Performance Evaluation of Dolomite Fertilizer Production: AHP and Scoring System Approach Based on Performance Prism

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Abstrak

Produksi pupuk sering menghadapi berbagai masalah kinerja yang dapat mempengaruhi efisiensi dan produktivitas. Salah satu permasalahan utama adalah ketidakstabilan kualitas bahan baku, yang bisa mengakibatkan variasi dalam kualitas produk akhir. Kinerja tenaga kerja juga menjadi faktor penting, dimana pelatihan yang tidak memadai dan motivasi yang rendah dapat mengurangi produktivitas. Kurangnya sistem pengukuran kinerja yang tepat, seperti Key Performance Indicators (KPIs) yang relevan dan akurat, dapat menyulitkan perusahaan dalam memonitor dan meningkatkan kinerjanya secara keseluruhan. Untuk mengatasi tantangan tersebut, diperlukan suatu sistem pengukuran kinerja yang dapat mengintegrasikan berbagai aspek perusahaan (stakeholder). Sistem pengukuran kinerja ini harus mampu mengakomodasi kepentingan dari berbagai pihak yang terlibat dalam operasional perusahaan sehingga dapat menghasilkan informasi yang lebih akurat dan relevan. Pendekatan pengukuran kinerja yang dimaksud dikenal dengan istilah *Performance Prism*. Kemudian didukung dengan menggunakan metode *Objective Matrix* (OMAX) untuk menentukan perangkingan serta perhitungan kelas pencapaian masing-masing KPI dan *Traffic Light System* (TLS). Berdasarkan hasil pengukuran kinerja dengan metode *Performance Prism*, *Analytic Hierarchy Process* (AHP), dan *Scoring System* pada PT. XYZ, terdapat 53 KPI yang terbagi ke dalam berbagai *stakeholder*. Dari analisis ini, dapat disimpulkan bahwa perancangan pengukuran kinerja perusahaan mencakup beragam aspek yang melibatkan *stakeholder* internal dan eksternal perusahaan. Indeks total kinerja sebesar 13,43 menunjukkan adanya kinerja yang baik secara keseluruhan. Dalam hal ini, total KPI yang digunakan yakni 53 KPI yang meliputi 10 KPI pada *stakeholder* karyawan, 5 KPI pada *stakeholder* pemilik, 10 KPI pada *stakeholder* pelanggan, 5 KPI pada *stakeholder* pemerintah, 4 KPI pada *stakeholder* investor, 10 KPI pada *stakeholder* supplier, 4 KPI pada *stakeholder* mitra, dan 5 KPI pada *stakeholder* masyarakat sekitar. Jika dilihat pada hasil *Objective Matrix* (OMAX) dan *Traffic Light System* (TLS) dapat diketahui bahwa 47 KPI masuk dalam kategori hijau, menandakan pencapaian yang baik, sementara 3 KPI masuk dalam kategori kuning dan 3 KPI lainnya masuk dalam kategori merah, menunjukkan area yang memerlukan perhatian lebih lanjut untuk perbaikan.

Kata Kunci : AHP, produksi pupuk, *performance prism*, indeks total kinerja

Abstract

Fertilizer production often faces various performance issues that can affect efficiency and productivity. One of the main problems is the instability in the quality of raw materials, which can result in variations in the quality of the final product. Workforce performance is also a critical factor, where inadequate training and low motivation can reduce productivity. The lack of an appropriate performance measurement system, such as relevant and accurate Key Performance Indicators (KPIs), can make it difficult for companies to monitor and improve their overall performance. To address these challenges, a performance measurement system is needed that can integrate various aspects of the company (stakeholders). This performance measurement system must be able to accommodate the interests of various parties involved in the company's operations to produce more accurate and relevant information. The performance measurement approach referred to is known as the Performance Prism. It is then supported by using the Objective Matrix (OMAX) method to determine the ranking and class calculation of each KPI and the Traffic Light System (TLS). Based on performance measurements using the Performance Prism, Analytic Hierarchy Process (AHP), and Scoring System at PT. XYZ, there are 53 KPIs divided among various stakeholders. From this analysis, it can be concluded that the design of the company's performance measurement encompasses various aspects involving both internal and external stakeholders. The total performance index of 13.43 indicates overall good performance. In this case, the total KPIs used are 53 KPIs, which include 10 KPIs for employee stakeholders, 5 KPIs for owner stakeholders, 10 KPIs for customer stakeholders, 5 KPIs for government stakeholders, 4 KPIs for investor stakeholders, 10 KPIs for supplier stakeholders, 4 KPIs for partner stakeholders, and 5 KPIs for surrounding community stakeholders. According to the results of the Objective Matrix (OMAX) and Traffic Light System (TLS), it can be seen that 47 KPIs fall into the green category, indicating good achievement, while 3 KPIs fall into the yellow category, and 3 other KPIs fall into the red category, indicating areas requiring further attention for improvement.

Key words : AHP, fertilizer production, performance prism, work performance index

PENDAHULUAN

Innovation and technological advances bring changes to industries related to company operations (Lundgren et al, 2020). So it is very important for companies to proactively maximize the effectiveness and efficiency of operational performance (Krasodomska & Zarzycka, 2020). One of the key strategies that can be implemented by the company is through comprehensive performance measurement based on Key Performance Indicator (KPI). (Garengo et al, 2022; Novita et al., 2021). KPIs explain how to improve performance in a structured and timely manner. Performance measurement is also very important to determine the level of ability of the company (Silaen et al, 2021; An'ars, 2022), whether the company is running well or not (Van Den Ingh et al, 2021). So that companies are triggered to account for their performance through an overall KPI system, one of which is fertilizer production (Bourne, 2021; Knowles, 2023).

Fertilizer production often faces various performance issues that can affect efficiency and productivity. One of the main issues is the instability of raw material quality, which can result in variations in the quality of the final product. Labor performance is also an important factor, where inadequate training and low motivation can reduce productivity. The lack of appropriate performance measurement systems, such as relevant and accurate Key Performance Indicators (KPIs), can make it difficult for the company to monitor and improve its overall performance. All these issues need to be addressed through a holistic and integrative approach to ensure efficient, quality and sustainable fertilizer production.

