Strategic decision analysis to enhance labor productivity affected by sick leave absenteeism in the manufacturing industry

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ABSTRACT
Purpose: To analyze the effect of sick leave absenteeism on labor productivity in a manufacturing factory and recommend strategies to meet the 2% absenteeism target.
Methodology/approach: Mixed qualitative–quantitative method using Kepner-Tregoe analysis, fishbone diagram, and prioritization matrix. Data came from attendance records, medical reports, interviews, FGDs, and secondary sources.
Results/findings: Sick leave contributed 3.06% to a total absenteeism rate of 3.36% in 2022, exceeding the target. Key causes were lifestyle issues, unsafe work areas, financial motives, ergonomics, chemical exposure, and weather. Six priority solutions were set: validate sick notes, healthy condition competitions, strengthen safety culture, Kaizen for work improvements, provide PPE, and healthy lifestyle education.
Conclusions: With a US$9,050 budget, the six strategies can reduce absenteeism and improve productivity if monitored over six months.
Limitations: Focused on one factory with ~550 employees, limiting generalization.
Contribution: Presents an integrated decision-making model for reducing absenteeism and boosting manufacturing productivity.

Keywords: *Absenteeism, Worker Productivity, Manufacturing Competitiveness, Production Costs,*

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1. Introduction
In the manufacturing industries, there are many measurements that are measured periodically by the factory leadership team to track the factory performance (Rajafi, Irianto, & Baridwan, 2024). Factory performance refers to the overall effectiveness and efficiency of a manufacturing facility in producing goods or providing services (Gunawan & Mappadang, 2024). It involves measuring and evaluating various aspects of the factory's operations to assess its productivity, quality, and overall success in meeting its goals (Mondal, Akter, Moni, & Polas, 2024).

One of the factory performances to be measured is related to people cost (Huang & Badurdeen, 2018). As part of the people cost measurement, the factory leadership team put absenteeism rate as one of the key KPI. The Factory leadership team puts the target of absenteeism rate is maximum of 2% of employee compared to all employees in the factory.

In the 2022-FY, the result of the absenteeism rate is 3.36%. Meaning that the result is out of target which is a 2% absenteeism rate. This condition makes the labour productivity becomes out of expected target and impacting the people cost to factory.
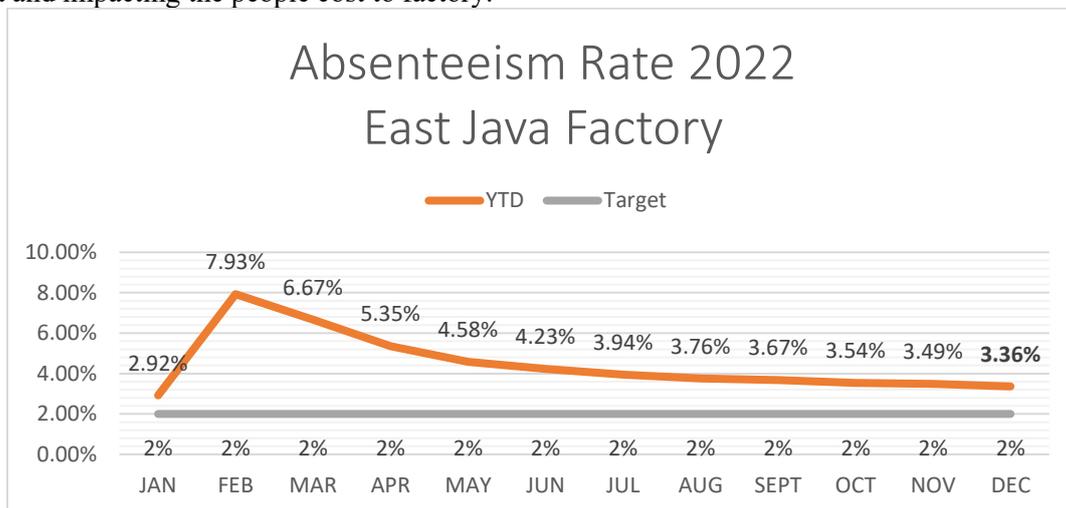

Figure 1. Accumulative of Absenteeism Rate - 2022
Source: Internal Data – Factory Performance

Refer to the Figure 1.1, the absenteeism rate since the beginning of 2022 did not meet the target. In the January the absenteeism rate was started at 2.92% and after that the rate became fluid and never met the expected target. In the December, the absenteeism rate was 3.6% (YTD) and close the year 2022 with average result does not meet the expected target.

Thus, factory leadership team would like to put absenteeism rate as one of the key priorities on top of others. Factory leadership team would like to reduce the absenteeism rate from the 3.6% to 2% as same as the target. The 2% target was top-down direction from the senior management team in the company.

1.1 Research Questions and Research Objectives
*1.1.1 Research Questions*To ensure the business continuity and sustainability of the company, decision-making is needed to find out the best solution to solve the high of absenteeism rate in the East Java factory. This research highlights the following questions for further investigation and recommendations to make decisions and recommendations on how to reduce the absenteeism rate that company can use:
1. What is the biggest factor/criteria that make the absenteeism rate high?
2. What is the best approach to solve the high of absenteeism rate issue?
3. How could the data improve the labour productivity?

*1.1.2 Research Objectives*This research aims to provide a recommendation by keeping the absenteeism rate meets the target and provide a clear guidance for the business or involved stakeholders in term of facing the absenteeism rate issues with the following objectives:
1. To identify the gap between the current situation in the company compared to the expected outcomes.
2. To create a new standard/workflow of the governance process that can be a guideline for the business users/involved stakeholders.
3. Provide recommendations for the business to keep or maintain the solutions to keep the absenteeism rate meet the target.

1.1.3 Research Scope and Limitation
This research has scopes and limitations as follows:
1. Scope
    a. This research focuses on the company as mentioned in the company profile.
    b. This research focuses on the East Java factory where the factory in the company operates.
    c. The department that will be impacted is Supply Chain (manufacturing).
    d. The data that will be used in this research only for East Java Factory.
2. Limitation
    a. The research only focuses on East Java factory.
    b. The number of employees in the East Java factory around 550 Employees.
    c. Some confidential information will be excluded to this research.

