

# Production Optimization Strategy with Implementation of Six Sigma in Increasing Company Profitability (Case Study of PT XYZ)

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**Abstract**— This study aims to examine the production optimization strategy using the implementation of six sigma and SWOT analysis (strength, weakness, opportunity, and treatment) in increasing production productivity and its impact on the achievement of the company's profitability ratios at PT XYZ. The sample used in this study is PT XYZ which is located in the KIIC Industrial Estate, Karawang, West Java. The research method used is qualitative research, the type of approach used is explanatory research with associative research approach. The sampling technique used is purposive sampling with non-probability sampling method. While the analysis technique used is descriptive analysis using six sigma analysis and SWOT analysis. The results of the research are (1) the determinant factors that can cause the production target not to be achieved such as the frequency of production shut down is quite high, the demand forecasting method is not precise, the material planning system is not precise and there are frequent revisions in the target policy from the marketing side; (2) solutions that can be used such as building a good work environment, improving work communication patterns, providing job training to employees, rearranging efficient working hours, conducting regular monitoring and evaluation, giving rewards to employees who have good work performance, and focus on the company's strategy and objectives; (3) implementation of six sigma and SWOT analysis can be used as a strategy in optimizing production as well as increasing the company's profitability ratio.

**Keywords**— Six sigma implementation, SWOT analysis, profitability ratios.

## I. INTRODUCTION

The development of the times in the era of globalization has had a very significant impact on the development of the business world which has resulted in increasingly fierce business competition. This situation has brought enormous changes to various industries, especially in the manufacturing sector. The increasing competition in the manufacturing industry will make consumers have more choices in choosing products. Therefore, every manufacturing company must have tactics and strategies in managing business continuity so that they are able to be competitive and survive the competition with other products. One of the important activities of a manufacturing company is production activities.

PT Taiho Nusantara is one of the branches of the Taiho Kogyo company is a manufacturing company engaged in the automotive component industry that produces several products including bearings, thrust washers, bushings, floating bushes, die casts, and shoe pistons. Production process activities can be said to be very important activities in the sustainability of PT Taiho

Nusantara because the number of products that can be produced in the production process will greatly affect the number of sales of products which will also have an impact on the company's financial condition and income.

PT Taiho Nusantara is a manufacturing company that carries out planning and the production process is determined based on requests from customers, the determination of production targets is determined after a request from the customer, the request is then processed and developed into the company's production programs and targets. In controlling the production process PT Taiho Nusantara adopts a system called kanban.

Just in time is a concept that delivers raw materials only when they are needed and manufactured products when they are needed. The focus of just-in-time efforts is on minimizing waste in manufacturing systems. The following is a comparison between target data and production realization from 2018 to 2020, as presented below.

**Table 1:** Comparison of Production Target and Actual Data

Year	Target	Realization	%	Conclusion
2018	Rp. 75.389.397	Rp. 66.679.169	88	Not Achieved

<b>2019</b>	Rp. 65.933.280	Rp. 60.879.027	92	Not Achieved
<b>2020</b>	Rp. 49.695.380	Rp. 45.285.327	91	Not Achieved

Sumber. Data HR. KPI Produksi PT Taiho Nusantara, (2022).

Based on Table 1.1. above, it can be explained that although in the continuity of the production process PT. Taiho Nusantara has adopted the kanban system, the data shows in the company's Key Performance Indicator (KPI) report that the realization of production in the last three years has never reached 100%, which is in accordance with the production plan target set by management. The impact of not achieving production realization at PT Taiho Nusantara indicates that there are problems in the production process that result in production effectiveness being not achieved. effectiveness is a performance measure that shows the relationship between goals (targets) and realized outputs or target realizations.

In the production process, the need for materials (raw materials) used by PT Taiho Nusantara, is supplied directly by the parent company, namely PT Taiho Kogyo Co. Ltd from Japan, because PT Taiho Nusantara wants to maintain the quality of the materials and products produced and is also a provision that has been set by the parent company. However, there are still some problems that often occur in the material requirements planning process and the material delivery process which takes a long time which then has an impact on the production process.

Referring to the KPI report data, it is known that the company is experiencing problems related to the frequency of the creation of defective products which is the cause of the problem of not achieving production effectiveness.

This defective product is a final product that has gone through the production process but does not meet the quality standards set by the company. In addition, the problem of production effectiveness caused by this defective product has an impact on PT Taiho Nusantara's business processes.

