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## PERFORMANCE MEASUREMENT USING PERFORMANCE PRISM METHOD: EMPIRICAL EVIDENCE OF A NATIONAL LOGISTIC COMPANY IN INDONESIA

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### ABSTRACT

The aim of this descriptive explorative research was to identify the performance aspects namely satisfaction, participation, tricks, procedures and competence of each stakeholder of the national logistic company named Dinamika Muda Mandiri in Jakarta, Indonesia. Some problems related to logistic were the indication of bottleneck in the warehouse performance process which led to high lead time as well as the absence of warehouse performance evaluation. This research was analyzed using the method of Performance Prism with the supporting method of Analytical Hierarchy Process and with measurable factors such as satisfaction and contribution of stakeholder, strategy, process, and capability. The conclusion of this research with the aid of Analytical Hierarchy Process method was that in general the company warehouse of Dinamika Muda Mandiri could do the job well in accordance with the wish of stakeholders, like management and investors, but it needed to be improved in the customer side. Performance Measurement using the method of Performance Prism was expected to be periodically reviewed in order that the performance variables and Key Performance Indicators could be aligned with the recent condition progress.

**KEYWORDS:** analytical hierarchy process, key performance indicators, performance measurement, performance prism, logistic warehouse, company operational performance

### 1. INTRODUCTION

In line with Indonesia's economic development companies grow, improve, and maintain their performance to have a selling point and competitiveness. In this case, managing company performance system is very necessary. Companies concentrate on Supply Chain Management system, which is one of the several components playing an important role, especially for the companies running in the logistic and warehouse sector. Delivery service and manufacturing companies have or carry out a rental warehouse in the form of an area or location for storing raw materials, goods in process, and



finished goods. Warehouse must be managed in a good and appropriate way, considering its function as a place for storing a number of production goods in a certain period prior to distribution invitation. Dinamika Muda Mandiri is a private company located in Jakarta, running logistic activities with the main focus on the distribution of telecommunication equipment. Dinamika Muda Mandiri indirectly helps the process of improving the quality of people communication because it can reach the areas difficult to be accessed by other companies with the expectation to give impacts of good communication quality to the people in those areas. To run the company's main activities, the warehouse has been equipped with a logistic system that functions to record the flow of goods movement, starting from goods arrangement, goods storing until goods delivery. The logistic system also provides the description or details of status and condition of the goods stored in the warehouse. The function of Dinamika Muda Mandiri's warehouse is to store its customers' materials or equipment. The materials are used for the activity of improving communication quality like antenna installment and renewal of performance supporting equipment from the communication providers. The materials include antenna, modem, cable, and others. The importance of warehouse for a company becomes the basis for necessary evaluation and Performance Measurement to conclude the warehouse effectiveness whether it has operated and functioned maximally for the company or even made a loss. In addition, the evaluation and measurement also function to know the things that affect the warehouse work process. A company that manages a warehouse must be able to monitor and measure the condition and performance of warehouse to avoid suffering losses due to the damage or loss of materials or goods stored in the warehouse.

The method that can be used for calculating and measuring the warehouse performance is Performance Prism. The tool of analysis includes the wish of the company stakeholders. Another method is Balanced Scorecard, a method of performance measurement and appraisal using four perspectives: finance, consumer, internal business system, learning and growth. There is an indication of bottleneck in a random delivery when the process of goods receiving and delivery uses container trucks, where the arrival and departure of the container trucks are based on Dinamika Muda Mandiri's customer request.

There is an indication of bottleneck in the warehouse performance process which affects the lead time whereas there has been no Performance Measurement of Dinamika Muda Mandiri warehouse, so the researchers intend to carry out a Performance Measurement of warehouse and to know the factors most influencing the warehouse performance, and to know whether the warehouse is making profit or loss. In order to know the need for Performance Measurement, a preliminary survey has been done with five indicators: goods arrangement, goods storing, warehouse system, loading time, and unloading time. The preliminary survey was done to 15 respondents and it found bad results in the warehousing system as big as 60 percent, in loading time as big as 53 percent and in unloading time



as big as 53 percent. Since the warehouse Performance Measurement does not measure finance, learning and growth, and internal business process, the Performance Measurement uses the method of Performance Prism.

