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Strategy for Determining the Optimal Number of Manpower to Increase Work Productivity in The Beauty Services Industry (Case Study Of PT XYZ)

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Abstract

The cosmetics industry in Indonesia is experiencing accelerated growth which has an impact on increasing competition and the need for continuous innovation, especially in the operational sector. This research aims to determine the optimal number of employees in each division, namely frontline, doctors, therapists, pharmacists and cashiers, as well as determining the productivity of employees in the therapy section of the Jogja-1 branch at PT XYZ. The methods used include productivity analysis and working time measurement (time study), as well as strategic analysis with cost analysis. It is hoped that the findings of this research can become a standard reference for PT XYZ. The results obtained in this research were able to reduce the number of manpower by 10 workers. The average level of therapist productivity is 76.03% during 2023. Based on the recommendation for the optimal number of manpower, the company can save labor costs of 175%.

Keywords
Optimal Number of Manpower, Productivity, Cost Analysis.

1. Introduction

The beauty industry business in Indonesia is growing rapidly. Business in this sector continues to grow positively along with the changing point of view of Indonesian people in paying attention to their appearance. Not only adult women, nowadays teenagers are also starting to prioritize appearance (Susiani, et al. 2021). According to Statista data, revenue in Indonesia in 2022 in the beauty and personal care sector reached $7.37 billion or if converted at a dollar exchange rate of IDR 15,467.5, around IDR 113.9 trillion. Business in this sector is expected to continue to increase by 5.81% annually (www.statista.com, accessed August 10 2024).

PT XYZ is engaged in the service industry in the beauty sector which has been established for more than 20 years. Based on the results of interviews with employees, PT XYZ has problems related to the increasing operational costs at the branch every year, the highest cost is in labor costs. This forces PT XYZ to continue to innovate to reduce waste in order to survive and be able to compete with new competitors. This is because there is no standard standard for determining labor in each branch. With a reference standard for the number of manpower, it will certainly make it easier for PT XYZ to plan recruitment and make production more efficient in terms of costs. Not only that, with the optimal use of labor, the company's productivity will also increase. Conversely, if labor is not used optimally, it will cause losses for the company and employees. Therefore, the researcher intends to examine the measurement of

working time with time study on each employee in each division so that the ideal number of manpower can be known, calculate the productivity of therapist, and analyze labor costs at PT XYZ Jogja-1 branch.

1.1 Objectives

Based on the calculation of the number of manpower that has been carried out, the researcher proposes to optimize the number of manpower in the frontline, doctors, therapists, pharmacists, and cashiers at the Jogja-1 branch of PT XYZ based on sales in January - December 2023. Furthermore, this study aims to determine the productivity of the therapist. After making recommendations for optimizing the number of manpower, then this research also aims to analyze labor costs. Finally, this paper proposes to reduce the number of manpower based on the significant factors identified in this study using statistical analysis namely standard time, standard productivity, and cost analysis so as to save labor costs in the Jogja-1 branch of PT XYZ.

2. Literature Review

In this research are theories related to the research case study. The theories are value stream mapping, human resource planning, rating factor, cycle time, normal time, allowance, standard time, productivity, and cost analysis. Amri (2023) in this study obtained results in the form of an optimal number of manpower of 18 employees and can improve employee performance. The method used is the Full Time Equivalent (FTE) method which converts the hourly workload into the number of people needed to complete a particular task. Statistical analysis is carried out by measuring work activity time with allowances, cycle time, normal time, and standard time. Afifi (2023) in this study obtained results in the form of optimal manpower of 20 workers in standard songkok with a standard time of 1099.33 seconds. Optimal manpower are 30 workers so that 2 additional manpower must be added to the AC songkok with a standard time of 1189.13 seconds. The optimal number of manpower is 20 songkok stacking workers with a standard time of 1129.29 seconds. The equation with the research conducted is the calculation of optimal labor by determining normal time, standard time and cycle time. The difference with the research conducted is the object of research conducted at a songkok company with 3 types of songkok, namely standard songkok, AC songkok, and stacking songkok. Kusuma and Firdaus (2019) in this study obtained results in the form of increasing productivity by adding a manpower of 15 people in order to fulfill orders optimally. The equation with the research conducted is the calculation of rating factor, cycle time, normal time, allowance, standard time. The difference with the research conducted is the object of research studied, namely the production division.