To overcome these challenges, a performance measurement system is needed that can integrate various aspects of the company (stakeholders) and does not only rely on financial reporting (Knowles, 2023). These stakeholders include investors, customers, labor, suppliers, and the general public (Tirta & Sulindawati, 2023). By involving various stakeholders, this system is able to provide a more comprehensive picture of the company's performance. This performance measurement system must be able to accommodate the interests of various parties involved in the company's operations so as to produce more accurate and relevant information. The performance measurement approach in question is known as Performance Prism (Cahyadi & Aziz, 2022; Ulum, 2019). This method uses a five-sided triangular prism that includes satisfaction, strategy, process, capability, and contribution (Helia et al., 2021; Van Den Ingh et al, 2021). With these five aspects, performance measurement becomes more comprehensive and accurate in describing the company's condition (Pandian dan Abdul-Kader, 2019). Performance Prism is later modified by using the Analytic Hierarchy Process (AHP) method which helps in decision making to solve complex problems by decomposing them into a tiered hierarchy (Imron, 2019; Sudradjat et al, 2020). Furthermore, at the Scoring System stage, the Objective Matrix (OMAX) method is used to map the objectives or criteria to be achieved in the decision-making process (Huda, 2023; Irawan et al, 2023; Ningsih & Astuti, 2022). In addition, the Traffic Light System (TLS) is also used as a tool to determine whether Key Performance Indicators (KPIs) require improvement or not (Hidayatullah et al., 2022). The combination of these methods makes the performance measurement system more effective and efficient in improving company performance (Pulansari et al., 2023).

So the purpose of this research is to develop and implement a comprehensive performance measurement system using the Performance Prism approach modified by the Analytic Hierarchy Process (AHP), Objective Matrix (OMAX), and Traffic Light System (TLS) methods. While the novelty of this research is the use of internal and external stakeholders that integrate various aspects and stakeholders of the company, such as employees, owners, customers, government, investors, suppliers, partners, and the surrounding community, in order to provide a more comprehensive and accurate picture of the company's performance. Thus, it is hoped that this performance measurement system will be able to produce relevant and useful information to improve the effectiveness and efficiency of the company's overall operations, especially in monitoring or knowing information related to the performance or performance of each stakeholder.

RESEARCH METHOD

The research was conducted at a company located in Gresik Regency, East Java, Indonesia. The company is a manufacturing industry engaged in the dolomite fertilizer industry. The time of this research was carried out in February 2024 until the required data was sufficient (Figure 1).
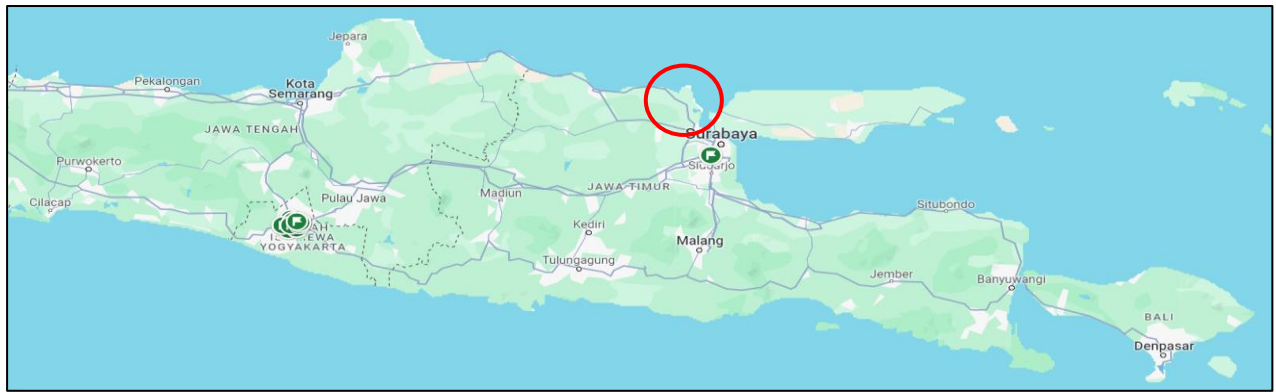
Figure 1. Research Location Map

Research Stages

The problem-solving framework is a series of procedures and steps in research that aim to obtain systematically structured stages, so that research can be carried out effectively and efficiently. The problem solving steps in this research are as follows.
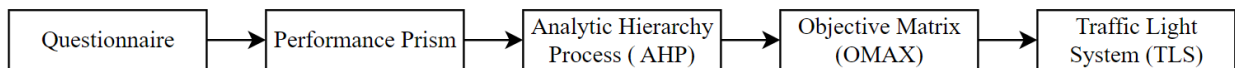

Figure 2. Research Stages

This research has 5 stages, among others: firstly, observations and interviews related to key performance indicators (KPIs) that will be used in compiling the questionnaire. After the KPI is appropriate, the questionnaire is distributed. Secondly, the data processing stage using the Performance Prism approach with 5 perspectives, namely Satisfaction, Strategy, Process, Capabilities and Contribution. Thirdly, the Analytic Hierarchy Process (AHP) calculation is carried out to find the weight on each KPI. Fourthly, scoring system with Objective Matrix (OMAX) model to determine the ranking and calculation of the achievement class of each KPI. Fifth, namely the determination using the Traffic Light System (TLS) to determine the three colors, namely red, yellow and green on each KPI that is good and needs to be improved. In research, variables play an important role in shaping the structure and success of research. The independent variables and dependent variables used in this study are:

Table 1. Research variables

Independent variable	Dependent variable
Employee KPIs	Company's performance to each stakeholder
Owner KPIs	
Customer KPI	
Government KPI	
Investor KPI	
Supplier KPI	
Partner KPI	
Neighboring Community KPI	