This is because as a manufacturing company that operates or produces production based on customer requests, production effectiveness is a very important part and is at the core of the company's sustainability because it will greatly affect the company's obligations in meeting customer needs. The number of products produced will affect the company's income.

Defective products will also be the root of other problems for the company's financial condition because defective products become products that have no value (selling price) which results in losses to the company. This production process problem affects the performance of the organization (company). especially on the company's ability to generate profits (profitability) to ensure the sustainability of the company. Company management must take action to improve and overcome production process problems so as to optimize the output of the production process and improve production effectiveness, so as to minimize the occurrence of defective products that will have an impact on increasing company profitability or organizational performance.

Riddish (2014) also said that the six sigma implementation practice in manufacturing industries in their research discusses methods for improving production processes and increasing productivity in the manufacturing industry with a six sigma approach and implementation. In the study they stated that six sigma introduced another way of thinking about process improvement and development with a primary focus on financial impact and how to reduce defects, customer satisfaction and ensure that all improved processes work and increase production output.

Tzu (2004), said that if an organization can understand and map the aspects of its strengths and weaknesses, then the organization has the opportunity to win the competition with other related and relevant organizations. map and analyze the weaknesses of the organization so that the organization can suppress and eliminate the determinant factors that can reduce aspects of the weaknesses of the organization. This means that if the organization can use the results of this analysis properly and correctly, then this analysis can be used as a strategic management instrument in formulating organizational policies.

## II. LITERATURE REVIEW

Baroto (2002), said that production is a process of converting raw materials into finished products. While the production system is a set of activities for the manufacture of a product, which in this manufacture involves labor, raw materials, machinery, energy,

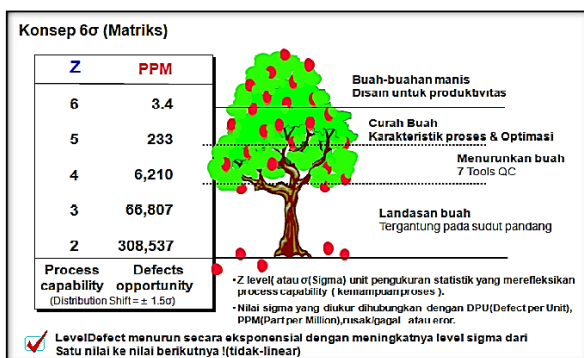
information, capital and management actions. Production planning and control are activities of the production system. The production system aims to plan and control production to be more effective, productive and optimal.

Six Sigma is an organizational approach to eliminate deviations and reduce waste in processes using a statistical approach. In 1995, the CEO (Chief Executive Officer) of a well-known company, General Electric (GE) Jack Welch decided to implement six sigma at GE and in 1998 GE claimed that six sigma had resulted in more than 750 million dollars in cost reductions and publicized this spectacular achievement extensively.

Define	Measure	Analyze	Improve	Control
Objective Define the Problem or Opportunity (30 – 50 Factors/Xs)	Objective Measure Current Performance (18 – 24 Factors/Xs)	Objective Analyze the Causes (10 – 15 Factors/Xs)	Objective Eliminate or Minimize Causes (6 – 9 Factors/Xs)	Objective Sustain & Optimize Improvements (3 – 6 Factors/Xs)
Steps - Identify problems - Define customer - Scope project - Define metrics - Problem statement - Set goals/estimations - Form team - Project kick off	Steps - Detailed process map - Value stream mapping - Identify quick wins - Determine all Xs - Prioritize Xs - Collect data - MSA - Determine baseline - Establish Capability	Steps - Root cause analysis - Identify failure modes - Prioritize Xs - Determine correlation - Analyze Xs based on data	Steps - Design an experiment - Execute an experiment - Generate solutions - Action planning - Design to-be process - Validate Y = f(X) - Implement solutions	Steps - Identify failure modes - Mistake proof - Monitor charts - Validate savings - Documentation - Sign Off
Tools - V6C - CTQ - Kano model - QFD - Opportunity & threat - Tree diagram - In & out frame - Stakeholder analysis - SIPOC - Macro process map - SWIH - Project charter	Tools - Process mapping - Value stream mapping - Fishbone diagram - Sampling techniques - MSA - Histogram - Pareto chart - Gap analysis - Sigma level - Process capability	Tools - 5 Whys - Cause & effect matrix - FMEA - Decision & risk study - Box plot - Run chart - Correlation - Regression - Scatter plot - Control charts - Hypothesis testing	Tools - DOE - Modeling - Solution generation techniques - Process mapping - APFM	Tools - FMEA - Time series chart - Control chart - Poka Yoke

**Figure 1: Road Maps DMAIC**  
*Source: DMAIC Way Teamfield Book*

Six sigma used by companies to improve the quality of existing business processes by regularly reviewing and improving these processes. To achieve this, Six Sigma uses a methodology known as DMAIC (Define, Measure, Analyze, Improve and Control).