1.1.4 Writing Structure
This research applies a standard writing structure that has been set by the framework of the Bandung Technology of Institute as follows:
1. Chapter 1: Introduction
2. Chapter 2: Literature Review
3. Chapter 3: Research Methodology
4. Chapter 4: Result and Discussion
5. Chapter 5: Conclusion and Recommendation

2. Literature review

In this research, the framework of selecting the best alternative solutions for reducing the absenteeism rate will be explained in the sub-chapter (Otonne & Ige, 2023). It also explains the tools and the process used to identify the root cause and the alternative solutions to overcome the problem in the current situation (Gangidi, 2018).
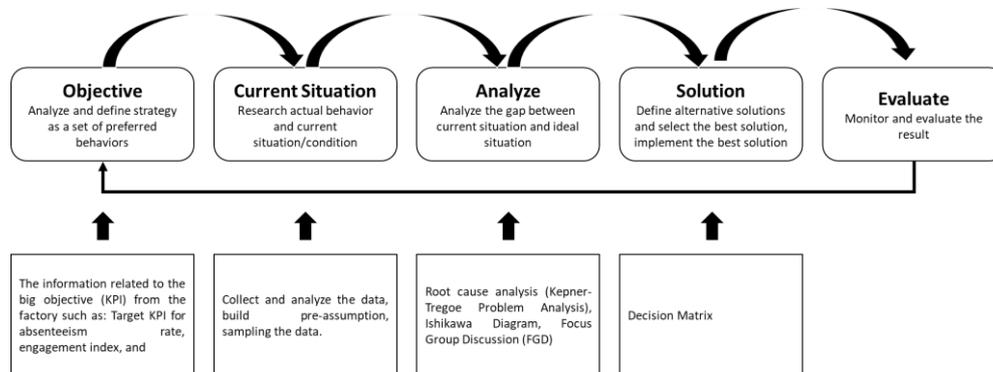

Figure 2. Research Framework
Source: Author

*2.1 Theoretical Foundations**Kepner-Tregoe (KT) Problem Analysis*
Kepner-Tregoe (KT) is a problem-solving and decision-making methodology developed by Charles H. Kepner and Benjamin B. Tregoe. It provides a systematic approach to analysing and resolving complex problems and making effective decisions in various organizational contexts (Markopoulos, Refflinghaus, Roell, & Vanharanta, 2022). The Kepner-Tregoe methodology consists of four main steps:
1) Situation Appraisal: In this step, the problem or decision is defined, and the desired outcome is established. The focus is on understanding the current situation, identifying any deviations from the expected standards, and determining the urgency and importance of the issue (Weckenmann, Akkasoglu, & Werner, 2015).
2) Problem Analysis: Once the situation is appraised, the next step is to analyse the problem in detail. This involves identifying the possible causes of the problem and gathering relevant data and facts.

The goal is to separate the symptoms from the causes and gain a clear understanding of the underlying issues.

3) Decision Analysis: After the problem is thoroughly analysed, potential solutions or alternatives are generated. Each alternative is evaluated based on its potential benefits, risks, and feasibility. Decision analysis techniques, such as decision trees or decision matrices, are used to compare and rank the alternatives objectively.

4) Potential Problem Analysis: The last step involves assessing the potential risks or negative consequences associated with the chosen solution. By anticipating potential problems, organizations can develop contingency plans and mitigate risks effectively.

The Kepner-Tregoe methodology is widely used in various industries and sectors, including business, engineering, project management, and IT service management. It provides a structured and logical approach to problem-solving and decision-making, helping individuals and teams make informed choices and resolve complex issues.
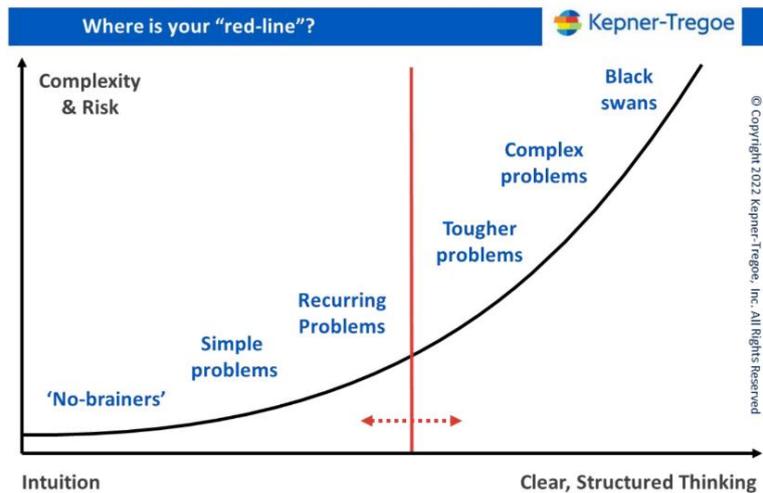

Figure 3. Critical thinking in complexity management
Source: (Markopoulos et al., 2022)

2.1.2 Fishbone Diagram

A fishbone diagram, also known as a cause-and-effect diagram or an Ishikawa diagram, is a visual tool used to identify and organize the potential causes of a problem or an effect. It is named after its shape, which resembles the skeleton of a fish, with the effect or problem at the head and the potential causes branching out like bones (Putri, Syamsu, & Triono, 2024).

The fishbone diagram is commonly used in problem-solving and quality improvement initiatives to systematically analyse and understand the root causes of an issue. It helps teams or individuals brainstorm and categorize the various factors that may contribute to the problem. By visually mapping out the causes, it becomes easier to identify the most likely sources of the problem and develop appropriate solutions (Coccia, 2018).

Here are the main components of a fishbone diagram:
1) Problem/Effect: This is the central issue or the effect that you want to investigate. It is typically written as a statement or a question at the head of the diagram.
2) Main Categories: The main branches of the fishbone diagram represent different categories of potential causes. Commonly used categories include the 6Ms (Manpower, Methods, Materials, Machinery, Measurements, and Mother Nature) or the 4Ps (Policies, Procedures, People, and Plant).
3) Sub-causes: Each main branch is further divided into sub-branches, representing specific factors or causes that could contribute to the problem. These sub-causes can be brainstormed and added to the diagram.

4) Analysis: Once the diagram is complete, teams or individuals can analyse the potential causes and prioritize them based on their relevance and impact. This analysis can help guide further investigation or problem-solving efforts.
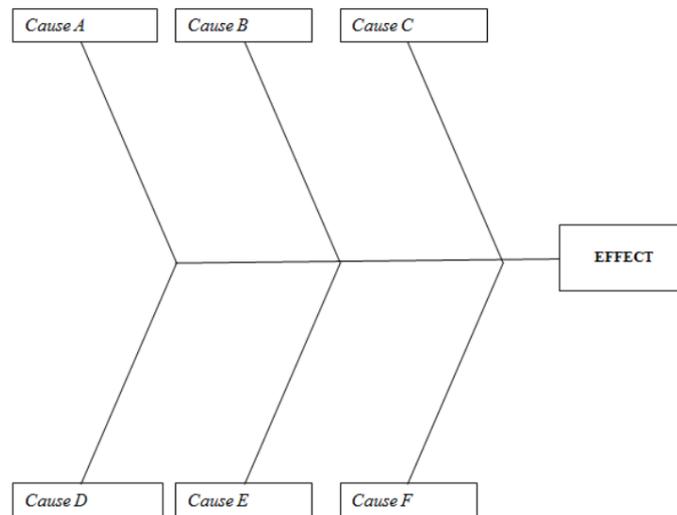

Figure 4. Fishbone diagram
Source: (Coccia, 2018)

By visually organizing the causes, a fishbone diagram encourages a systematic and comprehensive exploration of the problem, considering multiple dimensions and perspectives. It promotes team collaboration, as it allows for the involvement of different stakeholders who can contribute their expertise and insights (Barrane, Ndubisi, Kamble, Karuranga, & Poulin, 2020).