Data Analysis

Companies are analyzed using calculations on the Analytic Hierarchy Process (AHP) method to determine the weight of the assessment in group assessments using the geometric mean using the following formula:

$$GM = \sqrt[n]{X1.X2 \dots \dots (Xn)} \dots\dots\dots\dots(1)$$

Description: *GM = Geometric mean; X1 = 1st person assessment; X2 = 2nd person assessment; Xn = nth person assessment (n = number of assessors).* Then the consistency index (CI) is calculated with the following formula:

$$CI = \frac{\lambda \max - n}{n-1} \quad ....(2)$$

Description: CI = *Consistency Index; λmax = Eigen Value; n = Number of elements*

Finally, the AHP method calculates the consistency ratio (CR) using the formula:

$$CR = \frac{CI}{RI} \quad ....(3)$$

Description: *CR = Consistency Ratio; CI = Consistency Index; RI = Random Index*

Table 2. Random Index List

n	1	2	3	4	5	6	7	8	9	10
RI	0,00	0,00	0,52	0,89	1,11	1,25	1,35	1,40	1,45	1,49

If the CR value is <0.1, it can be said that the pairwise comparison matrix is good (the degree of consistency is satisfactory).

Reliability Test

In this case the reliability test is carried out after the questionnaire is filled in, this test is an important step in research because it ensures that the data used is of good quality and reliable. Below are the results of the reliability test based on each stakeholder.
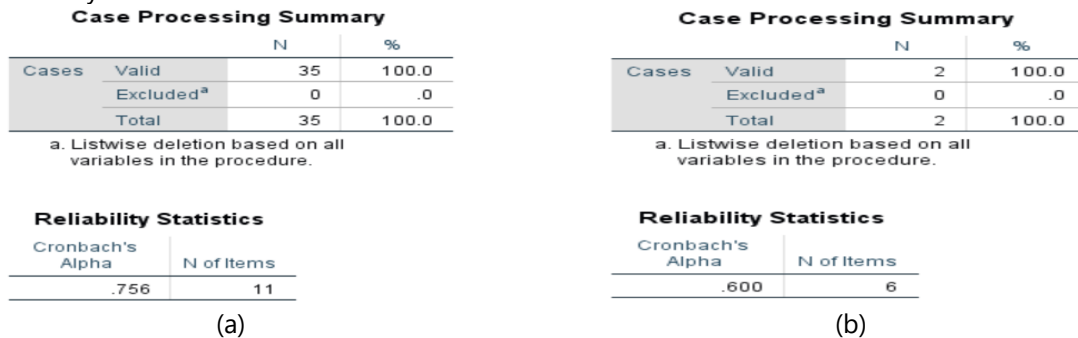

Figure 3. (a) Employee Reliability Test Results; (b) Owner Reliability Test Results

According to Imam Ghozali (2016), a variable is said to be reliable if the Cronbach Alpha value is> 0.70. In the SPSS calculation above, it can be seen that the value of Cronbach Alpha is 0.756. This shows that the employee questionnaire is said to be reliable. In the SPSS calculation above, it can be seen that the value of Cronbach Alpha is 0.6. This shows that the employee questionnaire is said to be unreliable, which is due to the limitations of company respondents.

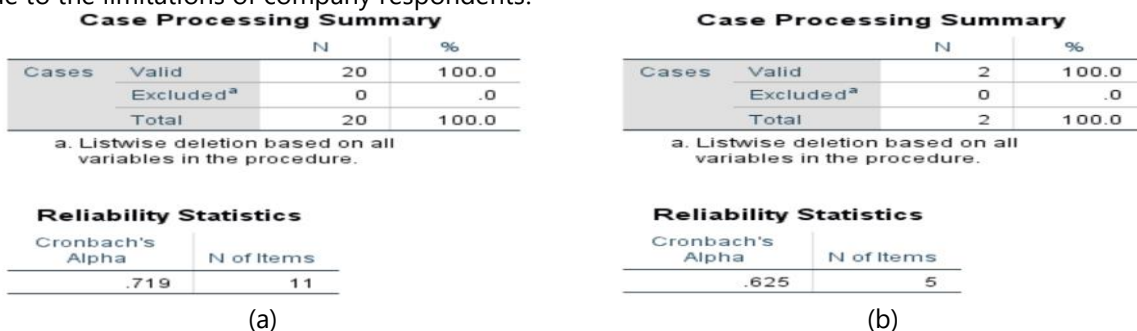Figure 4. (a) Customer Reliability Test Results; (b) Investor Reliability Test Results

According to Imam Ghozali (2016), a variable is said to be reliable if the Cronbach Alpha value is> 0.70. In the SPSS calculation above, it can be seen that the value of Cronbach Alpha is 0.719. This shows that the Customer questionnaire is said to be reliable. In the SPSS calculation above, it can be seen that the

value of Cronbach Alpha is 0.625. This shows that the Investor questionnaire is said to be unreliable, which is due to the limitations of company respondents.

Case Processing Summary

		N	%
Cases	Valid	10	100.0
	Excluded^a	0	.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.712	11

(a)

Case Processing Summary

		N	%
Cases	Valid	5	100.0
	Excluded^a	0	.0
	Total	5	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

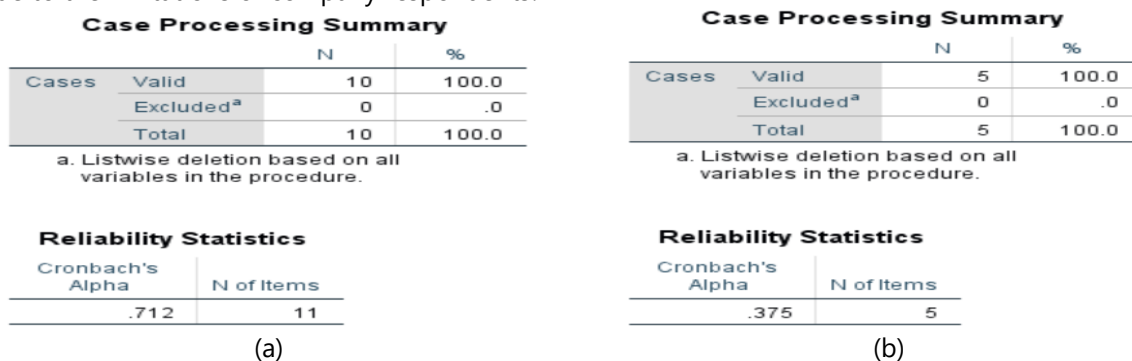| Cronbach's Alpha	N of Items
.375	5

(b)

