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Raw Material Logistics Performance Measurement Using OMAX Method

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ABSTRACT

The Fast-Moving Consumer Goods [FMCG] industry plays a strategic role in the Indonesian economy, where raw material logistics management remains a key challenge directly impacting production efficiency and competitiveness. This study analyzes the logistics performance of raw material suppliers at an Instant Noodle Company to identify performance patterns and their impact on operational efficiency using the Objective Matrix (OMAX) method across three main categories: seasoning, seasoning and vegetable oil, and packaging over one year. The results reveal significant variations in supplier performance, with the seasoning category showing substantial improvements in Cikampek and Semarang facilities correlating with increased production, while Surabaya experienced a notable decline. The seasoning and vegetable oil category demonstrated stable performance despite minor production fluctuations, whereas the packaging category revealed consistent performance deterioration among key suppliers, negatively affecting production capacity. The findings indicate that supplier performance directly influences logistics efficiency and production capacity. This study recommends supplier development programs, performance monitoring systems, and supplier portfolio diversification to enhance consistency and competitiveness in the FMCG sector.

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INTRODUCTION

The fast-moving consumer goods (FMCG) industry plays a strategic role in the Indonesian economy [1,2], both in terms of contribution to the domestic market and exports. This Instant Noodle Company, as the main entity in this sector, has strengthened its dominance as a leading manufacturer with a variety of superior products [3], including instant noodles, which are the main export commodity. Based on the Kantar Group and Affiliates report in Brand Footprint 2021, this Instant Noodle Company ranks first in the national FMCG sector with consumer reach points of 2,190 million and seventh at the global level with reach points of 2,221 million [4].

High global demand for FMCG products [5], especially instant noodles, demands continuous improvement in supply chain efficiency and productivity. Intensified industry competition [6,7] and volatility in raw material prices are the main challenges in maintaining a competitive advantage [8]. The success of this Instant Noodle Company is highly dependent on the effectiveness of raw material supply chain management [9], especially in the aspects of procurement and distribution of raw material that meet quality standards and on-time delivery.

In its operations, this Instant Noodle Company works with eight raw material suppliers spread across various strategic locations, including the Food Ingredient Division (FID) in Cikampek, Semarang, Surabaya, and Tanjung Api-Api for the provision of seasonings and seasoning oils, as well as several packaging suppliers such as Cikupa, Cikampek, Tangerang, and Cengkareng. The supply chain performance evaluation was conducted through Key Performance Indicators (KPIs) [10], which include quality rating and delivery rating. Based on the analysis of the evaluation data, 42.86% of the total supplier performance is still below the "Good" category threshold, with a delivery delay rate of 55% and a raw material quality discrepancy rate of 10%. This reflects significant challenges in supply chain management that could potentially hamper production efficiency.

Several relevant studies that explore similar topics have been conducted, including by a research [11] who used the SCOR, AHP [12], and OMAX methods [13] to measure supply chain performance at PT X. The results of the study showed that the application of the SCOR method to the supply chain performance of PT X was effective. and showed that the application of the SCOR and OMAX methods can improve understanding of supply chain performance, the efficiency, and effectiveness of its management, and provide comprehensive observation and measurement of the supply chain process [25]. Another study by Rudihartati & Arman [2023] [14], who designed a green supply chain performance measurement model at PT Japfa Comfeed Lampung using AHP and OMAX, showed that the implementation of proper raw material, purchasing planning, and employee training can improve supply chain performance. Stifany et al. (2020) in [14] also integrated the ANP and OMAX methods to evaluate supply chain performance in the chemical industry. Their approach produced more comprehensive performance insights that supported strategic decision-making processes [16], particularly in identifying key performance indicators and improving supply chain efficiency.

This previous study provides a relevant methodological reference for the present research, which applies the OMAX method to analyze logistics efficiency of raw material supply in instant noodle production at this

Instant Noodle Company. In addition, research by Sumaila et al. (2024) in [13], who applied OMAX for productivity analysis at PT Equiport Inti Indonesia found that the OMAX method can improve productivity by identifying factors that affect it and providing recommendations for improvement. These studies are relevant to support the development of supply chain performance analysis at this Instant Noodle Company, especially related to delays in the delivery of raw materials and quality that is not up to standard.