In the previous research, according to (Yadav & Sagar, 2013), management-based Performance Measurement has been generally used to measure performance. Some previous researchers like (Irfani et al., 2019; Reefke & Trocchi, 2013; Shaik & Abdul-Kader, 2012; Thakkar, 2012) have proposed that logistic performance management can use the system of Performance Measurement. Companies need to evaluate their performance from various perspectives as the guidance in the Performance Measurement (Sorooshian et al., 2016; Striteska & Spickova, 2012). Logistic performance evaluation has been done before, among others by the World Bank (Ojala & Çelebi, 2005). In the Warehouse Performance Measurement through Key Performance Indicators (KPIs), (Murphy & Wood, 2008) state that warehouse manager needs to make a periodic data analysis. The study by (Kucukaltan et al., 2016) mentions the need for KPI measurement model to identify the main performance indicators and different stakeholders in the logistic industry. Warehouse workers in the cargo handling in a logistic company have a fairly high risk and get negative impact on their health if they are exposed to chemical substances (Lovas et al., 2021). Other previous researches have been done by (Faveto et al., 2021; Marziali et al., 2021; Tokat et al., 2022) using KPIs especially for warehouse performance. Whereas the Analytical Hierarchy Process related to Performance Measurement has been done by (Kusrini et al., 2019; Shaik & Abdul-Kader, 2012; Tadesse et al., 2022), before.

Performance Prism (PP) Model is designed to improve the previous model and aligned with the company environment (Neely et al., 2001, 2003). According to (Neely et al., 2003), company performance must consider its effectiveness and efficiency, and PP model measures the company performance in terms of stakeholder satisfaction and contribution. PP provides the whole information that company performance needs various perspectives such as employee, process, and customer (Aki Jaaskelainen, 2013). Some researches using PP model have been done before by (H. J. Liu et al., 2018; Neely et al., 2001; Severgnini et al., 2018; Youngbantao & Rompho, 2015).

Based on this background, performance measurement process is carried out to visualize the performance of Dinamika Muda Mandiri warehouse by using PP method. The reference of performance measurement as a breakthrough involves stakeholders and considers a number of parts of each stakeholder's need and goal. It is expected to be able to determine the critical success performance and to improve the performance. From this background, some problems can be identified as follows: (1) Indication of no overall warehouse Performance Measurement. The previous measurement measures only personal performance, (2) Indication of bottleneck in the warehouse performance process which causes a high lead time, (3) Indication of not considering satisfaction and



full contribution of stakeholders, just concerned with the satisfaction of customers, employees and community, and (4) Indication of not conducting an identification of strategy, process and potency owned by the company to achieve stakeholder satisfaction. Based on the problem identification that has been stated, warehouse performance approach can be implemented from various perspectives such as from stakeholders including owners, consumers, suppliers, employees, and surrounding people, strategies, processes, capabilities, and stakeholder contribution. Therefore, it uses Prism Performance method to measure the warehouse performance of Dinamika Muda Mandiri because this method is regarded as appropriate for measuring and evaluating performance.

## **2. LITERATURE REVIEW**

### **Company Operational Performance**

Performance is a description of the achievement level of pelaksanaan suatu a program or policy to achieve the organization's targets, goals, vision and missions stated in the strategic plan (Gibson et al., 2012; Ricardianto, 2018). Performance is the value of series of employee behavior that contributes both positively and negatively to the achievement of organizational goals (Bacal, 2015; Colquitt et al., 2015). According to Brumbch, performance can be seen from the perspectives of result, process, or behavior that led to the goal achievement (Armstrong, 2009). Company Performance according to (Neely et al., 2002) must consider the effectiveness and efficiency of an action done by the existing parties in the company.

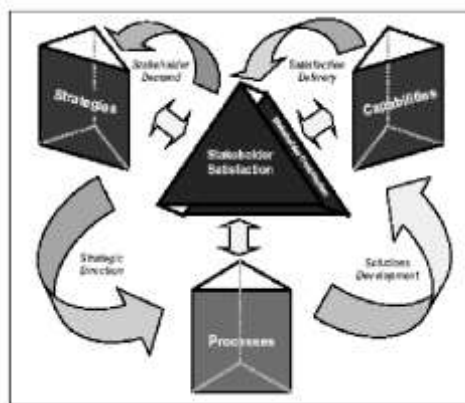
### **Performance Measurement**

According to (Neely & Adams, 2000), there are three popular models of integrated Performance Measurement system widely used in industries, namely: Balanced Scorecard, Integrated Performance Measurement System (IPMS) and Performance Prism. Moreover, (Neely et al., 2002; Striteska & Spickova, 2012) state that Performance Measurement is a process of quantifying the efficiency and effectiveness of past actions (Neely et al., 2002). In the early nineteenth century, management and cost accounting-based Performance Measurement was widely used to measure performance (Yadav & Sagar, 2013). Performance Measurement according to (Cuthbertson & Piotrowicz, 2011) is a process that depends on the context, adjusted to special requirements. Performance Measurement is also an indicator for measuring effectiveness and efficiency (Shepherd & Gunter, 2006; Shepherd & Günter, 2010).