Figure 5. (a) Supplier Reliability Test Results; (b) Partner Reliability Test Results

According to Ghozali (2016), a variable is said to be reliable if the Cronbach Alpha value is> 0.70. In the SPSS calculation above, it can be seen that the value of Cronbach Alpha is 0.712. This shows that the Supplier questionnaire is said to be reliable. In the SPSS calculation above, it can be seen that the Cronbach Alpha value is 0.375. This shows that the Partner questionnaire is said to be unreliable, which is due to the limitations of company respondents.
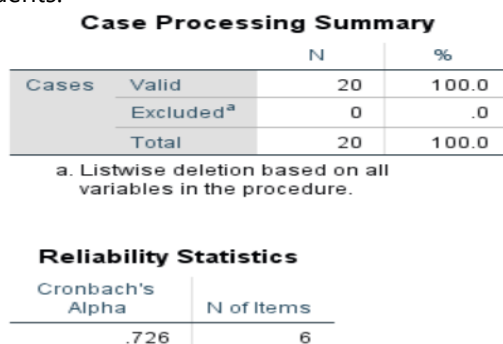
Case Processing Summary

		N	%
Cases	Valid	20	100.0
	Excluded^a	0	.0
	Total	20	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.726	6

Figure 6. Neighborhood Community Reliability Test Results

A variable is said to be reliable if the Cronbach Alpha value is> 0.70. In the SPSS calculation above, it can be seen that the value of Cronbach Alpha is 0.726. This shows that the surrounding community questionnaire is said to be reliable.

Performance Prism

In measuring the Performance Prism model, things are measured regarding 5 perspectives including Satisfaction (satisfaction), strategy (strategy), process (process), Capabilities (ability) and Contribution (contribution) stakeholders. Based on the explanation, Satisfaction includes how well the organization meets the expectations, needs, and values that are considered important by stakeholders. Strategy is what strategy the company takes to meet the needs of its stakeholders. Process is how the company does to realize the strategy. Meanwhile, capability is the capability of the company to carry out the process. And finally Contribution measures the extent to which the organization provides benefits to different stakeholders. Indicators are KPIs for each stakeholder and these indicators are adjusted to the 5 perspectives of performance prism. The results of the identification of KPI (Key Performance Indicators) can be seen in Table 3 below.

Table 3. KPI division based on Performance Prism

	SATISFACTION	
No	**Stakeholders**	**Indicator**
1	Employee	Guaranteed social and health benefits
		Fair treatment from leaders
		Provision of appropriate wages

2	Owner	Maintaining service systems, SOPs, and rules are well enforced
3	Customer	Good customer service
		Ease of payment transactions
4	Government	Infrastructure development such as roads, electricity, and telecommunications
5	Investors	Between investors and companies have their own benefits
6	Supplier	Low rate of returned goods
		There is a price agreement between the company and the supplier
7	Partners	The preparation of a memorandum of understanding (MoU) is fast and as expected
8	Neighboring Community	Job openings

STRATEGY

No	Stakeholders	Indicator
1	Employee	Employees take good care of company facilities
		Safe and comfortable working environment
2	Owner	Realization of operating costs in accordance with the budget
		Ease of getting the desired product
3	Customer	Competitive product prices
		Having product characteristics or what distinguishes it from others
4	Government	The existence of regulations and policies that govern aspects of the company's business such as tax, environment, labor, and others
5	Investors	Income security in investing
6	Supplier	Ease of ordering goods
7	Partners	Administration in the cooperation process is carried out easily and clearly
8	Neighboring Community	Healthy competition in labor recruitment

PROCESS

No	Stakeholders	Indicator
1	Employee	Improvement of inadequate performance
2	Owner	Transparent balance sheet/profit reporting to relevant stakeholders
3	Customer	Good product quality (no defects)
		Delivery of products to customers on time
4	Government	Responsible for enforcing business-related laws and addressing violations committed by the company
5	Investors	The existence of Return On Investment (ROI) / percentage of profit obtained from the total amount of assets invested
6	Supplier	Payment accuracy
		Sufficient lead time between order and delivery
7	Partners	Reporting of the final results of cooperative activities has been made and communicated
8	Neighboring Community	Cooperation in risk control, both social and environmental risks

CAPABILITIES

No	Stakeholders	Indicator
1	Employee	Employees participate in job skills training
		Rewarding achievements
2	Owner	Setting an example of good business ethics
3	Customer	Speed of handling complaints from customers
		Product return and exchange services

4	Government	Provision of data and information needed by the company to make the right business decisions
5	Investors	Between investors and companies have their respective benefits
6	Supplier	Suppliers can fulfill all the quantities of goods ordered by the company There is company trust in the goods supplied
7	Partners	Administration in the cooperation process is carried out easily and clearly
8	Neighboring Community	Become a supplier both in raw materials, labor and other services

CONTRIBUTION

No	Stakeholders	Indicator
1	Employee	Employees work according to the SOP given Do not hesitate to give suggestions to the leadership
2	Owner	Intensive control over company finances
3	Customer	Customer suggestions/feedback ideas towards the company
4	Government	Granting permits and licenses for company operations such as business permits, environmental permits, etc.
5	Investors	Increase the company's financial margin Delivery on time and as agreed
6	Supplier	Delivery of good and quality goods Providing warranty
7	Partners	Implementation of cooperation is in accordance with the agreed program objectives (MoU)
8	Neighboring Community	Supporting the company's products by using or buying these products

Source : Data Processed

RESULTS AND DISCUSSION

Analytic Hierarchy Process (AHP)

The first step in this AHP method is to calculate the level of importance of the Stakeholder criteria (Employees, Owners, Customers, Government, Investors, Suppliers, Partners, and the Neighboring Community). Weighting is done using Microsoft Excel based on a pairwise comparison matrix resulting from geometric mean.