2.1.3 Prioritization Matrix

A prioritization matrix, also known as a decision matrix or a weighted scoring matrix, is a tool used to evaluate and prioritize options or alternatives based on multiple criteria (Odu, 2019). It helps decision-makers objectively assess and compare different options by assigning weights to criteria and scoring each option accordingly (Ginige, Amaratunga, & Haigh, 2018). The prioritization matrix typically involves the following steps:

1) Define Criteria: Identify and define the criteria that will be used to evaluate the options. These criteria should be relevant, measurable, and specific to the decision at hand. Examples of criteria could include cost, time, quality, customer satisfaction, or any other relevant factors.
2) Assign Weights: Assign relative weights to each criterion to indicate its importance or priority compared to the other criteria. The weights can be determined based on the significance of each criterion in achieving the desired outcome. The sum of the weights should add up to 100% to ensure consistency.
3) Define Scoring Scale: Define a scoring scale or range for each criterion. This scale can be numerical, such as a scale of 1 to 10 or 1 to 5, or it can be descriptive, such as low, medium, and high. The scoring scale should be consistent across all criteria.
4) Evaluate Options: Evaluate each option or alternative against the defined criteria and assign scores based on the scoring scale. This evaluation can be done by individuals, or a group of stakeholders involved in the decision-making process. The scores reflect the performance or suitability of each option for each criterion.
5) Calculate Weighted Scores: Multiply the scores of each option by the corresponding criterion weights to calculate the weighted scores. This step emphasizes the relative importance of each criterion in the overall evaluation. The weighted scores provide a quantitative measure of each option's overall performance.
6) Total the Scores: Total the weighted scores for each option to obtain the overall scores. The option with the highest overall score indicates the most favourable choice based on the defined criteria and their respective weights.

7) Interpret and Decide: Analyse and interpret the results of the prioritization matrix. Consider the overall scores, along with any additional insights or considerations, to make a final decision or prioritize the options.

Figure 5. Impact vs Effort matrix
Source: (Ginige et al., 2018)

2.2 Conceptual Framework

The process in making product in Supply Chain departments will have significant impact in defining the product's price (Tao, Wang, & Zhu, 2023). Hence, the manufacturing process in the Supply Chain department should be monitored and managed properly (Shao, Liu, Li, Chaudhry, & Yue, 2021). Managing the production cost in the manufacturing process is important as well as produce a high-quality product to be delivered to the consumers.
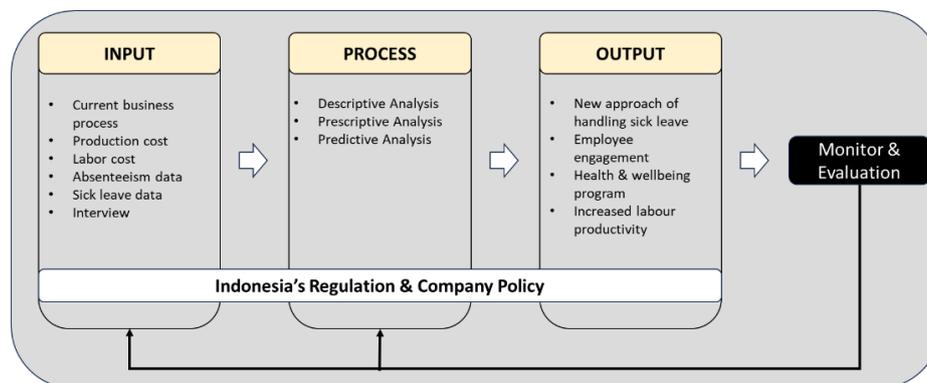
Figure 6. Conceptual Framework
Source: Author

Indonesia's regulation in regard of manpower related and company's policy will be the basic or foundation in this activity. The author will follow the regulation since the beginning until the end of process. After that, the continuous improvement will be circulated as a final approach to continuously check that all the output has met the objectives or not (Xu et al., 2023). If in any case the output does not meet or cannot exceed the objectives, then the activity will be back from data Input section or in the Process section depends on the evaluation result.

3. Research Methods

The author utilized a sample of primary data adjusted for research purposes which includes the number of employees, sick leave data, cost per headcount, as well as the detail activity of the employees. The author also conducts focus group discussion, interview session, and survey to employees. This framework will help the author to define the real problem and provide alternative solutions to solve the root causes.

3.1 Research Design

The research design will include end-to-end activities that cover from start to end activities followed by the assessment result, proposed alternative solutions, and recommendations for the business. The author uses Indonesia's regulations and business company's policies as the baseline to conduct all activities.

The purpose of the research design is to explain on how to start the concept to be carried out. In this case the author would like the reader to understand about the flow of the research and can help to understand easier and better of this research. It will begin with the objective of the organization followed by gather the data whether internal or external. After gathering the data, this will be continued by data analysis and clustering the information to make data more concise and easier to be addressed. The clustered data will help the researcher to classify the problem and propose the alternative solutions.

By using the research design framework, at the end of this research, the researcher would like to provide recommendations for the business and increase the labour productivity by reducing the absenteeism rate. The aim of this research is to help the business grow better and solve the problem.

The sequence of research design will be as follows:
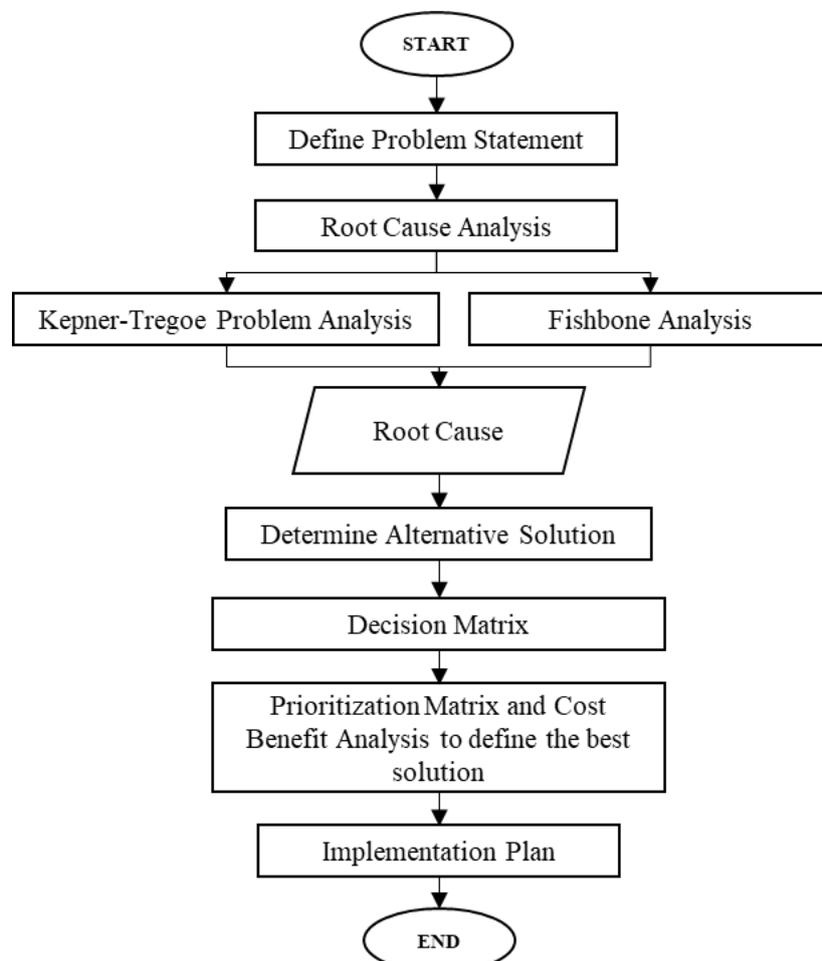