The theoretical foundation used in this research includes several important concepts in supply chain management and performance measurement, including the concept of productivity, which refers to the ratio of output to input in the production process [15]. High productivity reflects efficiency in the use of resources, which can reduce costs and improve the competitiveness of the company [16]. Supply chain efficiency is the ability of a company to minimize costs and time in the production and distribution process without sacrificing quality [17]. This efficiency is often measured by indicators such as delivery rating and quality rating, which describe the extent to which the supply chain can meet delivery time targets and quality standards [26].

The Objective Matrix (OMAX) method, used in this study, is an effective tool for analyzing and evaluating various factors that affect supply chain performance. OMAX helps in identifying priorities and solutions that can be implemented to improve operational and managerial performance. In addition, the theory of supply chain management [SCM] provides a framework for understanding how the flow of raw [18] materials, information, and products can be managed efficiently to meet customer demand at an optimal cost [19].

The main objective of this study is to analyze the productivity and efficiency of the instant noodle production supply chain at this Instant Noodle Company using the OMAX method. Practically, this study provides a KPI-based monitoring sheet and an integrated OMAX index that enable managers to track inbound raw material logistics performance periodically, identify the lowest-performing suppliers/KPI dimensions, and prioritize corrective actions [supplier quality control, delivery scheduling, and safety stock policy]. The results also provide a baseline for setting realistic targets and tracking improvement impacts over time.

RESEARCH METHOD

This research was conducted at the Instant Noodle Company, precisely at the instant noodle division factory in the production section located at Plant Cibitung MM2100 Industrial Estate Cibitung. The research took place from September to December 2024, which included interviews and data collection related to raw material logistics efficiency. The research subjects consisted of the Instant Noodle Company employees who were directly involved in the raw material logistics process, such as the Plant General Manager, Production Planning and Inventory Control Supervisor, Production Planning and Inventory Control Staff, and Quality Control Staff. The sample selection used purposive sampling techniques based on their role and knowledge in raw material management and quality control.

The method used in this research is a mixed method, which is a combination of qualitative and quantitative methods with the OMAX [20] approach to analyze the efficiency of raw material logistics KPIs on production. OMAX is used to measure productivity partially and monitor the performance of each part in the organization to achieve the set targets. This

research design uses a quantitative descriptive method [20], and calculations are done manually using Microsoft Office Excel to facilitate data analysis. The research procedure includes several stages, namely determining Key Performance Indicators [KPIs], determining KPI weights, standardizing KPI values, calculating actual performance indices, and measuring KPI efficiency [10,21]. Data collection and analysis were conducted in three sequential stages. First (qualitative stage), semi-structured interviews were carried out with employees involved in raw material logistics to map the inbound logistics process, confirm KPI definitions, and identify operational issues affecting production. Second [quantitative stage], secondary data for 2024 were collected through documentation, including monthly/periodic logistics KPI records and production targets. The quantitative dataset was then cleaned, compiled, and summarized using Microsoft Excel in tabular and graphical formats [22,23]. Third (integration stage), the interview findings were used to interpret the quantitative results, explain major KPI gaps, and link the efficiency performance to its implications for production continuity.The research flowchart can be seen in Figure 1.