3. Methods

3.1 Value Stream Mapping

Value Stream Mapping (VSM) is a technique used in lean principles that helps analyze the flow of materials and information required to deliver products and services to customers (Setiawan et al. 2021). VSM is considered the starting point for any lean implementation (Garcia et al. 2021). VSM provides analysis of company processes and highlights events that require action to continually improve an organization's internal processes (Ramos & Coelho, 2022). VSM is used to map the entire process flow in customer service. In VSM the data used include service process flow data, service waiting time data, and service process length data. At this stage, it can be seen the time needed for activities that have added value, do not have added value, and are needed but do not have added value. VSM maps all activities in the process, both value-added and non-value-added. In real activities, there are many activities that do not add value but cannot be avoided. There are three types of VSM activities, namely: (1) Value Added activities (VA); (2) Non Value Added activities (NVA); (3) Necessary but Non Value Added activities (NNVA).

3.2 Rating Factor

Rating factor is a factor determined by comparing the operator's work speed with the normal work speed measured by researchers or observers (Wignjoesubroto, 2006). The rating factor is based on one single factor, namely using the Westinghouse method which will lead to an assessment of 4 factors that are considered to determine fairness or unfairness in work, namely skill, effort, working conditions and consistency (Larasati et al., 2022). According to Niebel & Freivalds (2009), the Westinghouse rating system considers four factors in evaluating worker productivity, namely: skill, effort, condition and consistency. Once the skill, effort, condition and consistency of the process have been determined and their equivalence values assigned, researchers can determine the overall productivity by combining the four values and summing them (Niebel 2009).

The formula for the rating factor is (Safirin et al. 2022):
Rating factor value (P) = skill + effort + condition + consistency

P = P0 + P1
Where:
P = Performance Rating
P0 = 1
P1 = Obtained from the table according to the appropriate category

3.3 Cycle Time

Cycle time is the time required to complete one work process, or the amount of time for each element in a job. Cycle time is taken from direct observation using a stopwatch. Time study is a method of measuring operating time activities to obtain better system function (Delti 2021). The time study method with a stopwatch is a work measurement technique that uses a stopwatch as a time control tool that is displayed after the completion of an observed activity (Masniar et al. 2023). In the service industry, cycle time can differ due to several reasons, such as talking to customers, or differences in the level of complexity of dealing with customers. Time differences can occur usually due to several things, such as determining the start and end of measuring the time of a job. Therefore, it is necessary to calculate using the formula (Amri 2023).

$$X = \frac{\sum x}{n}$$

Where:
X = Cycle time
x = Observation time
n = Number of observations made

To find out whether the number of observations made is eligible or not by conducting a data sufficiency test. The sufficiency test can be calculated using the formula (Saputra et al. 2021):

$$N' = [k/s \ (\sqrt{(N \ (\sum x^2) - (\sum x)^2 \ / \sum x]^2}$$

Where:

K	= Confidence level
If the confidence level is 99%, then k	= 2.58 ≈ 3
If the confidence level is 95%, then k	= 1.96 ≈ 2
If the confidence level is 68%, then k	≈ 1
S	= Degree of precision (1 - 10%)
N	= Number of observations that have been made
Xi	= Observation data

If N' ≤ N (the number of theoretical observations is smaller or equal to the actual observations made), then the data is declared sufficient for the desired level of confidence and degree of accuracy.