**Figure 2: Six Sigma Metric Concept**  
*Source: Six-Sigma Quality for Business Improvement (2012)*

SWOT analysis (strengths, weakness, opportunities and threats) is a strategic management planning method that is used to analyze and evaluate aspects of the strengths, weaknesses, opportunities and threats that an organization has in carrying out its activities in accordance with its organizational goals. All of these processes involve and map the direction in determining specific organizational goals as well as identifying and mapping internal and external factors that can support the achievement of organizational goals, (Mariantha, 2018).

SWOT analysis is generally descriptive and is often interpreted and mapped subjectively, this is due to differences in paradigms and points of view in interpreting the aspects contained in this analysis between one related party (management) within the organization and other parties outside the organization (stakeholders). This is considered acceptable because basically the purpose of this analysis is only to provide and map out a picture in the form of output, namely the direction of organizational policies and not to be one of the strategic management instruments that can dominantly explain a phenomenon and or dynamic problem in both the internal and external environment.

## A. Formulation of The Problem

1. There are problems with the sustainability of the production process in the work environment of PT Taiho Nusantara which resulted in the failure to achieve production realization in accordance with the production targets set by the company's management which had an impact on profitability in the work environment of PT Taiho Nusantara, so that it greatly impacted the sustainability of the company's business.
2. Referring to the human aspect, there is still a lack of employee discipline; boredom in the environment and work routines; and workforce capabilities. Regarding the material aspect, the lack of effective procurement of quality materials; and material requirements planning. Related to the engine aspect, namely the replacement of engine parts, especially consumable parts; engine maintenance and repair system; machine life; machine technology is no longer relevant; and finally related to the implementation of SOPs.

## B. Research Purposes

1. The determinant factor that causes the production process does not achieve production effectiveness.



2. Solutions that can be used to ensure the production process achieves production effectiveness.
3. Six sigma and SWOT analysis strategies can optimize production which has an impact on increasing company profitability.

### III. METHOD

In this research, the researcher used descriptive qualitative method. The research method is a systematic-steps that will be a guide in solving problems. By doing this research method, a problem solving will be more focused and provide convenience in analyzing the problem until the activity concludes all the existing problems. A research is a long and comprehensive process, which starts from an interest in knowing a certain phenomenon.

The idea is intended to be more familiar with the problems that occur in the production process in the work environment of PT Taiho Nusantara. The conceptualization of the process is then poured into a complete research method with a pattern of observational analysis and data collection required. From the results of research and data collection, it is processed into information which can then be analyzed which in the end can draw the necessary conclusions.

Qualitative methods refer to research procedures that produce descriptive data, what is written and said by the observed person/behavior, KPI reports and other data. The type of qualitative descriptive research is to describe various ways to make strategic planning to improve existing conditions and deal with future periods. In carrying out this research, the researcher used the FGD (Forum Group Discussion) method. This method is

carried out to discuss and verify the results of the analyze and improve stages, in accordance with the company management's view of the sustainability of business processes in the work environment of PT Taiho Nusantara. In this stage, the researcher chose 6 informants who have responsibility for the continuity of production and have the authority to make decisions.

### IV. RESULT AND DISCUSSION

#### A. History of PT Taiho Nusantara

PT Taiho Nusantara is one of the branches of the Taiho Kogyo company. CO.LTD. which was established on October 9, 1998, with 100% ownership status owned by PT Taiho Kogyo Co.Ltd. PT Taiho Nusantara started operations in 1999 and carried out the production process by renting a factory owned by PT Astra Otopart Nusametal Division, in 2000 PT Taiho Nusantara started producing engine bearings, thrust washers, bushings for the deer and panther projects. Until 2002 PT Taiho Nusantara built a new factory with its own ownership and located on Jl. Permata Raya Lot BB-8B, KIIC Industrial Estate, Karawang Regency, West Java Province.