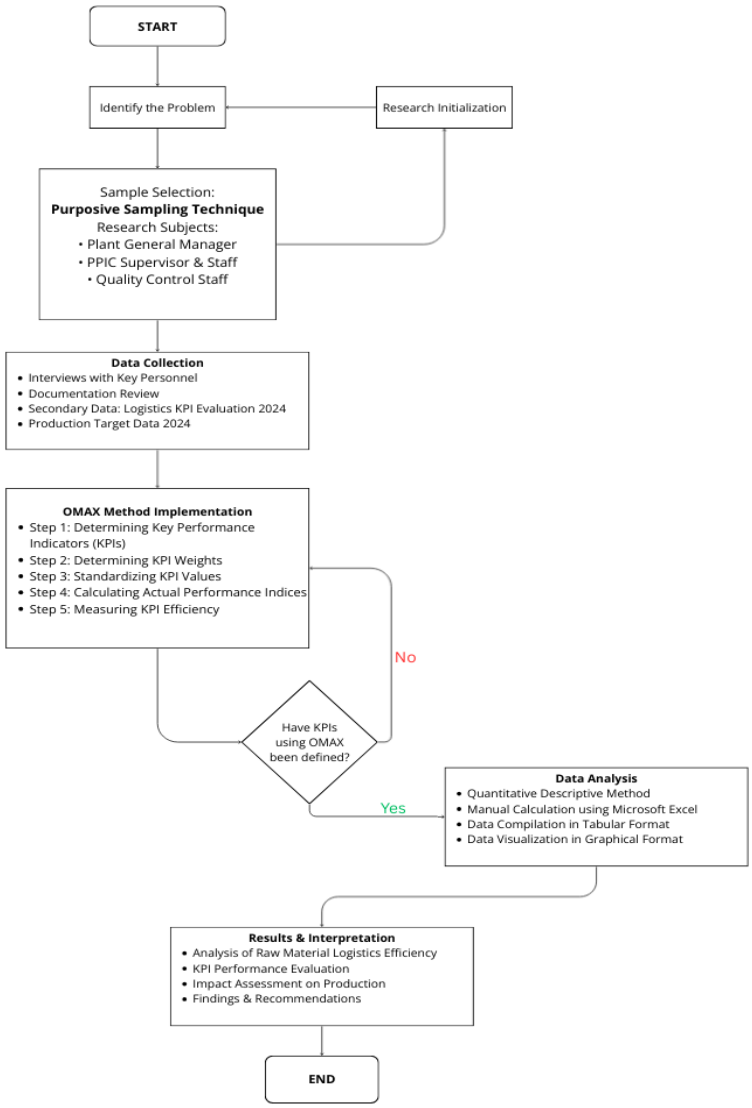

Figure 1. Flowchart Research's Method

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RESULT AND DISCUSSION

KPI Determination

Determination of KPIs used for measuring raw material delivery in this study has been presented by the company, namely quality rating and delivery rating.

Table 1. Evaluation Data of Raw Material KPIs

No	Type of Raw Material	Period I Quality Rating	Period I Delivery Rating	Period I Total Value	Period II Quality Rating	Period II Delivery Rating	Period II Total Value
1	Seasoning	60.00	28.10	88.10	60.00	29.00	89.00
		60.00	30.29	90.29	60.00	25.00	85.00
		60.00	29.17	89.17	51.00	24.00	75.00
		60.00	11.97	71.97	60.00	10.00	70.00
2	Seasoning Oil	60.00	27.76	87.76	60.00	24.50	84.50
		60.00	29.75	89.75	55.00	23.90	78.90
		60.00	26.60	86.60	60.00	24.80	84.80
3	Vegetable	60.00	27.67	87.67	60.00	23.00	83.00
		55.00	16.45	71.45	54.00	12.00	66.00
		60.00	23.34	83.34	60.00	27.00	87.00
4	Packaging	60.00	31.43	91.43	50.00	32.00	82.00
		60.00	35.43	95.43	60.00	25.00	85.00
		60.00	31.95	91.95	51.00	29.00	80.00
		57.50	26.78	84.28	50.00	25.00	75.00
		52.50	28.93	81.43	51.00	22.00	73.00

Source: Company Data (2024)

Based on Table 1, the use of the quality rating indicator is used to measure the accuracy and accuracy of the quality of raw materials according to the order and measure the suitability of the quality standards sent by the supplier. The delivery rating indicator is employed to evaluate the timeliness of raw material deliveries as well as the conformity between the quantity delivered and the quantity ordered.