Table 4. Stakeholder Pairwise Comparison Matrix

Stakeholders	Employees	Owners	Customers	Government	Investor	Supplier	Partner	Neighboring Community
Employees	1	0.5	0.2	0.5	0.33	0.33	0.5	0.5
Owners	2	1	0.33	0.5	0.33	0.33	0.5	0.5
Customers	5	3	1	0.5	0.5	0.33	0.5	0.5
Government	2	2	2	1	0.33	0.5	0.5	0.5
Investors	3	3	2	3	1	0.33	0.5	0.5
Suppliers	3	3	3	2	3	1	0.5	0.5
Partners	2	2	2	2	2	2	1	0.5
Neighboring Community	2	2	2	2	2	2	2	1
Total	20	16.5	12.53	11.5	9.5	6.83	6	4.5

From the table above, it is known that the total geometric equalization (Geometric Mean) in each stakeholder employee is 20, owner 16.5 ≈ 17, customer 12.53 ≈ 13, government 11.5 ≈ 12, investor 9.5 ≈ 10, supplier 6.83 ≈ 7, partner 6, and the surrounding community is 4.5 ≈ 5. After knowing the results of

geometric equalization, the next step is to calculate the criteria value matrix. The calculation results can be seen in the table below.

Table 5. Calculation of Normalization Values for Each Stakeholder

Stakeholders	Employees	Owners	Customers	Government	Investors	Suppliers	Partners	Neighboring Community	Total
Employees	0.05	0.03	0.02	0.04	0.04	0.05	0.08	0.11	0.42
Owners	0.10	0.06	0.03	0.04	0.04	0.05	0.08	0.11	0.51
Customers	0.25	0.18	0.08	0.04	0.05	0.05	0.08	0.11	0.85
Government	0.10	0.12	0.16	0.09	0.04	0.07	0.08	0.11	0.77
Investors	0.15	0.18	0.16	0.26	0.11	0.05	0.08	0.11	1.10
Suppliers	0.15	0.18	0.24	0.17	0.32	0.15	0.08	0.11	1.40
Partners	0.10	0.12	0.16	0.17	0.21	0.29	0.17	0.11	1.34
Neighboring Community	0.10	0.12	0.16	0.17	0.21	0.29	0.33	0.22	1.61
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00

The calculation of the normalization value for each stakeholder above is calculated based on the value of each pairwise comparison matrix divided by the results of the total pairwise comparison matrix for each stakeholder. Then each value of the stakeholder is totaled by producing the same value of 1, which means the calculation is correct or valid. Then after calculating the criteria matrix, the next step is to determine the weight and eigenvalue to calculate the Consistency Ratio (CR). Priority calculation is a continuation of table 4.4 above, the results of the calculation of weights and eigenvalues can be seen in table 6 below.

Table 6. Eigen Value (λmax)

Stakeholders	Total Criteria Value Matrix	Weight	Eigen Value	Consistency Ratio (CR)
Employees	0.42	0.052	1.045	
Owners	0.51	0.064	1.050	
Customers	0.85	0.106	1.333	
Government	0.77	0.096	1.108	
Investors	1.10	0.138	1.307	0.097
Suppliers	1.40	0.175	1.197	
Partners	1.34	0.167	1.002	
Neighboring Community	1.61	0.202	0.908	
Total	8.00	1.000	8.949	

From the table above, it can be calculated that:

Consistency Index (CI) $= \frac{\lambda \max - n}{n-1} = \frac{8.949-8}{8-1} = 0.136$

While Random Index (RI) = 1.40 (based on the number of criteria)

Thus, the results of *Consistency Ratio* (CR) $= \frac{CI}{RI} = 0.097$ (consistent)

Which means, if the CR value is <0.1, it be said that the pairwise comparison matrix is said to be good (the degree of consistency is satisfactory). From the weighting process that has been carried out previously, the hierarchical structure of KPI weights on each stakeholder at PT XYZ can be arranged as follows:
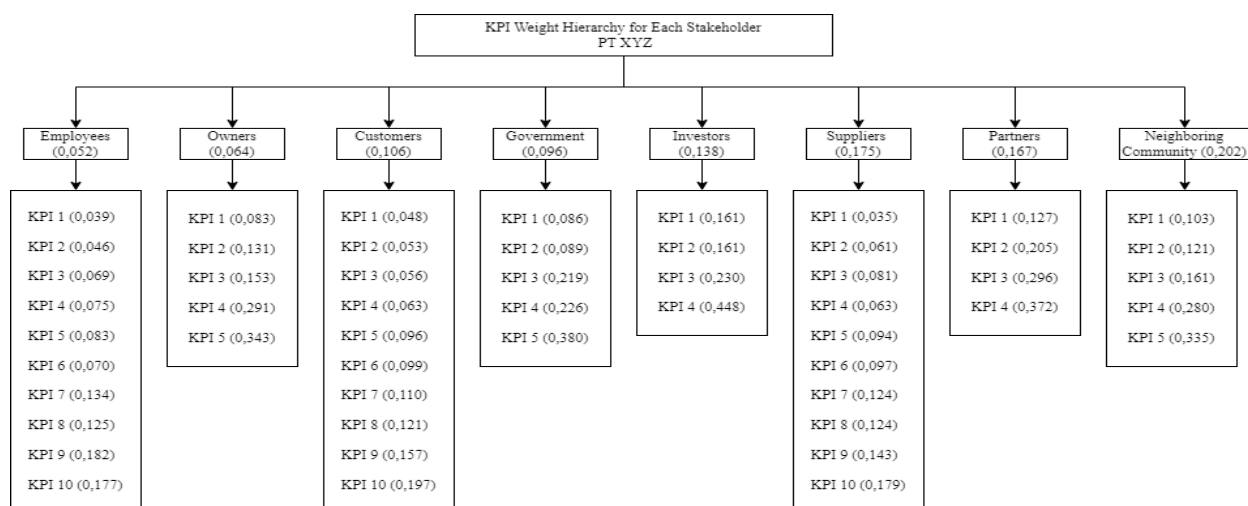
Figure 7. KPI Weight Hierarchy Structure