Based on the Regional Regulation of Karawang Regency No. 02 of 2013 concerning the Regional Spatial Plan (RTRW) of Karawang Regency, the location of the planned activities of PT. Taiho Nusantara is located in an area that is intended for industry, namely in the industrial zone area, with an area of  $\pm 30,190$  m<sup>2</sup>. PT Taiho Nusantara continues to make improvements and developments in the company's systems and management so that it can survive and continue to win the trust of customers.



**Figure 3:** Location Plan of PT Taiho Nusantara

*Source:* PT Taiho Nusantara, 2022.

## A. Business Activities

In accordance with the industrial business license granted by the Investment Coordinating Board on

December 6, 2000, PT Taiho Nusantara and other permits, PT Taiho Nusantara was granted a production permit with a production capacity.

**Table 2: Production Capacity of PT Taiho Nusantara**

No	Production Type (pcs)	Production Permit		Product Properties	
		Permission	Rill	1/2 So	So
1	Shoe Pistons	25,000,000	30,816,000	-	x
2	Bushings	9,000,000	5,027,838	-	x
3	Die cast	1,250,000	1,249,119	-	x
4	Bearings	26,000,000	24,225,582	-	x
5	RA coating			-	x
6	Washers			-	x

Source: HR & GA Documents, 2022.

## B. Six Sigma Implementation

At this stage the researcher will determine the conditions and problems in depth in the production process at PT Taiho Nusantara, namely by paying attention to the effectiveness of the production process. By paying

attention to the attributes that are very important to note because in the end it will be directly related to the level of production effectiveness in generating company profitability.

**Table 3: Recapitulation of Production Data of PT Taiho Nusantara**

No	Years	Target	Realization	Difference	
1	2020	49,695,380	45,285,327	91%	9%
2	2019	65,933,280	60,879,027	92%	8%
3	2018	75,389,397	66,679,169	88%	12%

Source: PT. Taiho Nusantara, 2022.

The data listed in the table above which is the company's KPI report for a period of 3 years, namely 2018-2020 explains that there is a difference between realization and production targets of around 9%-12% each year, this explains that the company is unable to produce to meet

the target. production that has been determined to meet customer needs, it can be concluded that there are problems in the production process that result in not achieving production effectiveness.

**Table 4: Recapitulation of Defective Production**

No	Year	Realization	Disabled	
1	2020	45,285,327	608.185	1.3%
2	2019	60,879,027	1,070,427	2.4%
3	2018	66,679,169	1,281,930	1.9%

Source: PT. Taiho Nusantara, 2022.

In addition to the problem of production effectiveness, the data above explains other problems in the production process, namely the frequency of occurrence of defective products (products that are not in accordance with the company's quality standards) in the work environment of PT Taiho Nusantara around 1.3%-1.9% per year. Problems in the effectiveness of production

and defective products have a very significant impact on the company's performance, especially on one of the performance indicators, namely the profitability of the company, so that by improving the production process problems it is predicted to improve production effectiveness, reduce the number of defective products and improve company profitability.

**Table 5: Recapitulation of Production Problem Categories**

No	Category	Number of Defective Units
1	Dekok	521,331
2	Scratch	474,348
3	Plot	408,757
4	Engine trouble	398,197
5	Side Rust	315,411
6	Thick/Thin	293,418
7	chamfer	220,511
8	Measurement	167,192
9	Fall down	77,497
10	Lot marking	46,857
11	Gompal	21,140
12	Oil Hole	11,613
13	Mold	3,524
14	Porous	746
<b>Total</b>		<b>2,960,542</b>

Source: PT. Taiho Nusantara, 2022.

**Table 6: Factors and Categories of Production Problems**

No	Factor	Category
1	Man	Fall down
		Scratch
		Measurement
2	Material	Mold
		Porous
		Side Rust
3	Machine	Engine trouble
		Dekok
		Oil Hole
		Plot
		chamfer
		Lot marking
4	Method	Thick/thin
		Gompal

Source: PT. Taiho Nusantara, 2022.

The results of the calculation of the profitability ratios obtained using three calculation methods and using the company's financial statement data for the last three years, namely 2018-2022.