Determining KPI Weight

After determining the KPIs, the company determines the weight of each KPI. As an instant noodle exporter, the company focuses on quality and quality products according to its vision. Therefore, the weight of the raw material logistics KPI in Tabel 2, focuses more on the quality rating, with the following details:

Table 2 KPI Weights of The Raw Material

	KPI Weight
Quality Rating	0.60
Delivery Rating	0.40

Source: Company Data (2024)

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KPI Determination

After determining the KPI weights, the next step is to standardize the value of each KPI to assess the consistency of performance against a certain average or standard. This standardization has an important role in operations, where low values indicate inconsistencies in raw material logistics performance, while high values reflect stability and consistency. Before calculating standardization, it is necessary to calculate the average value and standard deviation of each KPI. The average is used as an overview, comparison reference, and helps identify variations in the data. Meanwhile, the standard deviation serves to illustrate the degree of dispersion of the data against the average, where a small standard deviation indicates stability and consistency, while a large standard deviation reflects high variability which can be an indication of problems in logistics performance. Therefore, the standardization of KPI values is calculated using the appropriate formula for each indicator.

Here is the formula used:

a) *Quality Rating (QR)* [24]

1. Mean QR

$$\mu QR = \frac{\Sigma X}{n}$$

2. Standard Deviation QR

$$\sigma \mathrm{QR} = \frac{\sqrt{(X - \mu QR)^2}}{n}$$

3. Grade Standardization QR [ZQR]

$$ZQR = \frac{X - \mu QR}{\sigma QR}$$

Thus, the results of the above calculations produce a standardized Quality Rating [QR] value for two periods, which is then reflected in the following table 3.

Table 3. Standardization of QR Values

Type of Raw Material	*Supplier*	ZQR1	ZQR2
Seasoning	FID Cikampek	0.00	1.15
Seasoning	FID Semarang	0.00	1.15
Seasoning	FID Surabaya	0.00	-3.46
Seasoning	FID Tanjung Api-Api	0.00	1.15
Seasoning Oil	FID Cikampek	0.00	0.43
Seasoning Oil	FID Semarang	0.00	-0.87
Seasoning Oil	FID Surabaya	0.00	0.43
Vegetable	FID Cikampek	0.87	0.89
Vegetable	FID Semarang	-0.43	-0.34
Vegetable	FID Surabaya	-0.43	-0.55
Packaging	Cikupa	0.47	-0.38
Packaging	Cikampek	0.47	0.81
Packaging	Putra Naga Indotama	0.47	0.21
Packaging	Supernova	-0.12	-0.38
Packaging	Prima Makmur Rotokemindo	-1.29	-0.26
Packaging	Putra Naga Indotama	0.47	0.21
Packaging	Supernova	-0.12	-0.38
Packaging	Prima Makmur Rotokemindo	-1.29	-0.26

Source: Processed Data (2024)

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Description:

ZQR1 = Standardized Quality Rating Value Period I

ZQR2 = Standardized Quality Rating Value Period II

From the table 3 above, it can be concluded that the quality of raw materials from various suppliers shows different variations based on the ZQR1 and ZQR2 values.

In the seasoning category, all suppliers have ZQR1=0.00, which means that the quality is according to the average standard in Period I. However, in ZQR2, most suppliers have a positive value [1.15], except Surabaya, which has a value of -3.46, indicating below-average quality.

For seasoning oil, the value of ZQR1=0.00 for all suppliers indicates stable quality at the average standard. However, in ZQR2, Cikampek and Surabaya have a value of 0.43, indicating the quality is within the standard, while Semarang has a value of -0.87, which means the quality is lower.

In the vegetable category, Cikampek has ZQR1=0.87, indicating above-average quality, whereas Semarang and Surabaya have -0.43, indicating lower quality. In ZQR2, Cikampek continues to have a positive value (0.89), while Semarang and Surabaya remain negative (-0.34 and -0.55), indicating that quality has not improved.

Meanwhile, for packaging, Cikupa, Cikampek, and Putra Naga Indotama have ZQR1 = 0.47, meaning above-average quality. However, Supernova and Prima Makmur Rotokemindo have negative values (-0.12 and -1.29), with Prima Makmur Rotokemindo experiencing a significant decline. On ZQR2, Cikampek increased to 0.81, indicating a quality improvement, while Cikupa dropped to -0.38, meaning a decline in quality. Putra Naga Indotama remained positive (0.21) but experienced a slight decline, while Supernova and Prima Makmur Rotokemindo remained negative, despite a slight improvement.

b) *Delivery Rating [DR]* [25]

1. Mean DR

$$\mu DR = \frac{\Sigma X}{n}$$

2. Standard Deviation DR

$$\sigma \mathrm{DR} = \frac{\sqrt{(X - \mu DR)^2}}{n}$$

3. Grade Standardization DR [ZDR]

$$ZDR = \frac{X - \mu DR}{\sigma DR}$$

Thus, the results of the above calculations produce a standardized Delivery Rating [DR] value for two periods, which is then reflected in the following table 4.

