loyalty.

To overcome the deficiencies in the performance measurement, an approach method that measures the performance of the company is put forward which emphasizes the importance of aligning the overall aspects of the company, including investors, customers, labor, suppliers, regulations and society, then the performance prism method introduced by Chris Adam and Andy Neely in 2001 [2]. Performance



measurement in this study is supported by Analytical Hierarchy Process (AHP), Scoring System with Objective Matrix (OMAX) method, and Traffic Light System so that later recommendations for improvement will be found on KPIs whose targets have not been achieved. Analytical Hierarchy Process (AHP) is a method of decision making by conducting pair wise comparisons between selection criteria. Meanwhile Objective Matrix (OMAX) is a partial productivity measurement system developed to monitor productivity in each part of the company with productivity criteria that are consistent with the existence of the section (objective). From the results of the performance measurement shown by the Traffic Light System, it will be seen which parts of the company's performance are problematic. So that the company can find out the problems that occur and consider making improvements to the problematic company performance. According to Sawarni (2013) the design of environmental performance measurements developed is presented in the form of a Traffic Light System that can function as feedback for the achievement of existing performance.

2. Method and materials

Research on performance measurement using this prism performance was carried out in one hospital in the city of Makassar. Performance Prism departs from stakeholders rather than strategy [4]. In this era, the business environment is trying to find a clear picture of key stakeholders and what they want. Performance Prism defines what strategies are pursued to ensure that a value (value) has been given to stakeholders, understand what processes the company needs if this strategy is carried out and define capabilities to fulfill the process [5].

Experts try to think what is needed by the organization itself from stakeholders; workforce loyalty, customer benefits, long-term investment etc. The first stage was carried out in measuring performance with prism performance, namely identifying key stakeholders with interviews with the head of the hospital. In hospitals there are several stakeholders that must be considered, among others: investors, labor, consumers, suppliers, government and community regulations. Figure 1 shows stakeholders from the performance prisms framework.

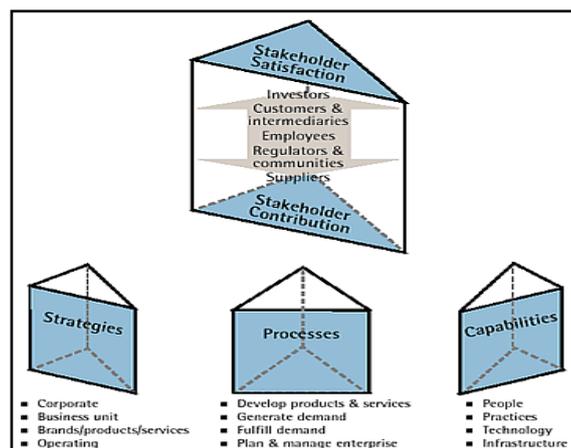


Figure 1. Stakeholder from Performance Prisms Framework

After finding out the key stakeholders, then identify the five perspectives of performance prism. Performance Prism has five aspects. The five facets of the upper and lower sides are stakeholder satisfaction and contribution stakeholders. While the other three sides are strategy, process and capability. Figure 2 is a performance prisms framework that shows five sides of performance prisms.