**Table 7. Recapitulation of Profitability Ratio Calculation Results Year 2018-2020**

Year	Profitability		
	OPM	NPM	ROA
<b>2020</b>	-18.1	-19.2	-11,2
<b>2019</b>	-10.9	-14.5	-10.4
<b>2018</b>	-12.7	-12.5	-9.3

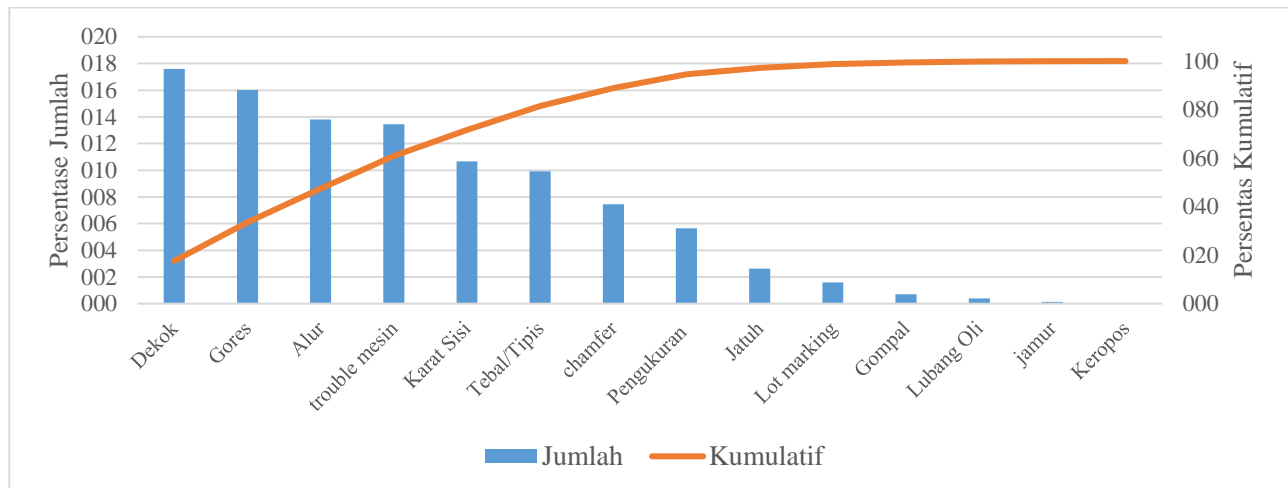
Source: PT. Taiho Nusantara, 2022.

The recapitulation of the profitability ratios in the table above shows that the company's profitability ratios for the last three years 2018-2020 in the three calculation methods have a negative value calculation result of around (9.2%) to (18.8%), this proves that the problem is sustainability. the production process in the work

environment of PT Taiho Nusantara which has not been able to achieve company effectiveness and the occurrence of defective products greatly affects profitability, that the company has not been able to use or maximize the resources it has in its operations in order to generate profits for the company.

Referring to KPI data for 2018-2020 related to the recapitulation of the causes of the problem of the effectiveness of the production of defective products which become production problems, an analysis is

carried out using a Pareto diagram to find out the sequence of causes of the company's production problems.



Category		Dekok	Scratch	Plot	Machine breakdown		Side Rust	Thick/Thin
Amount (%)		17.61	16.02	13.81	13.45		10.65	9.91
Cumulative (%)		17.6	33.6	47.4	60.9		71.5	81.5
chamfer	Pengu kuran	Fall down	Lot marking		Gompal	Oil Hole	mold	Porous
7.45	5.65	2.62	1.58		0.71	0.39	0.12	0.03
88.9	94.5	97.2	98.7		99.5	99.9	100.0	100.0

Figure 1: Pareto Diagram Production Process Problems PT Taiho Nusantara

Source: PT. Taiho Nusantara, 2022.

Based on the analysis using Pareto diagrams, it is known that there are six categories of defective product production problems that predominantly occur in the dominant production process with the percentage

occurring above ten percent, namely: (1) deck; (2) scratch; (3) plot; (4) engine breakdown; (5) side rust; and (6) thick and thin.