Table 4. Standardization of DR Values

Type of Raw Material	*Supplier*	ZDR1	ZDR2
Seasoning	FID Cikampek	0.86	1.95
Seasoning	FID Semarang	1.44	0.84
Seasoning	FID Surabaya	1.14	0.56
Seasoning	FID Tanjung Api-Api	-3.45	-3.34
Seasoning Oil	FID Cikampek	-0.14	0.18
Seasoning Oil	FID Semarang	0.89	-0.89
Seasoning Oil	FID Surabaya	-0.75	0.71

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Type of Raw Material	*Supplier*	ZDR1	ZDR2
Vegetable	FID Cikampek	0.41	0.32
Vegetable	FID Semarang	-0.87	-0.89
Vegetable	FID Surabaya	0.46	0.57
Packaging	Cikupa	-0.02	0.90
Packaging	Cikampek	0.52	-0.35
Packaging	Putra Naga Indotama	0.53	-0.22
Packaging	Supernova	-0.65	0.02
Packaging	Prima Makmur Rotokemindo	-0.36	-0.35

Source: Processed Data (2024)

Description:
ZDR1 = Standardized Period I Delivery Rating Value
ZQR2 = Standardized Period II Delivery Rating Value

From the Table 4 above, it can be concluded that the quality of raw material deliveries from various suppliers has varied based on ZDR1 and ZDR2 in the two periods.

In the seasoning category, Food Ingredient Division Tanjung Api-Api has the largest negative value in both periods (ZDR1: -3.45, ZDR2: -3.34), indicating very poor delivery performance. Food Ingredient Division Semarang had the best performance in ZDR1 (1.44) but experienced a decline in ZDR2 (0.84). Meanwhile, Food Ingredient Division Cikampek experienced a significant increase from ZDR1 (0.86) to ZDR2 (1.95), indicating an improvement in delivery.

For seasoning oils, the Food Ingredient Division Semarang had the best performance in ZDR1 (0.89) but dropped drastically to -0.89 in ZDR2, indicating instability. In contrast, Food Ingredient Division Cikampek improved from -0.14 to 0.18, and Food Ingredient Division Surabaya also improved from -0.75 to 0.71. In the vegetable category, Food Ingredient Division Cikampek has a stable value (0.41 to 0.32). However, Semarang's Food Ingredient Division performed less well in both periods (ZDR1: -0.87, ZDR2: -0.89). Surabaya's Food Ingredient Division experienced a slight improvement from 0.46 to 0.57.

As for packaging, supplier Cikupa showed a significant increase from -0.02 to 0.90. Supplier Cikampek experienced a decrease from 0.52 to -0.35, and Putra Naga Indotama also experienced a slight decrease from 0.53 to -0.22. Supplier Supernova showed improvement from -0.65 to 0.02. Meanwhile, Prima Makmur Rotokemindo remained a low performer in both periods (-0.36 to -0.35), indicating that delivery quality has not improved.

1) *Calculating the Performance Index*
After calculating the value standardization, the next step is to calculate the performance index. Performance indices are used to measure and evaluate the performance of a process, individual, or organization based on certain indicators. In this context, the performance index is used to assess and compare the supplier's performance in delivering raw materials in two different periods. To calculate the performance index, the following formula is used:

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$$Performance\ Index = [ZQR\ x\ WQR] + [ZDR\ x\ WDR]$$

Thus, the results of the performance index calculation are described in a table 5 according to the period and each supplier, namely:

Table 5. Performance Index Results

Type of Raw Material	Supplier	Index Result S1	Index Result S2
Seasoning	FID Cikampek	0.34	1.47
Seasoning	FID Semarang	0.58	1.03
Seasoning	FID Surabaya	0.46	-1.86
Seasoning	FID TAA	-1.38	-0.64
Seasoning Oil	FID Cikampek	-0.06	0.33
Seasoning Oil	FID Semarang	0.36	-0.88
Seasoning Oil	FID Surabaya	-0.30	0.55
Vegetable	FID Cikampek	0.68	0.66
Vegetable	FID Semarang	-0.61	-0.56
Vegetable	FID Surabaya	-0.08	-0.10
Packaging	Cikupa	0.27	0.13
Packaging	Cikampek	0.49	0.35
Packaging	Putra Naga Indotama	0.49	0.04
Packaging	Supernova	-0.33	-0.22
Packaging	Prima Makmur Rotokemindo	-0.92	-0.30

Source: Processed Data (2024)

The table 5 above shows that the performance of raw material suppliers varied based on the performance index across the two periods. In the condiment category, supplier performance varies significantly. The Tanjung Api-Api Food Ingredient Division performed poorly with negative values in both periods (-1.38 and -0.64), as did the Surabaya Food Ingredient Division, which experienced a decline in performance index from 0.46 in period I to -1.86 in period II. In contrast, the Food Ingredient Division Cikampek and Semarang showed better performance with positive values in both periods.

For seasoning oils, the Food Ingredient Division Cikampek and Surabaya showed an increase in performance index in period II to a positive value, while Semarang experienced a decrease.In the vegetable category, Food Ingredient Division Cikampek performed well with positive values in both periods, although it did not experience an increase. Meanwhile, the Food Ingredient Division Semarang and Surabaya had negative scores, indicating a lack of consistency in performance.

As for packaging, suppliers Cikupa, Cikampek, and Putra Naga Indotama had a positive performance index in both periods, despite the decline. Suppliers Supernova and Prima Makmur Rotokemindo continued to perform poorly with negative values in both periods.

2) *Calculating KPI Efficiency* [10]

After calculating the performance index, calculate the KPI efficiency with the formula:

$$\text{KPI Efficiency} = \frac{\text{Actual Index Performance}}{\text{Optimal Index Performance}}\ x\ 100\%$$

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If described in a table 6 according to the period and each supplier.

Table 6. KPI Efficiency Results

	Type of Raw Material	*Supplier*	Efficiency Periode I	Efficiency Periode II
KPI1	Seasoning	*Food Ingredient Division* Cikampek	34%	147%
KPI2	Seasoning	*Food Ingredient Division* Semarang	58%	103%
KPI3	Seasoning	*Food Ingredient Division* Surabaya	46%	-186%
KPI4	Seasoning	*Food Ingredient Division* Tanjung Api-Api	-138%	-64%
KPI5	Seasoning Oil	*Food Ingredient Division* Cikampek	-6%	33%
KPI6	Seasoning Oil	*Food Ingredient Division* Semarang	36%	-88%
KPI7	Seasoning Oil	*Food Ingredient Division* Surabaya	-30%	55%
KPI8	Vegetable	*Food Ingredient Division* Cikampek	68%	66%
KPI9	Vegetable	*Food Ingredient Division* Semarang	-61%	-56%
KPI10	Vegetable	*Food Ingredient Division* Surabaya	-8%	-10%
KPI11	Packaging	Cikupa	27%	13%
KPI12	Packaging	Cikampek	49%	35%
KPI13	Packaging	Putra Naga Indotama	49%	4%
KPI14	Packaging	Supernova	-33%	-22%
KPI15	Packaging	Prima Makmur Rotokemindo	-92%	-30%

Source: Processed Data [2024]

a. Good Performance:
   i. Food Ingredient Division Cikampek showed significant improvement in seasoning (34% → 147%) and seasoning oil (-6% → 33%), and stable in vegetable (68% → 66%).
   ii. Food Ingredient Division Semarang remained positive on seasoning (58% → 103%).
   iii. Cikupa, Cikampek, and Putra Naga Indotama packaging suppliers are still efficient despite the decline.

b. Poor Performance:
   i. Food Ingredient Division Surabaya experienced a drastic decline in seasoning (46% → -186%).
   ii. Semarang Food Ingredient Division experienced a significant decline in seasoning oil (36% → -88%).
   iii. Packaging suppliers Supernova and Prima Makmur Rotokemindo remained in the negative zone despite a slight improvement.