Rating System with Objective Matrix Model (OMAX)

After that, the next process is to integrate the performance measurement model with a scoring system model known as the OMAX (Objective Matrix) model. The main purpose of this integration is to harmonize or unify the range of values of each indicator in the model, ensuring that the evaluation of each parameter can be done comprehensively, thus providing a clear picture of the company's overall performance. Using the OMAX method, we can identify the maximum target value of each Key Performance Indicator (KPI) for various stakeholders. For example, KPI 1 for employees, owners, customers, government, investors, suppliers, partners, and the surrounding community have the same target value of 100 for all, except for suppliers who have a target of 0. All these targets are then set at level 10. On the other hand, the company sets different minimum targets for each stakeholder, with values varying from 80 to 90, except for partners and the surrounding community who have targets of 1 and 50, and these are put at level 3 in the OMAX table.

Table 7. Results of Scoring System OMAX and TLS Customer

KPI		KPI 1	KPI 2	KPI 3	KPI 4	KPI 5	KPI 6	KPI 7	KPI 8	KPI 9	KPI 10
Performance		98	8	8	0	100	12	3	2	2	1
	10	100	15	10	5	100	10	5	7	3	2
	9	80	15	15	3.5	95	8	7.5	7.5	4	2
	8	60	15	20	2	90	6	10	8	5	2
	7	63	16	22	1.6	89	5.8	11	7	6	2.8
Score	6	63	15.5	21.75	0.75	88	5	10.5	6	5.5	2.25
Performance	5	63.7	15.3	22.0	0	87	4.3	10.3	5	5.3	2
	4	66	16	24	-1	86	4	11	4	4	3
	3	75	20	30	0	85	5	15	3	10	6
	2	75	18.33	33.33	1.67	86.67	4.67	13.33	5.33	8.33	4.67
	1	74.5	16.17	36.17	2.83	87.83	3.83	11.17	7.17	6.17	2.83
	0	75	15	40	5	90	4	10	10	5	2
Score		100	15	10	0	100	10	5	3	3	2
Weight		0.002	0.002	0.004	0.004	0.004	0.004	0.007	0.007	0.009	0.009
Value		0.2028	0.0359	0.0359	0	0.4316	0.0364	0.0348	0.02	0.028	0.0184

It can be seen in the table above that the results of the Objective Matrix (OMAX) and Traffic Light System (TLS) scoring system on customer stakeholders are mostly green, which means that overall customer stakeholders can be said to have achieved the expected performance or performance. However, there is 1 that is yellow and red, namely KPI 4 is yellow and KPI 8 is red. In this case, it is said that the performance has not been fully achieved so that there is a need for improvement or improvement. From this table, a total index of 0.84 is obtained. This value is obtained from the total value of KPI 1 to KPI 10.

Table 8. Results of Scoring System OMAX and TLS Partner

KPI		KPI 1	KPI 2	KPI 3	KPI 4
Performance		100	30	90	90
	10	100	15	90	90
	9	100	22.5	90	90
	8	100	30	90	90
	7	96	30	86	84
Score	6	94.25	29.25	84.25	81.75
Performance	5	92.0	28.7	82.0	78.7
	4	89	29	79	74
	3	80	30	70	60
	2	86.667	30	76.67	70.00
	1	92.833	29.5	82.83	79.50
	0	100	30	90	90
Score		100	30	90	90
Weight		0.002	0.002	0.004	0.004
Value		0.2028	0.0718	0.3229	0.351

Partner stakeholders are mostly green, which means that overall partner stakeholders can be said to have achieved the expected performance or performance. However, there is 1 red color, namely KPI 2, which means that the performance has not been fully achieved so that there is a need for improvement or improvement. From this table, a total index of 0.95 is obtained. This value is obtained from the total value of KPI 1 to KPI 4.

Table 9. Results of Scoring System OMAX and TLS Neighboring Community

KPI		KPI 1	KPI 2	KPI 3	KPI 4	KPI 5
Performance		100	30	20	20	25
	10	100	50	30	5	25
	9	85	35	20	7.5	25
	8	70	20	10	10	25
	7	66	20	10	12	23
Score	6	64.25	19.25	9.25	11.75	21.75
Performance	5	62.0	18.7	8.7	12.0	20.3
	4	59	19	9	14	19
	3	50	20	10	20	15
	2	53.333	16.667	10.00	16.67	18.333
	1	56.167	12.833	9.50	12.83	21.167
	0	60	10	10	10	25
Score		100	35	20	20	25
Weight		0.002	0.002	0.004	0.004	0.004
Value		0.2028	0.0837	0.0718	0.078	0.1079

In the surrounding community stakeholders, most of them are green, which means that overall the surrounding community stakeholders can be said to have achieved the expected performance or performance. However, there is 1 red color, namely in KPI 4, which means that the performance has not been fully achieved so that there is a need for improvement or improvement. From this table, a total index of 0.54 is obtained. This value is obtained from the total value of KPI 1 to KPI 5.