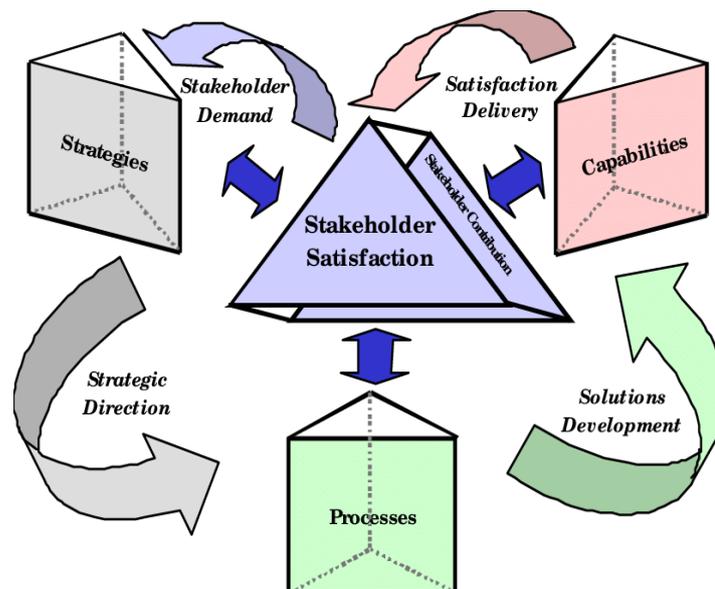


Figure 2. Performance Prisms Framework

Five explanations that are interconnected from the perspective that exists on performance prism, can be identified with five key questions to measure design, namely stakeholder satisfaction, strategies, processes, capabilities, and contribution stakeholders. Questions about stakeholder satisfaction around who are key stakeholders and what they want and need.

After identifying five perspectives of performance prism, the next step is to create a key performance indicator (KPI) based on the identification of the 5 perspectives of performance prism by brainstorming with the hospital management related to the problem of performance appraisal. KPI is an indicator that provides information to what extent it has succeeded in realizing a predetermined work target [6]. The parameters that have been formulated are then poured into a questionnaire form to be given back to all heads of one house ill in Makassar City to be given weight according to hospital needs. Weight for each category is then processed further using Analytical Hierarchy Process (AHP). AHP is a functional hierarchy with the main input being human.

Because it uses input from human perception, this model can process data that is both qualitative and quantitative in the decision-making process. In addition, AHP has the ability to solve multi-objective and multi-criteria problems based on the comparison of preferences of each element in the hierarchy, so that it becomes a comprehensive decision-making model [7].

Furthermore, the performance measurement model can be combined with a system scoring model. Scoring system is used after the results of the performance measurement system design have been completed. Performance measurement stage by collecting measurement year performance data in the form of realization data or achievement measurement achievement and company predetermined targets. Some scoring system models are OMAX (objectives matrix) and Traffic Light System (TLS) models. Objective Matrix is a method of assessing the performance of a company where the assessment is carried out on qualitative criteria relating to the performance of the company [8]. The OMAX function is to equalize the value scale of each indicator, so that the achievement of each existing parameter can be used to determine the overall performance.

The OMAX scheme above is divided into 3 parts, namely A, B, and C. Part A, is the defining part or determines the factors that affect performance. The second line (performance) is the result of achieving the company's performance in each of the KPIs. Part B, is a quantifying part, in this section is determined the division of performance achievement levels from level 10 (highest) to the lowest level (0).

Level 10 is the highest level of achievement or a target set by the company. The level of achievement of the initial matrix operated (achievement of previous company performance) is placed at level 3, and below level 3 is the achievement that is worse than the initial performance or the worst performance as

long as the company operates (zero level). Section C, is a monitoring part as an analysis of level, weight, and value for each KPI.

Line level or score is filled in accordance with the level of achievement of the KPI that has been determined in part B. The weight line is filled in according to the weight of each KPI filled by the company. the value line is the result of the assessment or multiplication between the row levels and the weight lines of each KPI.

The Traffic Light System is closely related to the scoring system. Traffic Light System serves as a sign of whether the score of a performance indicator requires an improvement or not. This Traffic Light System indicator is represented by three colors namely green, yellow and red.

The green color is the achievement of performance indicators that have been achieved or even exceeded the target. The OMAX scale starts from values 8 to 10 taken for performance in green. Yellow is the achievement of a performance indicator that has not been achieved, even though the value is close to the target.

So the management must be careful with various possibilities. The OMAX scale starts from values 4 to 7 taken for performance in yellow. Red is the achievement of a performance indicator that is truly below the target set and requires immediate improvement. The OMAX scale starts from 0 to 3 taken for performance in red.