Overall, Food Ingredient Division Cikampek showed a positive trend, while Surabaya and Semarang experienced instability or declining performance.

1) Interpretation of Results
   a. Raw Materials with Good Efficiency:
      i. Seasonings: Suppliers with excellent efficiency performance are Food Ingredient Division Cikampek (34% → 147%) and Semarang (58% → 103%).

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ii. Vegetables: Cikampek (68% → 66%) is the most efficient and stable supplier.
iii. Packaging: Cikampek (49% → 35%) and Putra Naga Indotama (49% → 4%) remain positive despite the decline.

b. Raw Materials with Poor Efficiency:
i. Spices: Surabaya (46% → -186%) and Tanjung Api-Api (-138% → -64%) suppliers require in-depth evaluation.
ii. Seasoning Oil: Semarang (36% → -88%) experienced a drastic decline, while Surabaya (-30% → 55%) improved but is still unstable.
iii. Vegetables: Semarang (-61% → -56%) and Surabaya (-8% → -10%) suppliers remain inefficient.
iv. Packaging: Supernova (-33% → -22%) and Prima Makmur Rotokemindo (-92% → -30%) are still in poor condition despite slight improvements.

Overall, Cikampek's Food Ingredient Division has the best efficiency, while Surabaya, Semarang and some packaging suppliers require significant improvement.

Based on the interpretation of the above results, raw material efficiency will be compared with production targets to determine the impact of logistics KPIs on production. A simple approach is used with the efficiency to production ratio formula to see the direct relationship between KPI efficiency and production achievement, with the following formula:

$$\text{Actual Production} = \left(\frac{\text{KPI Efficiency}}{100}\right) \text{x Production Target}$$

This can be illustrated through a table 7 covering the period and each supplier:

Table 7. Actual Production Results

Type of RM	Supplier	Actual Production Period I	Actual Production Period II
Seasoning	FID Cikampek	1,365,667	6,002,500
Seasoning	FID Semarang	2,329,667	4,205,833
Seasoning	FID Surabaya	1,847,667	(cannot be calculated)
Seasoning	FID TAA	(cannot be calculated)	(cannot be calculated)
Seasoning Oil	FID Cikampek	(cannot be calculated)	1,347,500
Seasoning Oil	FID Semarang	1,446,000	(cannot be calculated)
Seasoning Oil	FID Surabaya	(cannot be calculated)	2,245,833
Vegetable	FID Cikampek	2,731,333	2,695,000
Vegetable	FID Surabaya	(cannot be calculated)	(cannot be calculated)
Packaging	Cikupa	1,084,500	530,833
Packaging	Cikampek	1,968,167	1,429,167
Packaging	Putra Naga Indotama	1,968,167	163,333

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Type of RM	Supplier	Actual Production Period I	Actual Production Period II
Packaging	Supernova	(cannot be calculated)	(cannot be calculated)
Packaging	Prima Makmur Rotokemindo	(cannot be calculated)	(cannot be calculated)

Source: Processed Data, (2024)

From the table 7 above, it can be concluded:

1) Comparison of Period I and II:
   i. Spices:
   Cikampek increased sharply (339.4%) from 1,365,667 to 6,002,500. Semarang increased significantly (80.5%) from 2,329,667 to 4,205,833. Surabaya was stable (0%) at 1,847,667. This result indicates a major change in raw material availability or logistics performance, which should be discussed in relation to inbound delivery reliability, order fulfillment, and inventory planning to ensure the increase aligns with actual production requirements and does not create excess inventory.
   ii. Seasoning Oil:
   Cikampek and Surabaya cannot be analyzed due to incomplete data. Semarang has no data in period II. This limitation suggests weaknesses in data recording and traceability; therefore, the company should improve data completeness by standardizing KPI reporting, enforcing periodic data audits, and integrating logistics records with PPIC documentation to support consistent performance evaluation.
   iii. Vegetables:
   Cikampek experienced a small decrease (-1.3%) from 2,731,333 to 2,695,000. Semarang and Surabaya have no data. The slight decrease may reflect tighter control of supply or changing production needs, but the absence of data prevents a reliable conclusion; thus, establishing minimum reporting requirements for each supplier and period is necessary to support accurate efficiency tracking and decision-making.
   iv. Packaging:
   Cikupa dropped drastically (-51.1%) from 1,084,500 to 530,833. Cikampek down (-27.4%) from 1,968,167 to 1,429,167. Putra Naga Indotama dropped dramatically (-91.7%) from 1,968,167 to 163,333. Supernova and Prima Makmur Rotokemindo have no data. Given that packaging is critical for output continuity, this decline should be discussed as a potential risk to production stability; improvement strategies include strengthening supplier performance management (OTIF and defect rate targets), revising delivery schedules, applying safety stock for high-risk packaging items, and implementing tighter incoming inspection and rejection feedback loops to suppliers.

2) Overall Interpretation:
   i. Efficiency Improvement:
   Seasonings from Cikampek and Semarang showed significant improvement, likely exceeding production targets. To sustain this

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improvement, the company should standardize the best practices observed (e.g., supplier coordination, delivery windows, and PPIC forecasting alignment) and incorporate them into routine operating procedures and supplier scorecards.

ii. Decrease in Efficiency:
Packaging from Cikupa, Cikampek, and Putra Naga Indotama experienced a large decrease, indicating a decrease in efficiency or a reduction in requirements. To improve performance, the company should conduct root-cause analysis (supplier capacity, lead time variability, quality issues, or order planning), renegotiate service-level agreements, consider dual sourcing for critical packaging, and apply corrective-action requests (CAR) with measurable follow-up targets.

iii. Stable:
Surabaya shows stable production with no significant changes. This stability can be used as a benchmark for setting realistic targets and identifying practices that can be replicated across other suppliers/material categories.

CONCLUSION

Based on the analysis of raw material supplier performance using the OMAX method, there are significant variations in the performance index between suppliers that affect logistics and production efficiency. In the seasoning category, FID Cikampek experienced an increase in performance index of 332.4%, from 0.34 (period I) to 1.47 (period II), followed by FID Semarang, which increased by 77.6%, from 0.58 to 1.03. This increase resulted in an increase in production of 339.4% and 80.5%, respectively, with total production in period II reaching 6,002,500 units for FID Cikampek and 4,205,833 units for FID Semarang. In contrast, FID Surabaya showed a drastic drop in the performance index, from 0.46 to -1.86, which could indicate inefficiencies in quality and delivery. In the seasoning oil category, FID Cikampek and FID Surabaya managed to improve their performance with the index increasing to positive in period II, while FID Semarang experienced a decline in performance from 0.36 to -0.88. In the vegetable category, FID Cikampek maintained a positive index (0.68 and 0.66) despite its production dropping by 1.3%, from 2,731,333 to 2,695,000 units. Meanwhile, in the packaging category, suppliers such as Cikupa and Cikampek experienced index declines of 51.1% and 27.4%, respectively, which were in line with production declines of 553,667 units and 539,000 units. Overall, the improvement in the supplier performance index had a positive impact on production efficiency, as seen in FID Cikampek and FID Semarang. However, declining performance at certain suppliers, particularly in the packaging and seasoning categories, directly contributed to declining logistics efficiency and production stability. This indicates that the correlation between logistics KPI efficiency and production productivity is very strong, so it is necessary to improve supplier performance consistency to support an optimal supply chain. Nevertheless, this study is limited by its single-company case scope, the use of 2024 operational records, and incomplete data for several suppliers/materials in certain periods, which may constrain

generalizability and correlation inference. Future research should extend the analysis to multiple plants/companies and longer observation periods, incorporate additional KPI dimensions (e.g., cost, flexibility, and risk), and apply statistical or predictive approaches to quantify the KPI–productivity relationship and evaluate the impact of specific improvement interventions.

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