Figure 7. Research Design
Source: Author

3.2 Data Collection Method

The data collection method will be conducted and will be elaborated using both Primary Sources and Secondary Sources. The author will use quantitative and qualitative data to be collected as a basis for this research (Djamba, 2002; Khoa, Hung, & Hejsalem-Brahmi, 2023). The approach to collect the data as follows:
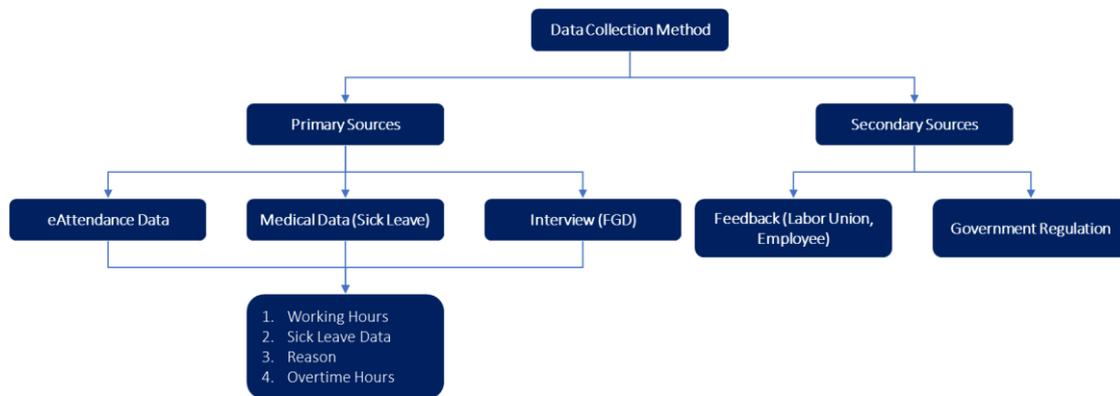
Figure 8. Data Collection Method
Source: Author

3.2.1 Primary Sources

The Primary Sources will collect uses 3 different data. It is related to the e-attendance data, medical data, and the interview to the specific person. It will result the data that can be used for the research including: working hours, sick leave absenteeism, reason of absenteeism, and the overtime hours that strongly correlate with labor productivity.

1) E-Attendance

By generate the data from the system, the author will be able to start analyzing the working hours, overtime hours, absences, as well as employee who are taking sick leave.

2) Medical Data

Using the medical data that company has collected, it is important and will play important role in the research. The data will explains about the reason why employees are taking leave, type of sickness, as well as the frequency of sickness.

3) Interview

The interview can be conducted through one-on-one session or Focus Group Discussion (FGD). The aim of the interview is to collect qualitative data to support the analysis through e-attendance and medical data. Through the interview, the employee can give a suggestion to company related to the current problem.

3.2.2 Secondary Sources

To ensure that all the data collected are in place, the author will gather secondary information from Labor Union and Government Regulation. The feedback or aspirations from Labor Union will play significant role in the development of business strategies. In this case Labor Union will feel involved in the designing of the strategy and increase the ownership level. At the same time, we know that in regard to manpower matters it will strongly correlate with government regulation. So, it should consider government regulation as the information sources.

3.3 Data Analysis Method

As the explained in the above statement, the author will use quantitative and qualitative data analysis method to ensure that the decision to be made has met several aspects of the business point of view.

3.3.1 Qualitative Method

To analyze the data, the author will use qualitative methods to have the overview related to the current situation and the expectation from the targeted stakeholders. The list of data that will be used as qualitative measurement as follows:

1. Interview: One-on-One session

The interview will be conducted to collect the information and employee aspirations.

2. Focus Group Discussion

Focus Group Discussion (FGD) to align the answer from on employee with others or to have a common sense related to the current situation (Akyıldız & Ahmed, 2021). As well as the aspiration from the group discussion result, what is their pain/problem and their expectations to the company (Themelis & Tang, 2023).

3. Government Regulations

As a foundation to protect and avoid unnecessary action that breach the regulations of Indonesia's government (Husen, Anwar, Rahman, & Hidjaz, 2023). Government regulation will be set as a baseline for this research.

3.3.2 Quantitative Method

1. Absent Hours

The total hours of employee who are not coming in their schedule. The absent hours include Illness, Lost Time Accidents (LTA), Absence without reason, Long-term Illness, and Illness whilst pregnant. The absent hours also exclude Vacations, Absence with company interest, Maternity leave, and Training (Schmutte & Skira, 2023).

2. Total Working Hour

The accumulation of total number of working hours and total number of absent hours (Park et al., 2023). This number is required to understand the total hours to be calculated to create a product. It will strongly correlate with labor productivity.

3. Overtime Hour

Overtime cannot be avoided whenever any additional manpower outside the scheduled manpower. The production team already designed the manpower to run the activity in the production area and need an overtime when there is additional manpower is needed to do manpower backup (Lasahido & Setyaning, 2024). The production team will require manpower backup for certain activities such as: backup for the person who are taking individual leave, sick leave, absence without reason, etc.

4. Manhour/Ton

Manhour/ton is the formulation of calculating the manhour needed per ton. The more manhour needed indicates the more resource to created product per ton. Meaning that less manhour needed is better for the production.

5. Cost/Ton

The total cost of creating a product per ton. As well as manhour/ton, cost/ton is strongly correlated with the productivity in the production team. The production team needs to reduce the cost required to create a product in 1 ton. In this case, the focus of cost breakdown is more to working hour and overtime hour.