### **Performance Prism**

Theoretically, Performance Prism (PP) according to (J. Liu et al., 2016; Neely et al., 2001, 2002) is a thinking method that integrates five interrelated perspectives and provides a structure that allows executives to determine the answers for five basic questions, namely: stakeholder satisfaction, strategy, process, capability, and stakeholder contribution (Figure 1). By using PP method, the

stakeholders who play roles in the Performance Measurement according to (Friedman & Miles, 2006) are shareholders, customers, suppliers, employees and local communities. A comprehensive measurement framework discusses the main business problems in many organizations (Neely et al., 2001). The design process steps of PP system specifically using PP model according to (Neely et al., 2003) are identifying what stakeholders need and want, identifying what stakeholder contribution wanted, and identifying the strategy, processes, and capabilities needed by the company to satisfy each stakeholder's need and want.



Source: (Neely et al., 2002)

Figure 1. The Prism Fields of Performance Prism

### Key Performance Indicators

According to (Asih et al., 2020; Barreto-Maceda et al., 2021; Gabcanova, 2012; Warren, 2011) Key Performance Indicators (KPIs) are the measurement that evaluate how an industry or company can establish its organizational strategic goals and vision. In addition, identifying measurable goals, seeing the trend and supporting decision making are also the use of KPIs (Baneerje & Bueti, 2012). KPIs measurement according to (Torbacki & Kijewska, 2019) consists of three-dimension perspectives namely industry, logistics and sustainable development in product distribution. In the warehouse Performance Measurement through KPIs, according to (Murphy & Wood, 2008), the warehouse manager needs to conduct a periodic data analysis.

Therefore, it can be synthesized that KPIs are a quantitative measurement in the organizational performance evaluation with various perspectives and become a reference for the target achievement of an organization. Stakeholders can be divided into two, namely main stakeholders or commonly called Primary Stakeholders and the other stakeholders are supporting stakeholders or can be called Secondary Stakeholders. Main Stakeholders are related to and affect the running of a company. They are shareholders, suppliers, customers, employees, and competitors. Whereas the other stakeholders,



among others, are communities, environmental or social activist groups, and the government with their policies (Ma et al., 2018).

### **3. RESEARCH METHODS**

The method of Data Analysis used was Performance Prism with the supporting method of Analytical Hierarchy Process. The factors to be measured are; (1) Stakeholder satisfaction, (2) Strategies, (3) Processes, (4) Capabilities, (5) Stakeholder contribution, and (6) Performance. The methods of data gathering to be used in Dinamika Muda Mandiri were direct data taking, interview, questionnaire and brainstorming. Stakeholder's want and need, expected stakeholder contribution, strategies and capabilities to be developed were independent variables of this research. The dependent variables were the system and operational performance of Dinamika Muda Mandiri warehouse. The selected sourcepersons were those with the occupation of management representative, warehouse manager, human resource development manager, procurement manager, and delivery manager. Several steps of data processing were taken such as; (1) Designing the Performance Measurement and Performance Prism, (2) Validating the Key Performance Indicators, weighting by using the method of Analytical Hierarchy Process, and (3) Analysis and discussion steps followed by finding the target of company performance and action plan to realize the performance improvement program based on the Key Performance Indicators (KPIs) which need to be accomplished soon. In order to weigh the KPIs, a calculation of average scores given by each respondent was done first. The next calculations were calculating eigen value, lamda max, consistency index and random index, and subsequently calculating the Consistency Ratio (CR).

### **4. RESULTS AND DISCUSSION**

#### **Company Stakeholders Identification**

Before setting and measuring the company performance, the researchers identified the stakeholders having important contribution in the company sustainability. As intended, the identification was done through some interviews with the warehouse manager of Dinamika Muda Mandiri as the person in charge.