Based on the calculation results of the OMAX and TLS scoring systems above, it is known that for the employee stakeholder, most are green, but there is 1 yellow indicator, which is on KPI 2 with a total index value of 3.38. For the owner stakeholder, all are green with a total index value of 1.2. For the customer stakeholder, there are 1 yellow indicator for KPI 4 and 1 red indicator for KPI 8, with total index values of 0.84. For the government stakeholder, all are green with a total index value of 1.44. For the investor stakeholder, all are green with a total index value of 0.89. For the supplier stakeholder, there is 1 yellow indicator for KPI 3 with a total index value of 4.18. For the partner stakeholder, there is 1 red indicator for KPI 2, which means the performance has not been fully achieved yet and improvement or correction is needed. From the table, a total index of 0.95 is obtained. Meanwhile, for the surrounding community stakeholder, there is also 1 red indicator for KPI 4 with a total index value of 0.54. It can be seen that there are 3 KPIs in the yellow category, indicating that these KPIs have not reached the expected performance even though the results are close to the set targets. The performance aspects still in the yellow category are the lack of improvement in underperforming performance, lack of handling complaints from customers, and accuracy of payments. For the priority improvement from the 3 yellow KPIs, the priority is KPI 3 for supplier with a value of 0.1. Meanwhile, there are 3 KPIs in the red category. The performance aspects still in the red category are KPI 8 for customers, which is the delivery of products to customers very timely with a value of 0.02, KPI 2 for partners, which is the financial administration in the cooperation process with a

value of 0.07, and KPI 4 for the surrounding community, which is the surrounding community's difficulty in competing in the recruitment of company employees with a value of 0.08. Therefore, for the priority improvement from the 3 red KPIs, the priority is KPI 4 for the surrounding community because it has the highest value compared to the others.

When compared to other relevant studies in recent years, such as the research by Setiawan et al. (2020) that used the Balanced Scorecard (BSC) approach in evaluating the performance of fertilizer companies, the results indicate that the use of comprehensive performance measurement systems like OMAX and TLS can provide a more detailed and accurate picture of company performance compared to the more general BSC. The study found that BSC tends to overlook specific and detailed aspects of each stakeholder. Another study by Helia et al. (2021) that also used the Performance Prism approach revealed the importance of integrating various stakeholders in performance measurement. Their research findings suggest that by using AHP and Scoring System, organizations can be more effective in identifying areas that need improvement and prioritizing based on the KPI index value. This is consistent with the findings of this study, which show the presence of red and yellow KPIs that require special attention for improvement. Thus, the results of this study are consistent with other findings that indicate that more specific and integrated performance measurement approaches, such as those applied in this study, can provide a more comprehensive and accurate picture of company performance, as well as assist in decision-making for performance improvement.

CONCLUSIONS

Based on the performance measurement results using the Performance Prism, Analytic Hierarchy Process (AHP), and Scoring System at PT. XYZ, there are 53 Key Performance Indicators (KPIs) divided among various stakeholders. From this analysis, it can be concluded that the design of the company's performance measurement covers various aspects involving internal and external stakeholders. The total performance index of 13.43 indicates good overall performance. In this case, the total KPIs used are 53, including 10 KPIs for employee stakeholders, 5 KPIs for owner stakeholders, 10 KPIs for customer stakeholders, 5 KPIs for government stakeholders, 4 KPIs for investor stakeholders, 10 KPIs for supplier stakeholders, 4 KPIs for partner stakeholders, and 5 KPIs for community stakeholders. Looking at the results of the Objective Matrix (OMAX) and Traffic Light System (TLS), it can be seen that 47 KPIs are in the green category, indicating good achievement, while 3 KPIs are in the yellow category and another 3 KPIs are in the red category, indicating areas that require further attention for improvement. Improvement recommendations are suggested for these 2 categories to help the company optimize the performance of each relevant stakeholder. This study has several limitations that need to be considered. First, the use of a sample that may not be representative of the overall population can limit the generalization of research findings. Second, the use of specific performance measurement methods such as OMAX and TLS may have limitations in depicting the overall performance of the company, so further research may consider using other methods or combinations of methods to obtain a more comprehensive picture. Third, this study may be limited by external factors that are not fully controlled by the researcher, such as market conditions or regulatory changes that can affect the company's performance. Recommendations for further research include expanding the sample scope to be more representative of the overall population. Additionally, further research could consider using more diverse performance measurement methods or combinations of methods to gain a deeper understanding of the company's performance. Further analysis of external factors that can affect the company's performance could also provide more comprehensive insights for stakeholders.

REFERENCES

Bourne, M. (2021). Performance measurement and management in a VUCA world. *International Journal of Production Research*, *59*(24), 7311–7316. https://doi.org/10.1080/00207543.2021.2004042

Cahyadi, U., & Aziz, R. A. (2022). Perancangan Key Performance Indicator Untuk Mengukur Kinerja di Aromanis Ebeg Karangpawitan Garut Menggunakan Metode Performance Prism. *Jurnal Kalibrasi*, *20*(1), 60–67. https://doi.org/10.33364/kalibrasi/v.20-1.1093

Garengo, P., Sardi, A., & Nudurupati, S. S. (2022). Human resource management (HRM) in the performance measurement and management (PMM) domain: a bibliometric review. *International Journal of Productivity and Performance Management*, *71*(7), 3056–3077. https://doi.org/10.1108/IJPPM-04-2020-0177

Helia, V. N., Sutrisno, W., Zaputra, A. S., & Qurtubi, Q. (2021). Performance measurement system using performance prism approach in batik company: a case study. *Jurnal Sistem Dan Manajemen Industri*, *5*(1), 43–52. https://doi.org/10.30656/jsmi.v5i1.3099

Hidayatullah, S., Dahda, S. S., & Ismiyah, E. (2022). Pengukuran Kinerja Perusahan Menggunakan Metode Objective Matriks (Omax) Dan Analytical Hierarchy Process (Ahp). *JUSTI (Jurnal Sistem Dan Teknik Industri)*, *2*(2), 270. https://doi.org/10.30587/justicb.v2i2.3668

Huda, M. (2023). Analisa Produktivitas Pada Divisi Produksi Buku Pt Xyz Menggunakan Metode Objective Matrix (Omax) Dan Fuzzy Analytic Hierarchy Proces (Fahp). *SENTRI: Jurnal Riset Ilmiah*, *2*(7), 2528–2537. https://doi.org/10.55681/sentri.v2i7.1081