Table 8: Why Analysis of Production Problems

No	Factor	The main cause	Whys Analysis
1	Man	Lack of work discipline	There is a historical feud between the union and the company management
		Saturation in the environment and work routines	There is no rotation program for workers
		Labor Ability	There is no capacity building and refreshment program for the workforce
2	Material	Material Quality	The age of the material can only last for 4 months until it becomes the final product
		Material requirements planning	Error in calculating material requirements
3	Machine	Replacement of machine parts, especially consumable parts	preventive maintenance does not go according to target.
		Machine maintenance and repair systems.	The maintenance system was transferred to the principal machine maker in Japan.



		Machine life	There are five main lines still using machines that already have a service life of 20 years.
		Machine technology is no longer relevant	Most of the machining facilities are still using old technology
4	Method	SOP Implementation	Differences in the use of equipment

Source: PT. Taiho Nusantara, processed, 2022.

The improve phase or improvement phase is related to determining the implementation of solutions based on the results of the analysis that was carried out previously in the analyze phase. In this study, the activities carried out in the improve phase are to determine solutions or actions to overcome problems in the production process and then the solution will be designed into a business

strategy that will be discussed and verified with the company's management using the Forum Group Discussion (FGD). The strategy that will be designed will only be an input for the company to be considered for implementation. Designing solutions or actions to improve the production process.

**Table 9: Action Plans or Production Problem Solutions**

Factor	The main cause		Solution
<b>Man</b>	Lack of work discipline	There is a historical feud between the union and the company management	Resolve the dispute by taking a win solution for both parties
	Saturation in the environment and work routines	There is no rotation program for workers	Create a rotation program and evaluate individual performance
	Labor Ability	There is no capacity building and refreshment program for the workforce	Create a capacity development program and refresh the workforce
<b>Material</b>	Material Quality	The age of the material can only last for 4 months until it becomes the final product	Planning and calculating material requirements more precisely and accurately
	Material requirements planning	Miscalculation of requirements and material procurement planning	a. Make a study of substitution of materials from Japan with local materials  b. Looking for local material sources with equivalent quality at competitive prices to be submitted to management as an alternative
<b>Machine</b>	Replacement of machine parts, especially consumable parts	preventive maintenance does not go according to target.	Recalculate the life of components which are consumable categories and reformulate the preventive maintenance schedule.
	Machine maintenance and repair systems.	The maintenance system was transferred to the principal machine maker in Japan.	a. Propose training on maintenance and repair mechanisms to take over the maintenance and repair process. to shorten downtime in the event of a breakdown.  b. Propose a gradual rejuvenation of machinery facilities
	Machine life	There are five main lines still using machines that already	Propose a gradual rejuvenation of machinery facilities



		have a service life of 20 years.	
	Machine technology is no longer relevant	Most of the machining facilities are still using old technology	Propose a gradual rejuvenation of machinery facilities
<b>Method</b>	SOP Implementation	Differences in the use of equipment	Make procedures, socialize and evaluate their implementation

Source: PT. Taiho Nusantara, processed, 2022.

## 1. SWOT Analysis Implementation

Based on Table 4.21 above, it can be seen that the strength aspect score is 1.15, this can be interpreted that the company's current position is in a less strong position

because the company's internal position is below the average value of 1.17 (the number of weight-divided by three indicators from the aspect of strength).

**Table 10: IFE Matrix**

No	Internal factors	Weight	Rating	Weight x Rating
<b>Strength:</b>				
1	Most of the Car makers are our current Customers.	0.25	2	0.5
2	Employee status 100% permanent workers.	0.15	3	0.45
3	The production process starts from raw materials to finished goods.	0.1	2	0.2
<b>Weakness:</b>				
1	Some raw materials are still imported from other countries	0.25	2	0.5
2	Competitors also act as suppliers	0.15	2	0.3
3	Product design and testing is still at Headquarters	0.1	2	0.2
<b>Total</b>		1		2.15

The results above also indicate that the company's internal factors are relatively less strong in utilizing various forms of strength they have. The most dominant strength factor for the company is 0.50. These strength factors indicate that most of the car makers are loyal customers of PT Taiho Nusantara.

Meanwhile, the results of the assessment on the aspect of weakness show a score of 1.00. This can be

interpreted that the company's current position is in a strong position because the value of the organization's internal position is above the average value of 1.17. The results above also show that the company's internal factors are relatively strong to minimize various forms of weaknesses they have. The most dominant weakness factor for the company is 0.50. These weakness factors indicate that some raw materials are still imported from other countries.