#### **Identification of the Five Sides of Performance Prism**

Identification of the five sides of Performance Prism was conducted through an interview by which the questions have been developed based on five key questions. The aim was that the questions were focused and the answers from the stakeholders of Dinamika Muda Mandiri right on target according to the data to be obtained. The following are details of questions addressed to each stakeholder: (1) What are needed and wanted by the stakeholders from the warehouse of Dinamika Muda Mandiri?, (2) What are needed and wanted by the warehouse of Dinamika Muda Mandiri from the stakeholders?, (3) What strategies can be used to fulfill the stakeholder's want and need?, (4) What process must be



fulfilled to succeed the strategies?, and (5) What capabilities the warehouse of Dinamika Muda Mandiri must have to implement the process?

**Identification of Key Performance Indicator Parameters**

The result of interview is communicated again to the management representative and warehouse manager so as to determine a number of performance parameters in accordance with the basic framework of Performance Prism and the real condition of Dinamika Muda Mandiri warehouse. The next step is to weigh the KPIs by using the method of Analytical Hierarchy Process aimed to know the importance of each KPI according to Stakeholder’s opinion (Table 1 – Table 5).

**Table 1 Key Performance Indicators Weight by the Criteria of Leader**

Level 2		Weight of Each Level		Level 4		
Name of Criterion	Criterion Weight	Name of Sub-Criterion	Sub-Criterion Weight	KPI	Weight	KPI Weight
Leader	0.420997558	Satisfaction	0.409877237	P-1	0.487437	0.084110807
				P-2	0.512563	0.088446509
		Contribution	0.080923986	P-3	0.436693	0.014877617
				P-4	0.563307	0.019191184
		Strategy	0.13183125	P-5	0.445289	0.02471384
				P-6	0.554711	0.030786795
		Process	0.139667175	P-7	0.411745	0.024210389
				P-8	0.588255	0.034589151
		Capability	0.237700352	P-9	0.590617	0.059103784
				P-10	0.409383	0.040967483

**Table 2 Key Performance Indicators Weight by the Criteria of Customer**

Level 2		Weight of Each Level		Level 4		
Name of Criterion	Criterion Weight	Name of Sub-Criterion	Sub-Criterion Weight	KPI	Weight	KPI Weight
Customer	0.062514035	Satisfaction	0.380947625	C-1	0.546082	0.013004705
				C-2	0.453918	0.010809868
		Contribution	0.081320179	C-3	0.461967	0.002348478
				C-4	0.538033	0.002735175
		Strategy	0.14070532	C-5	0.579784	0.005099815
				C-6	0.420216	0.003696242
		Process	0.156563035	C-7	0.636138	0.006226131
				C-8	0.363862	0.003561257

Capability		C-9	0.387822	0.005829882
	0.24046384	C-10	0.612178	0.009202483

**Table 3 Key Performance Indicators Weight by the Criteria of Supplier**

Level 2		Weight of Each Level		Level 4		
Name of Criterion	Criterion Weight	Name of Sub-Criterion	Sub-Criterion Weight	KPI	Weight	KPI Weight
Supplier	0.145196288	Satisfaction	0.386610121	S-1	0.436693	0.024513496
				S-2	0.563307	0.031620858
				S-3	0.470644	0.005595804
		Contribution	0.081886828	S-4	0.529356	0.006293859
				S-5	0.756783	0.018387442
		Strategy	0.167337955	S-6	0.243217	0.005909408
				S-7	0.395547	0.008350805
		Process	0.145403311	S-8	0.604453	0.012761216
				S-9	0.355829	0.011302351
		Capability	0.218761785	S-10	0.644171	0.020461048

**Table 4 Key Performance Indicators Weight by the Criteria of Employee**

Level 2		Weight of Each Level		Level 4		
Name of Criterion	Criterion Weight	Name of Sub-Criterion	Sub-Criterion Weight	KPI	Weight	KPI Weight
Employee	0.129527266	Satisfaction	0.419146745	K-1	0.620424	0.033683383
				K-2	0.379576	0.020607549
				K-3	0.571266	0.005435622
		Contribution	0.073459826	K-4	0.428734	0.004079429
				K-5	0.403914	0.008662398
		Strategy	0.165572344	K-6	0.596086	0.012783735
				K-7	0.436693	0.007788331
		Process	0.137691362	K-8	0.563307	0.010046454
				K-9	0.659442	0.017435876
		Capability	0.204129723	K-10	0.340558	0.009004489