After all KPIs can be identified and structured hierarchically, the next design phase is to weight the KPI to determine the contribution or influence of each indicator on the overall performance of the company. The parameters that have been formulated are then poured into a questionnaire form to be given to the installation head to be weighted according to needs. The weight for each category is then processed with use Analytical Hierarchy Process (AHP). Weighting is carried out 3 times.

The weighting is weighting among stakeholders, weighting between perspectives for each *stakeholder*, and weighting between KPIs in every perspective. Of the three weightings carried out, the overall weighting value will be obtained. To get the KPI weight value for the company can be done on the following ways:

Supplier has stakeholder KPI, namely supplier satisfaction level, length of payment, speed of delivery of goods, level of procurement optimization, evaluation of supplier performance, number of defective products, percentage of product quality standards, goods inspection system, and level of discipline of employees in receiving goods.

Regulators and the community have stakeholder KPIs, namely community satisfaction index, cooperative relations with the community, cooperative relations with health institutions, health counseling to the surrounding community, a long period of collaboration with health or education institutions, evaluation of cooperation in health or education institutions, and competent resources in their field.

3. Result and Discussion

After identifying the perspective of performance prism, then identifying the KPI by interviewing the head of the hospital installation. KPIs were identified as many as 99 KPIs covering 17 KPIs for investor stakeholders, 35 KPIs for stakeholder customers, 16 KPIs for employee stakeholders, 15 KPIs for stakeholder suppliers, and 16 KPIs for regulator and Community stakeholders. Investors have stakeholder KPIs, namely ROI (Return on Investment), total asset turnover rate, level of investment increase, income increase, detailed and accurate financial statements, evaluation of marketing systems, accuracy of hospital tariff databases, and completeness of the hospital tariff database.

Customers have stakeholder KPIs, namely patient satisfaction in outpatient services, AVLOS (Average Length Of Stay), BTO (Bed Turn Over), fulfillment of chemicals and laboratories, fulfillment of logistics materials, laboratory service time response, waiting time at Obgyn installation, completeness of information.

Regarding service lines, and competent human resources. Employees have stakeholder KPIs, namely availability of facilities and infrastructure for employees, availability of training for employees, level of employee discipline, level of employee ability, completion of work according to targets, employee competency level, open employee recruitment, management training budget, application of punish

system and implementation of reward system. To get the KPI weight value for the company can be done in the following ways:

$$\begin{aligned} \text{KPI I-1} &= \text{Weight value stakeholder investor} \times \text{weight perspective satisfaction} \times \\ &\quad \text{Weight value KPI} \\ &= 0,22 \times 0,22 \times 0,2 \\ &= 0,00968 \end{aligned}$$

The overall KPI weight value for the company can be seen in Table 2.

Table 2. Overall Weight Value of one hospital in the city of Makassar

Between Stakeholder		Between Perspective		Between KPI		Overall Weight Value
Stakeholder	Bobot	Five Perspective	Weight	KPI	Weight	
Investor	0,22	Satisfaction	0,22	KPI I-1	0,20	0,00968
		Contribution	0,21	KPI I-6	0,36	0,01663
		Strategies	0,18	KPI I-9	0,35	0,01386
		Process	0,20	KPI I-12	0,31	0,01364
		Capabilities	0,19	KPI I-15	0,32	0,01338
Customer	0,20	Satisfaction	0,19	KPI C-1	0,10	0,00380
		Contribution	0,21	KPI C-13	0,16	0,00672
		Strategies	0,22	KPI C-19	0,15	0,00660
		Process	0,20	KPI C-26	0,16	0,00640
		Capabilities	0,18	KPI C-33	0,37	0,01332
Employee	0,19	Satisfaction	0,17	KPI E-1	0,30	0,00969
		Contribution	0,24	KPI E-4	0,33	0,01505
		Strategies	0,18	KPI E-7	0,32	0,01094
		Process	0,22	KPI E-10	0,35	0,01463
		Capabilities	0,19	KPI E-13	0,29	0,01047
Supplier	0,18	Satisfaction	0,18	KPI S-1	0,32	0,01037
		Contribution	0,18	KPI S-4	0,31	0,01004
		Strategies	0,17	KPI S-7	0,31	0,00949
		Process	0,23	KPI S-10	0,31	0,01283
		Capabilities	0,24	KPI S-13	0,35	0,01512
Regulator	0,20	Satisfaction	0,22	KPI R-1	0,27	0,01188
		Contribution	0,27	KPI R-5	0,36	0,01944
		Strategies	0,16	KPI R-8	0,31	0,00992
		Process	0,19	KPI R-11	0,31	0,01178
		Capabilities	0,16	KPI R-14	0,33	0,01056