**Table 11: EFE Matrix**

No	External Factors	Weight	Rating	Weight x Rating
<b>Opportunity:</b>				
1	The car market is still growing	0.05	3	0.15
2	Local toolmaker development	0.3	2	0.6
3	PTN location close to customers	0.2	3	0.6
<b>Threat:</b>				
1	The salary of employees in Karawang is the highest in Indonesia	0.2	2	0.4
2	The development of electric cars has been realized and masspro.	0.1	3	0.3
3	The Covid-19 disease adds a new variant called OMICRON.	0.15	4	0.6
	<b>Total</b>	1		2.6

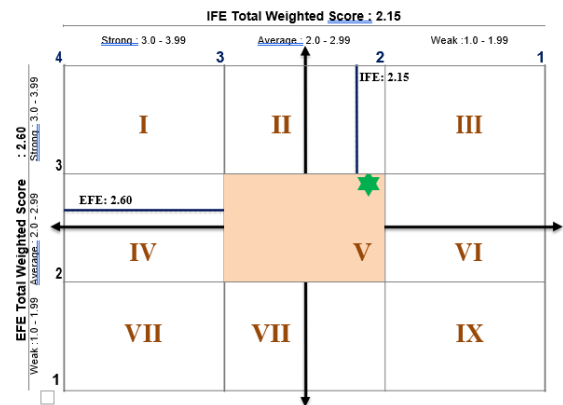
Based on Table 4.10 above, it can be seen that the score of opportunity aspect (opportunity) is 0.55, this can be interpreted that the company's current position is in a less strong position because the company's internal position is above the average value of 0.18.

The above results also indicate that the company's internal factors are relatively strong enough to take advantage of the various opportunities it has.

The most dominant opportunity factor for the company is 060. This strength factor indicates that the development of local tool manufacture and PTN locations are close to loyal customers of PT Taiho Nusantara.

Meanwhile, the results of the assessment on the threat aspect show a score of 0.45, this can be interpreted that the company's current position is in a strong position because the value of the organization's internal position is above the average value of 0.15. The results above also show that the company's internal factors are relatively strong in minimizing various forms of threats faced.

The most dominant threat factor for the company is 0.60. The threat factor indicates that the Covid-19 disease is increasing due to the discovery of a new variant of Omicron. The data obtained from the IFE and EFE Matrix from before, the total score for IFE is 2.15 and the score for EFE is 2.60. Thus placing PT. Taiho Nusantara in region V is as presented below.



**Figure 4: Analysis of I/E Matrix (Internal/External)**

Source: PT. Taiho Nusantara, processed, 2022.

In accordance with its understanding, the Competitive Profile Matrix (CPM) aims to identify the company's main competitors, strengths and weaknesses, especially in the company's strategic position. Because the critical success factors in CPM include internal and external issues, therefore the rating refers to strengths and weaknesses where 4 = major strength, 3 = minor strength, 2 = minor weakness and 1 = major weakness. In CPM, the ranking and weighted total score for competing companies can be compared with companies in the scope of benchmarking. Based on the results of IFE and EFE which stated that the total IFE score was 2.15 and EFE 2.60, it was the next step to analyze the CPM matrix. Based on the data obtained, the score obtained is based on CPM analysis with company performance, solid HR, market share, technological progress, HR competence, and branch limitations.

**Table 12: QSPM Matrix**

No	Internal & External Factors	Weight	Strategy 1		Strategy 2		Strategy 3	
			US	BAG	US	BAG	US	BAG
Strength:								
1	Most of the Car makers are our current Customers.	0.13	4	0.52	1	0.13	1	0.13
2	Employee status 100% permanent workers.	0.09	2	0.18	2	0.36	2	0.18
3	The production process starts from raw materials to finished goods.	0.08	4	0.32	3	0.24	4	0.32
Weakness:								
1	Some raw materials are still imported from other countries	0.12	-		-		-	
2	Competitors also act as suppliers	0.10	3	0.30	4	0.40	3	0.30
3	Product design and testing is still at Headquarters	0.09	2	0.18	2	0.18	4	0.36
Opportunity:								
1	The car market (automotive manufacturers) is still growing	0.14	4	0.56	4	0.56	2	0.28
2	Local toolmaker development	0.1	-		-		-	
3	PTN location close to customers	0.09	4	0.36	2	0.18	2	0.18
Threats:								