6. Absenteeism Rate

Absenteeism is measured as a ratio of absent hours over the total hours worked in the factory.

$$\text{Absenteeism \%} = \frac{\Sigma \text{ Absent hours of direct labor} + \Sigma \text{ Absent hours of indirect labor}}{\Sigma \text{ Working hours} + \Sigma \text{ Absent hours}} \times 100$$

The sequence of interview and Focus Group Discussion (FGD) including the participants will be done as follows:

Targeted participants

Table 1. Targeted Participant of Interview & FGD

Position	Remark
Labor Union leader	Representative of union organization
Labor Union secretary	Representative of union organization
Employee 1	The people who are ranked as highest of sick leave
Employee 2	The people who are identified has top 5 highest of sick leave

Employee 3	The people who are identified as the most fit employee (no sick leave in 1 year)
Employee 4	The people who are ranked as highest absence with no reason
Employee 5	The people who don't have absent
Team Leader 1	The people who are responsible to find the backup employee
Team Leader 2	The people who are responsible to find the backup employee

4. Result and Discussion

Month	Leave	Long Leave	Menstrual Leave	Maternity	Holiday	Late Enter	Early Leaving	Absent	In-Sharp	Mgmt Discretion	Leave no Pay	Go Home Earlier	Go Home Earlier Cut Overtime	Go Home Earlier in Holiday	Union Discretion	Sick Leave	Late	Late Cut Overtime	Late in Holiday	No Check In	No Check Out	Grand Total
JAN	1,050	134	5		3,649	45	8	49	15,375	645	-	3	1	16	56	587	78	51	-	24	17	21,793
FEB	637	115	4		3,390	30	3	27	11,782	847	-	2	6	12	12	2,625	65	44	-	31	24	19,656
MAR	1,318	170	4		2,202	63	12	277	16,371	246	-	1	2	8	138	646	112	84	1	52	24	21,731
APR	1,943	151	5		2,826	18	2	44	11,564	2,268	1	5	4	4	84	154	27	44	-	19	13	19,176
MAY	2,132	224	4		4,676	30	7	4	9,622	1,556	10	-	1	7	49	217	36	51	-	20	15	18,661
JUN	736	94	6		2,530	33	15	65	12,023	134	3	2	-	10	55	262	33	41	-	26	12	16,080
JUL	524	136	4	-	3,179	22	2	34	11,517	660	2	-	1	3	99	271	38	52	-	27	14	16,585
AUG	393	96	6	-	2,683	14	7	18	12,627	158	-	2	2	4	88	364	39	47	-	19	18	16,585
SEPT	350	82	4	-	2,133	11	4	31	12,185	680	9	1	1	3	31	426	31	34	-	20	14	16,050
OCT	455	89	7	-	3,308	20	3	22	12,257	415	15	5	-	4	21	361	36	29	-	17	17	17,081
NOV	368	59	8	-	2,240	15	3	32	12,746	383	3	3	2	-	82	456	43	32	-	31	24	16,530
DEC	678	101	6	-	2,235	3	3	37	12,624	899	17	2	2	3	61	271	32	44	1	20	11	17,050
Grand Total	10,584	1,451	63	-	35,051	304	69	640	150,693	8,891	60	26	22	74	776	6,640	570	553	2	306	203	216,978

In this chapter, the author would like to explain about the analysis using the method as mentioned in the previous chapter. Starting from the analysis, business solutions, as well as implementation plan & justification. By the result and discussion chapter, the author would conclude about the analysis result using the decision-making mechanism.

4.1 Analysis
In the current state, the author would like to understand the breakdown of absence from work. Refer to below diagram, we can understand about the component that create absenteeism.
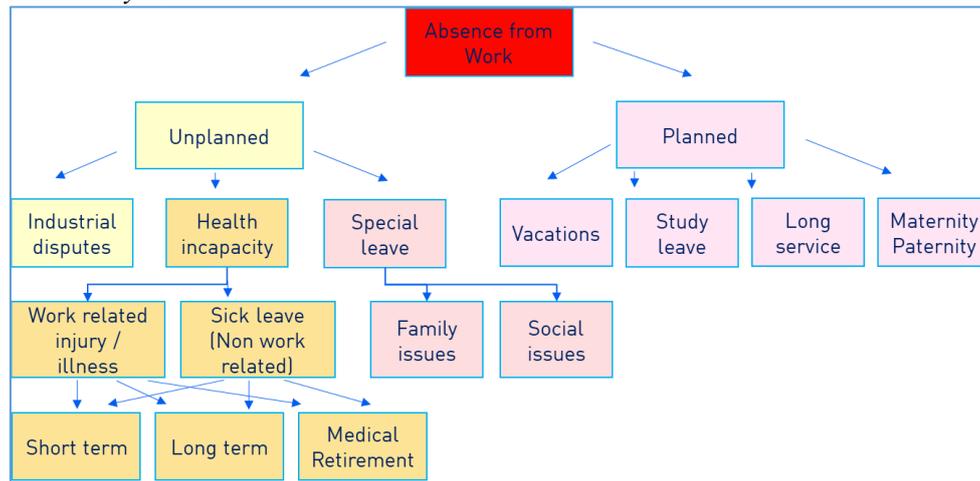
4.1.1 Problem Analysis

Figure 9. Absence from work divided by its category
Source: Author

Absenteeism can be defined as non-attendance of work by the employee. In the Production team, normally observed in 2 types of non-attendance which is unplanned and planned. By looking at the definition of absenteeism rate, the focus of this research will be on the absent hours include Illness, Lost Time Accidents (LTA), Absence without reason, Long-term Illness, and Illness whilst pregnant. To calculate the absenteeism rate, the company has set the standard calculation as follows:

$$\text{Absenteeism \%} = \frac{\Sigma \text{ Absent hours of direct labor} + \Sigma \text{ Absent hours of indirect labor}}{\Sigma \text{ Working hours} + \Sigma \text{ Absent hours}} \times 100$$

Refer to the calculation formula and follow the company guideline, will use the specific data:

Absent Hours of Direct Labor
Sick Leave, Absent (no reason)
Absent Hour of Indirect Labor
N/A (no indirect labor)
Working Hours
Grand total from the above criteria

Following above guidelines, the absenteeism rate that strongly correlate with the productivity and contribute 3.36% for 2022 as follows:
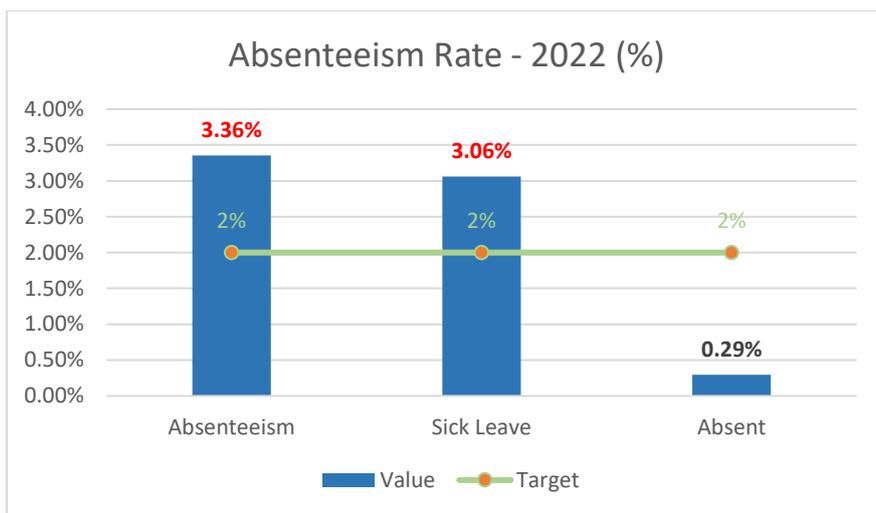
Figure 4.2: Absenteeism Rate 2022 compared to Target (2%)
Source: Internal Data – Author