Imron. (2019). Penerapan Metode AHP pada Penentuan Sales Terbaik Studi Kasus: PT. Sampoerna Telekomunikasi Indonesia. *Jurnal Teknik Komputer AMIK BSI*, *5*(1), 127–134. https://doi.org/10.31294/jtk.v4i2

Knowles, C. (2023). Managing the unmeasurable: Developing a new performance management framework for the voluntary sector. *Public Money and Management*. https://doi.org/10.1080/09540962.2023.2275594

Krasodomska, J., & Zarzycka, E. (2020). Key performance indicators disclosure in the context of the EU directive: when does stakeholder pressure matter? *Meditari Accountancy Research*, *29*(7), 1–30. https://doi.org/10.1108/MEDAR-05-2020-0876

Lundgren, C., Bokrantz, J., & Skoogh, A. (2020). Performance indicators for measuring the effects of Smart Maintenance. *International Journal of Productivity and Performance Management*, *70*(6), 1291–1316. https://doi.org/10.1108/IJPPM-03-2019-0129

Mardiono, L., Wibisono, E., dan Jolanda, C. (2019). Pengukuran Kinerja Menggunakan Model Performance Prism (Studi Kasus di Perusahaan Makanan). *Proceedings 6th National Industrial Engineering Conference (NIEC-6)*, 108–115.

Neely, A., dan Adams, C. (2019). Perspectives on performance: the performance prism. *Journal of Cost Management*, *15*(1), 7–15.

Neely, A., dan Gray, D. (2014). *Measuring Corporate Management and Leadership Capability Andy Neely, Dina Gray , Mike Kennerley and Bernard Marr Centre for Business Performance , Cranfield School of Management* (Issue November).

Ningsih, N. A., dan Astuti, R. D. (2022). Analisis Pengukuran Kinerja Produksi Loom dengan Metode OMAX Scoring System pada Unit Weaving PT . Dan Liris. *Seminar Dan Konferensi Nasional IDEC 2022*, 1–9.

Novita, E., Marxoni, E., dan Welly, W. (2021). Pengukuran Kinerja Dengan Metode Performance Prism. *Inaque: Journal of Industrial and Quality Engineering*, *9*(1), 49–61. https://doi.org/10.34010/iqe.v9i1.4307

Nugroho, M. W., dan Amudi, A. (2021). *Penerapan Analytical Hierarchy Process (AHP) Dalam Pemetaan Berbasis Geographic Information System (GIS)*.

Pandian, G. R. S., dan Abdul-Kader, W. (2019). Performance evaluation of reverse logistics enterprise–an agent-based simulation approach. *International Journal of Sustainable Engineering*, *10*(6), 384–398. https://doi.org/10.1080/19397038.2017.1370032

Prabowo, R., dan Aditia, R. (2020). Analisis Produktivitas Menggunakan Metode POSPAC dan Performance Prism Sebagai Upaya Peningkatan Kinerja (Studi Kasus: Industri Baja Tulangan di PT. X Surabaya). *Jurnal Rekayasa Sistem Industri*, *9*(1), 11–22. https://doi.org/10.26593/jrsi. v9i1.3362.11-22

Pribadi, Denny . Saputra, Amegia Rizal . Maulanahuddin, J. . G. (2020). *Buku Ajar Sistem Pengambilan Keputusan*.

Pulansari, F., Nugraha, I., Winusito, Y.C., Sholeha, F., Arier, T.N., & Gufron, A. (2023). Penerapan sistem reverse logistic industri logam menggunakan model supply chain operation references (SCOR) dengan metode analytical hierarchy process (AHP).

Saputra, M. I. H., dan Nugraha, N. (2020). Sistem Pendukung Keputusan Dengan Metode Analytical Hierarchy Process (Ahp) (Studi Kasus: Penentuan Internet Service Provider Di Lingkungan Jaringan Rumah). *Jurnal Ilmiah Teknologi Dan Rekayasa*, *25*(3), 199–212. https://doi.org/10.35760/tr.2020.v25i3.3422

Setiawan, D., Syaputra, M. J., Hadi, Y. K., dan Ikatrinasari, Z. F. (2020). Penerapan Metode Balanced Scorecard Untuk Penentuan Key Performance Indicator di Departemen Production Engineering (Studi Kasus Pada Perusahaan Farmasi PT. X). *Journal Industrial Servicess*, *5*(2). https://doi.org/10.36055/jiss.v5i2.8004

Silaen, N. R., Syamsuriansyah, S., Chairunnisah, R., Sari, M. R., Mahriani, E., Tanjung, R., Triwardhani, D., Haerany, A., Masyruroh, A., & Satriawan, D. G. (2021). *Kinerja Karyawan*.

Sirait, M. (2020). Analisa Produktivitas pada UKM Dompet Kulit dengan Metode Objective Matriks (OMAX). *Teknoin*, *26*(1), 23–29. https://doi.org/10.20885/teknoin.vol26.iss1.art3

Sudradjat, A., Sodiqin, M., dan Komarudin, I. (2020). Penerapan Metode Analytical Hierarchy Process Terhadap Pemilihan Merek CCTV. *Jurnal Infortech*, *2*(1), 19–30. https://doi.org/10.31294/infortech. v2i1.7660

Supriadi, A., Rustandi, A., Komarlina, D., dan Ardiani, G. T. (2018). Analytical Hierarchy Process (AHP) Teknik Penentuan Strategi Daya Saing Kerajinan Bordir. In *Advanced Decision Making for HVAC Engineers*.

Tirta, M. A. W. K., & Ni Luh Gede Erni Sulindawati. (2023). Analisis Pengukuran Kinerja dengan Metode Performance PRISM pada Koperasi Kredit Swastiastu. *Vokasi : Jurnal Riset Akuntansi*, *12*(01), 34–47. https://doi.org/10.23887/vjra.v12i01.56187

Van Den Ingh, L., Eshuis, R., & Gelper, S. (2021). Assessing performance of mined business process variants. *Enterprise Information Systems*, *15*(5), 676–693. https://doi.org/10.1080/17517575.2020.1746405