1	The salary of employees in Karawang is the highest in Indonesia	0.11	4	0.44	3	0.33	1	0.11
2	The development of electric cars has been realized and masspro.	0.12	3	0.36	3	0.36	4	0.48
3	Covid-19 disease adds a new variant called OMICRON	0.06	-		-		-	
<b>TOTAL</b>				3.22		2.74		2.34

The results of the QSPM matrix show that strategy 1 has the highest score of 3.22, followed by strategy 2 of 2.74 and strategy 3 of 2.34. Based on the results of the analysis carried out, the combination of Defensive Strategy, namely Cost Leadership and Intensive Strategy, namely market penetration and product development by carrying out investment strategies for business development so that it can continue to increase demand which has been increasing at PT. Taiho Nusantara.

## A. Discussion of Research Results

### 1. Determinant factors that cause the production process does not achieve production effectiveness

Based on information from PT Taiho Nusantara, it has been six years since 2015-2020 the company continues to experience losses every year, there are several contributing factors including a lack of employee discipline; burnout at work; the level of workforce capability possessed by each employee; quality of material requirements planning; quality of materials; replacement of engine parts; engine maintenance system; machine life; machine technology; and implementation of SOPs.

Therefore, the quality of production cannot be separated from the factors of production, without these five factors of production, a production process will not run smoothly. The determinant factors that affect production include: (1) natural resources in the form of raw materials from nature to produce goods (2) human resources as labor that will help companies produce goods (3) capital consisting of tools and a number of funds that support companies to run production operations; (4) expertise to coordinate and manage production factors so that they are on the right track, and (5) information resources in the form of information on market condition projections, raw material data, and employee knowledge.

### 2. Solutions that can be used to ensure the production process achieves production effectiveness

Team productivity is one of the determining factors for achieving company success. Therefore, it is important for companies to manage teams effectively in order to create a good working atmosphere and environment and support company productivity. Several solutions that can be used to ensure the production process achieves production effectiveness include: (1) building a good working environment; (2) improve work communication patterns; (3) provide job training to employees; (4) rearrange efficient working hours; (5) conduct periodic monitoring and evaluation; (6) provide rewards to employees who have good work performance; and (7) focus on the company's strategy and objectives.

Especially in the improve phase, the goal is to find and implement solutions that will eliminate the cause of the problem, reduce process variations and prevent the same event from happening again. This phase deals with the determination and solutions based on the results of the analysis that has been done previously in this phase. There are five steps in achieving these goals, namely: (a) generating creative ideas; (b) processing initial ideas; (c) choose a solution; (d) pilot tests; (e) full scale implementation.

### 3. Six sigma and SWOT analysis strategies can optimize production which has an impact on increasing company profitability

Six sigma as a process that focuses on reducing variation in business production processes to achieve tighter control over its operating systems, increase cost effectiveness and drive productivity breakthroughs. The basic principle of six sigma is product improvement by making improvements to the process so that the process produces a perfect product. Six sigma projects are oriented towards long-term performance through quality improvement to reduce the number of errors with the target of zero defects in process capabilities equal to or more than 6-sigma in measuring standard deviation.

Based on the results of the SWOT analysis in the previous section, a strategy can be drawn up, namely although some of the raw materials are still imported from other countries, PT Taiho Nusantara most of the car makers are loyal customers to the company. Thus, it is necessary to provide and utilize local resources to support the company's production process. The threat of the spread of COVID-19 is currently still an obstacle for many manufacturing companies in Indonesia.

Production efficiency analysis is used to measure the level of efficiency, which is a method used in the production process by producing maximum output by suppressing production expenditures as low as possible, especially raw materials or can produce maximum production output with limited resources. In this production concept, technical efficiency and economic efficiency or price efficiency are often known (Doll & Orazem, 1984).

## V. CONCLUSION

Based on the results of data analysis and discussion in the previous chapter, the conclusions in this study include the following:

1. The determinant factors that can cause the production target not to be achieved such as the frequency of production shut down is quite high, the demand forecasting method is not precise, the material planning system is not right and there are frequent revisions in the target policy from the marketing side.
2. Solutions that can be used include building a good work environment, improving work communication patterns, providing job training to employees, rearranging efficient working hours, conducting regular monitoring and evaluation, giving rewards to employees who have good work performance, and focus on the company's strategy and goals.
3. Six sigma implementation and SWOT analysis can be used as a strategy in optimizing production as well as increasing the company's profitability ratios.

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