Based on the above data, it is shown that the result in 2022 did not meet the target which the result was more than 2%. When it comes to detailing the component of absenteeism rate, the result shown that sick leave rate already over the target with the result 3.06% meanwhile the absent with no reason was 0.29%. To check the detail of distribution, here is the detail of each month in 2022:
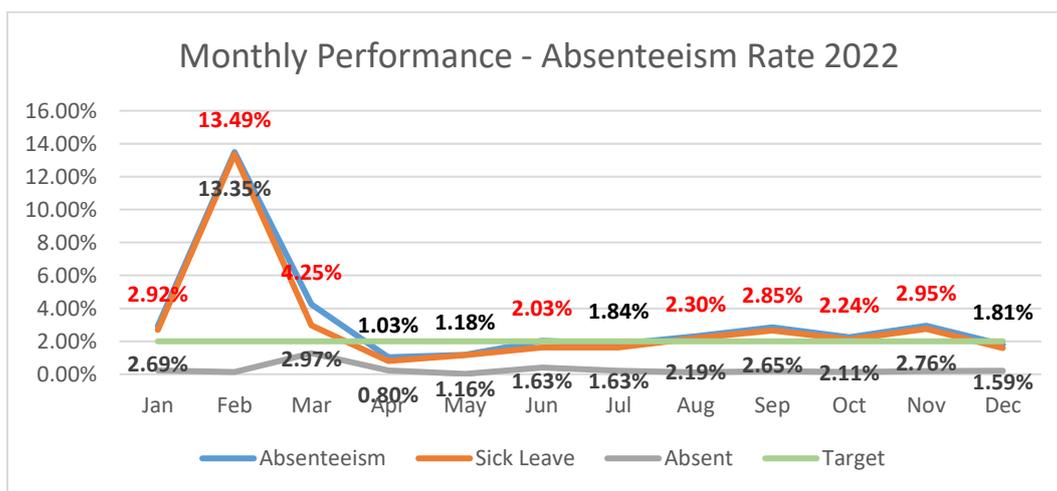
Figure 4.3: Absenteeism Rate 2022 followed by the detail – monthly basis
Source: Internal Data – Author

Refer to the data above, it is confirmed that the absenteeism rate was driven by the sick leave. The percentage of sick leave was almost the same as absenteeism percentage.

4.1.2 Kepner Tregoe Analysis
To understand the business issue related to absenteeism rate did not meet the target because the sick leave rate is high, the Author will use Kepner-Tregoe (KT) Problem Analysis to find out the root cause of the business issue and focusing on sick leave.

4.1.3 Situation Analysis
To understand the current situation, the author conducts situation analysis to know more about what is happening. The focus of the situation analysis is high of sick leave rate that causing high of absenteeism rate.

Table 4.2: Situation analysis – sick leave

Situation	Timing	Trend	Impact	Process
Prepare backup person to replace employee who are sick	H	H	H	DA
Verify the sick statement letter from hospital/clinic/doctors	M	L	H	PPA
Educate employee and their family about healthy lifestyle	M	M	H	PPA
Ask employee with high frequency of sick leave rate to do MCU/deep checking about their condition	L	L	H	PA
Line Manager confirming employee who are taking sick leave	M	M	M	DA
Block/blacklist the hospital/clinic/doctor which issuing sick statement letter	L	L	M	PPA
Visit employee to find out the situation in their house and the condition of their family	L	L	L	PPA
Check working environment and fix the unsafe condition	M	M	M	PPA
Educate about safety is priority	M	M	M	PPA

Source: Author

4.2 Problem Analysis

After conducting situation analysis, the Author uses problem analysis:

Table 4.3: Problem analysis – sick leave

PROBLEM: High of absenteeism rate due to high of sick leave rate				
	IS	**IS NOT**	**DISTINCTION**	**CAUSE**
WHAT	Sick leave rate	Absent with no reason	Sick leave will not be punished by the company, while absent will impact to employee's performance	Stress, careless eating, lifestyle, sick statement letter is easy to get, work accident, weather condition
WHEN	Work with normal activity	No production (engagement activity)	No production is the day with no activity. Employee will have engagement activity	Stress, avoid working
WHERE	Shop floor (factory)	Management office	Shop floor is the place of blue-collar employee, while management office is the place of management team	Working environment, physical fatigue
EXTEND	Blue Collar employee	White Collar employee	Blue collar entitle overtime pay, white collar does not entitle overtime pay	To give opportunity other employees (colleagues) to get additional income (overtime pay)
The possible cause is of the problem above will be categorized as follows: **WORK** 1. Working environment 2. Fatigue **BEHAVIOR/MAN**				

| 1. Careless eating |
| 2. Lifestyle |
| **ECONOMY** |
| 1. Helping other employees to get more income (overtime pay) |
| 2. Stress (debt: cooperative, online debt, bank) |
| **OTHERS** |
| 1. Weather condition |
| 2. Easy to get sick statement letter |
| To verify above statement will use Ishikawa diagram, employee interview, and focus group discussion |

Source: Author

4.2.3 Focus Group Discussion

The Focus Group Discussion (FGD) was held to gather the qualitative data that can be used to validate and verify the analysis. The summary of the focus group discussion will be summarized as follows:

No	Category	Summary
1	Sick Leave Category	9 out of 9 participants are aware and understand that there are employees who are taking sick leave
2	Sick Leave Absenteeism	5 out of 9 participants ever took a sick leave. The reason they showed up during the discussion is because uncertainty weather or fatigue.
3	Backup Person	9 out of 9 participants are aware that the employees who are absent with any reason will be backed up by other employees
4	Backup Person	8 out of 9 participants feel happy if any employees are absent because they can be a backup person and increase their income because of overtime
5	Working Area	5 of 9 participants feel that some particular area specifically in the chemical area & pallet area in the production line need more attention to have a better working area condition.
6	Procedure	7 of 9 participants suggest to the company to review and update the working instruction/SOP that is relevant to current condition.
7	Lifestyle	9 of 9 participants agree that after working hour (when they are not in the factory), the lifestyle is not under control.