**Table 5 Key Performance Indicators Weight by the Criteria of Government and Community**

Level 2		Weight of Each Level		Level 4		
Name of Criterion	Criterion Weight	Name of Sub-Criterion	Sub-Criterion Weight	KPI	Weight	KPI Weight
Government and Community	0.241764853	Satisfaction	0.375309919	M-1	0.387822	0.03518971
				M-2	0.612178	0.055547037
		Contribution	0.079613006	M-3	0.596086	0.011473236
				M-4	0.403914	0.00777439
		Strategy	0.16813682	M-5	0.445289	0.018100821
				M-6	0.554711	0.022548753
		Process	0.195781246	M-7	0.411745	0.019489114
				M-8	0.588255	0.027843911
		Capability	0.181159008	M-9	0.563307	0.02467164
				M-10	0.436693	0.019126241

From the weighting results using the method of Analytical Hierarchy Process it can be analyzed that the highest weight of criterion is for leader (0.421) and the lowest is for customer (0.063). The highest weight of sub-criterion for leader is on stakeholder satisfaction (0.409) and the lowest is on stakeholder contribution (0.081), whereas the highest weight of sub-criterion for customer is on stakeholder satisfaction (0.381) and the lowest is on stakeholder contribution (0.081). The KPI's highest weight of stakeholder satisfaction for leader is P-2 or current ratio (0.513) and the lowest is P-1 or accuracy in conveying management report (0.487), whereas the KPI's highest weight of stakeholder contribution for leader is P-4 or Idea, Suggestion (0.563) and the lowest is P-3 or budget allocation (0.436). The KPI's highest weight of stakeholder satisfaction for customer is C-1 or quality standard (0.546) and the lowest is C-2 or standard quality (0.454), whereas the KPI's highest weight of stakeholder contribution for customer is C-4 or repurchase (0.538), and the lowest is C3 or convenience of payment (0.462). From the analysis it can be concluded that the lowest weight is convenience of payment with the weight of (0.462).

**DISCUSSION**

Based on the result of Performance Prism research through five Criteria namely shareholders, customers, suppliers, employees and local communities by weighting Key Performance Indicators using the method of Analytical Hierarchy Process, this research supports some previous researches. This research is in line with the study (Firstyani & Wibisono, 2016; Sorooshian et al., 2016) stating that the Performance Measurement System is designed to be able to evaluate and measure the



performance level shown by a company and aimed to achieve the maximum satisfaction level in the company performance. This research is also in line with some studies (Bhagwat & Sharma, 2007; Gaudenzi & Borghesi, 2006; Shaik & Abdul-Kader, 2012) related to the performance measurement using the method of Analytical Hierarchy Process in the logistic business and supply chain management. This measurement of Key Performance Indicators related to warehouse operational performance in the logistic industry also supports the results of some researches (Asih et al., 2020; Kucukaltan et al., 2016; Neri et al., 2021; Tokat et al., 2022). Whereas the use of measurement with the method of Performance Prism in some previous researches (Afifah et al., 2022; Goharshenasan et al., 2021; Nuryadin et al., 2019) is also in line with this research.

## **5. CONCLUSION AND IMPLICATION**

The Performance Measurement that considers five elements namely stakeholder's satisfaction and contribution, strategies, processes and capabilities in the warehouse of Dinamika Muda Mandiri Jakarta can be conducted by using the method of Performance Prism where this tool of analysis is an improvement of the existing Performance Measurement like balanced scorecard so that the Performance Measurement which can be done by using the method of Performance Prism does not only measure the performance from physical target like financial use, or income-outcome, but from the dimension of organizational performance.

From the analysis of Performance Measurement using the method of Performance Prism, it can be concluded that with the aid of Analytical Hierarchy Process method, in general the Dinamika Muda Mandiri warehouse can perform its work well in accordance with stakeholders' want from the company side, but it needs improvement from the customer side. In order that the improvement, be more effective and efficient in the stakeholder contribution and stakeholder contribution there are two KPIs namely C3 in the convenience of payment and C4 in the repurchase. For further research, it is expected to contribute additional work variables such as method addition/integration and sample addition from all related stakeholders.

### **Implication**

From the conclusion obtained by processing the data of criteria, sub-criteria up to KPIs of Dinamika Muda Mandiri warehouse, it is known that customers want convenience of payment. So, this research recommends the company warehouse of Dinamika Muda Mandiri to provide some additional alternatives for customers to pay for the services delivered by the Dinamika Muda Mandiri warehouse so that they can do the payment more easily. If this customer want cannot be realized, it may give an impact of not maximal payment transaction between the customers and the services delivered by the Dinamika Muda Mandiri warehouse.



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