After obtaining the KPI as a parameter of hospital performance measurement, then the preparation of the performance measurement record sheet for each KPI is carried out. The preparation of record sheet performance measurement is done by interviewing the head of the installation regarding the objectives, formulas, target levels, data sources, who is responsible and who plays a direct role in the measurement. After preparing the performance measure record sheet, the next step is collecting the necessary data. Data retrieval is carried out at each installation as stated in the performance measure record sheet. In the process of performance measurement, it is needed consisting of input data from each performance indicator (KPI) in accordance with the formulation, the target of each KPI and its realization. The data used in this measurement and performance assessment are performance achievement data for each criterion in the 2010 and 2011 periods.

Besides score, part of monitoring is weight. Weight states the weight of the KPI-KPI to be measured. The weight value obtained comes from AHP processing. Value states the results of the multiplication of the score with weight.

Performance indicators state the number of values of all criteria that have been measured. From the calculation of the performance indicator by adding up the total values of all the existing criteria, the value of 7.9 is obtained. Traffic Light System uses three colors, namely green with a threshold of 8 to 10 meaning that the achievement of a KPI has been reached, the color yellow with a threshold of 3 to 7 means that the achievement of a KPI is not yet achieved, although the value is close to the target, the management must be careful of the various possibilities, the red color with a threshold smaller or equal to 3 means that the achievement of a KPI is really below the target set based on the characteristics of the organization and business activities therein.

From the results of performance measurement that has been done, obtained a total performance index value of 7.9 as a result of scoring using Objectives matrix method (OMAX) and when using traffic light system is in the yellow category which indicates that the overall hospital performance can be said not achieve the expected performance. Improved performance in 99 KPIs was prioritized starting from 3 KPIs in the red category and 28 KPIs in the yellow category.

Recommendations for improvement include implementing a CRM (Customer Relationship Management) strategy, fostering good relations with the surrounding community and providing solutions to auditor requests.

References

- [1] Vanani, I. 2009. Performance Measurement: Model dan Aplikasi. Surabaya: ITS Press.
- [2] Neely, N. and Adams, C. 2001. Managing with measures: The stakeholder Perspective, Cranfield School of Management, Andersen Consulting.
- [3] Neely, N. and Adams, C. 2001. Perspectives on Performance: The Performance Prism, Centre for Business Performance, Cranfield School of Management, UK.
- [4] Neely, A.D., and Kennerley, M. 2000. Performance measurement framework, Centre for Business Performance, Cranfield School of Management, UK.
- [5] Neely, N. and Adams, C. 2001. The Performance Prism to boost M&A Success, Cranfield School of Management, Andersen Consulting.
- [6] Retrieved from <http://strategimanajemen.net>
- [7] Saaty, T. L. 1988. Pengambilan Keputusan Bagi Para Pemimpin, Proses Hirarki Analytic Untuk Pengambilan Keputusan Dalam Situasi Yang Kompleks. Terjemahan Liana Setiono. Jakarta: PT. Pustaka Binaan Pressindo.
- [8] Riggs, J. 1985. Production System, Prentice Hall.