4.2.4 Fishbone Diagram

After completing find out the problem analysis using Kepner-Tregoe (KT), the Author would like to verify the root cause analysis based on above analysis by using Ishikawa diagram. The pre-assumption was built before doing the fishbone analysis that the focus of the problem is high of sick leave absenteeism.
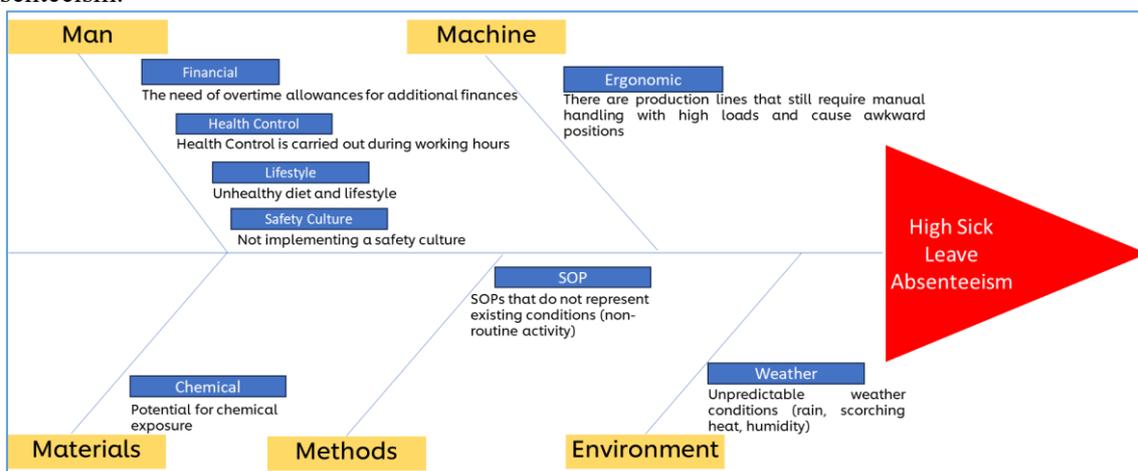
Figure 4.4: Root cause analysis of sick leave absenteeism rate
Source: Author – Internal data

To do deep verification, it is important to verify the type/reason of sick leave from the respective department that manage the sick leave. The data was recorded during 2022 and already ignored the COVID19 data:

Table 4.4: Top 10 sick leave data from in-house clinic

No	Diagnose	Rate
1	Acute Pharyngitis	41.05%
2	Common Cold	12.63%
3	Gastroenteritis	10.53%
4	Myalgia	9.47%
5	Gastritis	7.37%
6	Cephalgia	5.26%
7	Diabetes Mellitus	4.21%
8	Conjunctivitis	3.16%
9	Dyspepsia	3.16%
10	Low Back Pain	3.16%

Source: Internal Data – Author

Refer to the data based on Kepner-Tregoe problem analysis and Ishikawa diagram, the sickness data is aligned with the root cause of the sickness. There is no sickness that does not have a strong/solid correlation with the analysis that has been identified.

Based on the above analysis, the author will conclude to find out the possible cause that later can be followed up with alternative solutions in the next sub-chapter.

Table 4.5: List of possible causes

Category	Aspect	Description	Possible Disease	Root Cause (Y/N)
Man	Financial	The need of overtime allowace for additional income	Gastroenteritis, Myalgia, Gastritis, Dyspepsia	Y
Man	Health Control	Health control is carried out during working hour		N
Man	Lifestyle	Careless eating and lack of awareness of healthy food	Acute Pharyngitis, Diabetes Mellitus, Dyspepsia	Y
Man	Safety	Not implementing a safety culture	Low back pain	Y
Machine	Ergonomic	There are production lines that still using manual handling to move goods from one place to others	Low back pain	Y
Material	Chemical	Potential of chemical exposure	Acute Pharyngitis, Cephalgia, Conjunctivitis	Y
Methods	SOP	The SOP does not represent the current activity (non-routine)		N

Environment	Weather	Unpredictable weather	Cephalgia, Acute Pharyngitis	Y

To summary the possible causes that has been identified, the Author summarize the list of root causes and followed by proposed solutions that will be elaborated further in the next section.

Table 4.6: List of root causes and proposed of solutions

No	Root Cause	Proposed Solutions
1	The need of overtime allowace for additional income and employee tends to misconduct the sickness statement letter	- Financial literacy/financial education - Develop entrepreneurship system program for company/family - Strengthen the validation of sick statement letter - Blacklist the hospital/clinic which issuing sick statement letter - Employee home visit - Premium allowance for 100% presence
2	Careless eating and lack of awareness of a healthy food	- Healthy lifestyle education - Eating of healthy food competition - Healthier condition competition
3	Not implementing a safety culture	- Strengthen safety culture by using behavioral observation - Kaizen competition for safety aspect (continuous improvement) - Implement disciplinary for safety incident (proven obey the rules)
4	There are production lines that still using manual handling to move goods from one place to others	- Standardize and improve working environment condition - Eliminate manual handling - Kaizen competition for working environment (continuous improvement)
5	Potential of chemical exposure	- Purchase safety PPE (Personal Protective Equipment) - Identify the dangerous area that might have exposure to chemical materials - Periodic monitor the health condition for employee who are working in the dangerous area
6	Unpredictable weather	- Healthy lifestyle education - Educate the preventive action to face the unpredictable weather - Increase the quality of food to increase the immunity level

4.3 Business Solution

To provide the business solution, the Author will consider the Indonesia's regulation to not obey and misconduct the implementation. It is regulated by the government that employee who are taking sick leave is not permitted to to enter/work. The employer should provide paid leave to the respective employee who are taking sick leave.

Article 93

(1) No wages will be paid if workers/ labourers do not perform work.

(2) However, the ruling as referred to under subsection (1) shall not apply and the entrepreneur shall be obliged to pay the worker/ labourer's wages if the worker/ labourer does not perform work because of the following reasons:

    a.   The workers/ labourers are taken ill so that they cannot perform their work;

    b.   The female workers/ labourers are ill on the first and second day of their menstrual period so that they cannot perform their work;

    c.   The workers/ labourers have to be absent from work because they get married, marry off their children, have their sons circumcised, have their children baptized, or because the worker/ labourer's wife gives birth to a baby, or suffers from a miscarriage, or because the wife or

Figure 4.5: Manpower Regulations Law 13 Year 2003 – Article 93
Source: (Tinga, 2020)

As mentioned in the article 93, if the workers/employee who are not coming to work because of illness, the employer should give the rest/leave and pay their salary. In this case, giving sanction nor does not pay their salary during their illness period will not be the solution (Muchsinati, Oktalia, & Priscilla, 2024). During the analysis, each root cause has multiple alternative solutions. To select the best solution to be implemented, in certain cases the combination of alternative solution to tackle 1 root cause is possible to be done or it could be implemented in the matter of prioritization.

The criteria to select and implement the alternative solution would be:
1. Cost [8]
2. Complexity [9]
3. Stakeholder involved [5]
4. Regulation [10]
5. Timeline to implement [7]

To conduct the scoring criteria, the less complication would be lower and the high complication would be higher. The need of overtime allowace for additional income and employee tends to misconduct the sickness statement letter

Criteria	Weight (1-10)	Financial Education Rating	Financial Education Score	Entrepreneurship System for Employee & Family Rating	Entrepreneurship System for Employee & Family Score	Validate sick statement letter Rating	Validate sick statement letter Score	Blakclist hospital/clinic Rating	Blakclist hospital/clinic Score	Employee home visit Rating	Employee home visit Score	Premium for 100% presence Rating	Premium for 100% presence Score
Cost	8	7	56	6	48	10	80	10	80	9	72	2	16
Complexity	9	8	72	7	63	9	81	2	18	8	72	8	72
Stakeholders to be involved	5	7	35	5	25	5	25	2	10	5	25	8	40
Regulation	10	10	100	10	100	10	100	5	50	10	100	10	100
Timeline to implement	7	9	63	5	35	10	70	4	28	10	70	4	28
Total Score			326		271		356		186		339		256

Careless eating and lack of awareness of a healthy food

Criteria	Weight (1-10)	Healthy Lifestyle Education Rating	Healthy Lifestyle Education Score	Healthy food competition Rating	Healthy food competition Score	Healthier condition competition Rating	Healthier condition competition Score
Cost	8	7	56	8	64	10	80
Complexity	9	8	72	8	72	9	81
Stakeholders to be involved	5	7	35	5	25	5	25
Regulation	10	10	100	10	100	10	100
Timeline to implement	7	9	63	8	56	6	42
Total Score			326		317		328

Not implementing a safety culture

Criteria	Weight (1-10)	Strengthen safety culture by implementeing behavioral observation		Kaizen competition for Safety aspect		Implement disciplinary for safety incident	
		Rating	Score	Rating	Score	Rating	Score
Cost	8	8	64	6	48	10	80
Complexity	9	6	54	8	72	4	36
Stakeholders to be involved	5	7	35	5	25	5	25
Regulation	10	10	100	10	100	10	100
Timeline to implement	7	8	56	8	56	6	42
Total Score			309		301		283

There are production lines that still using manual handling to move goods from one place to others

Criteria	Weight (1-10)	Standardize & Improve working condition		Eliminate manual handling		Kaizen competition for working environment	
		Rating	Score	Rating	Score	Rating	Score
Cost	8	6	48	3	24	6	48
Complexity	9	5	45	3	27	8	72
Stakeholders to be involved	5	7	35	5	25	5	25
Regulation	10	10	100	10	100	10	100
Timeline to implement	7	6	42	3	21	8	56
Total Score			270		197		301

Potential of chemical exposure

Criteria	Weight (1-10)	Purchase safety PPE for chemical		Identify and label the area that have potential exposure to chemical material		Periodic monitor to health condition of employee who are working in the dangerous area	
		Rating	Score	Rating	Score	Rating	Score
Cost	8	7	56	9	72	5	40
Complexity	9	10	90	7	63	4	36
Stakeholders to be involved	5	9	45	8	40	5	25
Regulation	10	10	100	10	100	10	100
Timeline to implement	7	8	56	8	56	5	35
Total Score			347		331		236

Unpredictable weather

Criteria	Weight (1-10)	Healthy lifestyle education		Educate the preventive action about unpredictable weather		Increase the quality of food/provide vitamins to increase the immunity	
		Rating	Score	Rating	Score	Rating	Score
Cost	8	7	56	8	64	4	32
Complexity	9	8	72	7	63	4	36
Stakeholders to be involved	5	7	35	8	40	5	25
Regulation	10	10	100	10	100	10	100
Timeline to implement	7	9	63	8	56	5	35
Total Score			326		323		228

After doing weighting and rating calculations, there are 6 (six) solutions that is available to be implemented with the highest score in every aspect. To implement the solution and give a high impact,

it requires to do prioritization by using impact effort matrix to check which solution that can be implemented first as the priority and which solutions will follow.

Before doing impact effort matrix, here is the summary of the solutions in one table after doing weighting and rating:

Table 4.7: Case & solutions matrix

No	Case	Solution
1	The needs of overtime allowace for additional income and employee tends to misconduct the sickness statement letter	Validate the sick statement letter
2	Careless eating and lack of awareness of a healthy food	Healthier condition competition
3	Not implementing a safety culture	Strengthen the safety culture by implementing behavioral observation system
4	There are production lines that still using manual handling to move goods from one place to others	Kaizen (continuous improvement) for working environment
5	Potential of chemical exposure	Purchase safety PPE (safety tools) for chemical
6	Unpredictable weather	Healthy lifestyle education

Source: Internal – Author

Refer to the above solutions, the result of put them in impact effort matrix will be as follows:

Figure 4.6: Impact & Effort matrix to prioritize the Solutions
Source: Internal - Author

After put all the available solutions in the matrix, the next step is setup the implementation plan and justification if necessary. Some additional solutions/adjustment might be added during the result of monitoring for every solution.

IV.3 Implementation Plan & Justification
There are 4 solutions in the High Impact & Low Effort dimension (quick wins) and can be implemented immediately. The rest solutions are in the High Impact & High Effort, meaning that the solution will require robust strategies, advance monitoring, and good control. Before creating and justifying the

schedule, the budget needs to be settled first. From those alternative solutions, the team have already calculated the required budget.

Table 4.8: Budget requirements

No	Solution	Budget Required (USD)	Remarks
1	Validate the sick statement letter	0	
2	Healthier condition competition	500	Gift competition
3	Strengthen the safety culture by implementing behavioral observation system	1,500	- Build the application system - Purchase gift for full year (high submission)
4	Kaizen (continuous improvement) for working environment	1,500	- Build the application system - Purchase gift for full year (high submission)
5	Purchase safety PPE (safety tools) for chemical	4,800	Coverall, gloves, goggles, mask, shoe cover *1 package x 20 x 3 shift x 4 quarter*
6	Healthy lifestyle education	750	Invite Keynote speaker
Grand Total		**9,050**	

Source: Internal - Author

The required budget as mentioned above is for full year calendar. The required amount to implement the solution is lower than the required budget to close the backup of sick leave absenteeism. The hours of sick leave for full year is 6,640 hours and equivalent to **US \$33,263.** It is 27.21% in comparison between investment of implementation and sick leave absenteeism cost. The implementation of this initiative will require 1 month since the kick off. The execution will be executed parallel from 1 solution to other solutions. After 1 month execution, it will be monitored until 6 months after all the initiatives being implemented to check the result.

Legend:
P: Planned

5. Conclusion
The last chapter of this research will explain about the conclusion and recommendations including the proposed business solutions that have been analyzed and conducted in the previous chapter. In this chapter will answer the questions that already stated in the previous chapter.

5.1 Conclusion
In this part, the author will explain about the main objective of this research and answer the following questions that have been explained in the Chapter I. The main objective of this research is to find the gap and providing solutions to the business that can keep their competitiveness among factories in the company and global as well as competitiveness with competitors.

The main gap of the labor productivity gap is about sick leave absenteeism which plays significant role in the absenteeism rate. It means that the main problem of this research has been identified and the Author focus is to close the gap of sick leave absenteeism rate. All the causes have been identified and the Author have provided 6 alternative solutions.

5.2 Recommendation
Based on the analysis by using Kepner-Tregoe analysis method and strategic decision-making, the recommendation is to conduct 6 alternative solutions to close the gap of sick leave absenteeism rate as follows:

1. Validate the sick statement letter
2. Healthier condition competition
3. Strengthen the safety culture by implementing behavioral observation system
4. Kaizen (continuous improvement) for working environment
5. Purchase safety PPE (safety tools) for chemical
6. Healthy lifestyle education

The Kaizen implementation and healthier competition will require special taskforce to implement and monitor the result as explained in the impact-effor matrix. The timeframe to implement the 6 alternative solutions will require 1 month of execution with investment US $ 9,050. The implementation of the idea will be monitored periodically for the next 6 months after implementation to check the timely execution and the output.

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