3.4 Normal Time

Normal time can be obtained from multiplying the cycle time by the rating factor. The rating factor is applied to normalize the working time obtained from work measurements due to the changing tempo or speed of employee work. The time value obtained cannot be determined as standard time because there is still a need for additional allowances according to the type of work. The time value obtained here cannot be determined as the standard time for completing a job, because this calculation has not taken into account factors related to allowance time so that operators can work optimally. Therefore, to find the normal time, it is determined by the formula (Amri 2023):

Normal Time = Cycle Time x (1 + Rating Factor)

3.5 Allowance

Allowances or allowances that are needed and can interfere with the production process can be divided into 3 types, namely personal allowance, fatigue allowance, and delay allowance (Wignjosoebroto 1992).

3.6 Standard Time

Standard time is the time used to complete one cycle of work performed at normal speed by considering rating factors and allowances. Standard time is the actual time an operator needs to serve customers (Putri 2021). Standard time is the amount of time required for a worker to work at an appropriate speed to complete a particular task in an optimal work system (Nurpratama et al. 2021). Then measure working time to determine how long it takes to carry out the work method and determine standard time by the improved method (Prayoga et al. 2021). Standard time can be done after normal time is added with allowance. The standard time can be obtained using the following formula (Amri 2023):

$$\text{Standard Time} = \text{Normal Time x } (1 + \text{Allowance})$$

3.7 Determination of Optimal Labor Quantity

Next, the standard number of manpower is determined by considering the standard time and the average number of visits by a day. Each division in the Jogja-1 branch gets a labor standard recommendation. To calculate the optimal workforce is formulated as follows (Sofyan 2014):

$$\text{Optimal Number of Manpower} = \frac{\text{Standard Time x Output}}{\text{Working Time}}$$

3.8 Determination of Standard Productivity

Determination of standard productivity is by calculating the amount of work completed by a day divided by the number of available manpower. Increase productivity by optimizing all workforce human resources in work activities and the time required for employees to complete tasks according to the job description given by management (Sutaarga & Ramlan, 2020). This also has an impact on fulfilling the daily service targets set by the company (Wahyulistiani, 2022). Achieving planned goals requires efficient management of available resources (Rahmadhani & Arfi, 2024). The optimal number of workers will have a positive impact on the continuity of the company (Meilani, 2023). Standard productivity is done to measure the level of productivity in each division after calculating the standard number of manpower. The way to determine standard productivity is by calculating the amount of work completed by a day divided by the number of available manpower (Atifudin et al., 2016).

$$S = \frac{\text{No}}{\text{Nw}}$$

Where
PS = Standard Productivity
No = Number of Work Orders Completed
Nw = Number of Manpower

3.9 Cost Analysis

Labor costs or what is commonly called employee salaries/wages are compensation for factors of production, namely labor (Huda 2008). Labor costs are divided into two, namely (Blocher, 2007): (1) Direct labor costs; (2) Indirect labor costs. In this study, researchers focused more on direct labor costs, namely the basic salary of employees in the frontline, doctors, therapists, pharmacists, and cashiers.

4. Data Collection

4.1 Visitor's Time

Based on the results of data collection that has been carried out by observing the duration of patients at PT XYZ Jogja-1 branch, the total time for activities carried out from the time the patient arrives until the patient discharged is 9152 seconds.

4.2 Service Process Time

Based on 30 observations, the average service process time for the frontline, doctors, therapists, pharmacists, and cashiers is 8.65 minutes; 4.89 minutes; 92.57 minutes; 6.75 minutes; 4.04 minutes.

4.3 Sales

Based on observations, the total sales data obtained in January, February, March, April, May, June, July, August, September, October, November, December are 1317 transactions; 1117 transactions; 1239 transactions; 1670

transactions; 1371 transactions; 1364 transactions; 1314 transactions; 1235 transactions; 1319 transactions; 1300 transactions; 1226 transactions; 1374 transactions.

4.4 Base Salary

Based on the results of interview observations of the Operations Manager, the total salary in a year in the frontline, doctors, therapists, pharmacists, and cashiers are IDR 111,589,200; IDR 753,227,100; IDR 557,946,000; IDR 83,691,900; IDR 446,356,800.

5. Results and Discussion

5.1 Value Stream Mapping

The results of the analysis using value stream mapping to see the general operational flow can be seen in Figure 1. below:

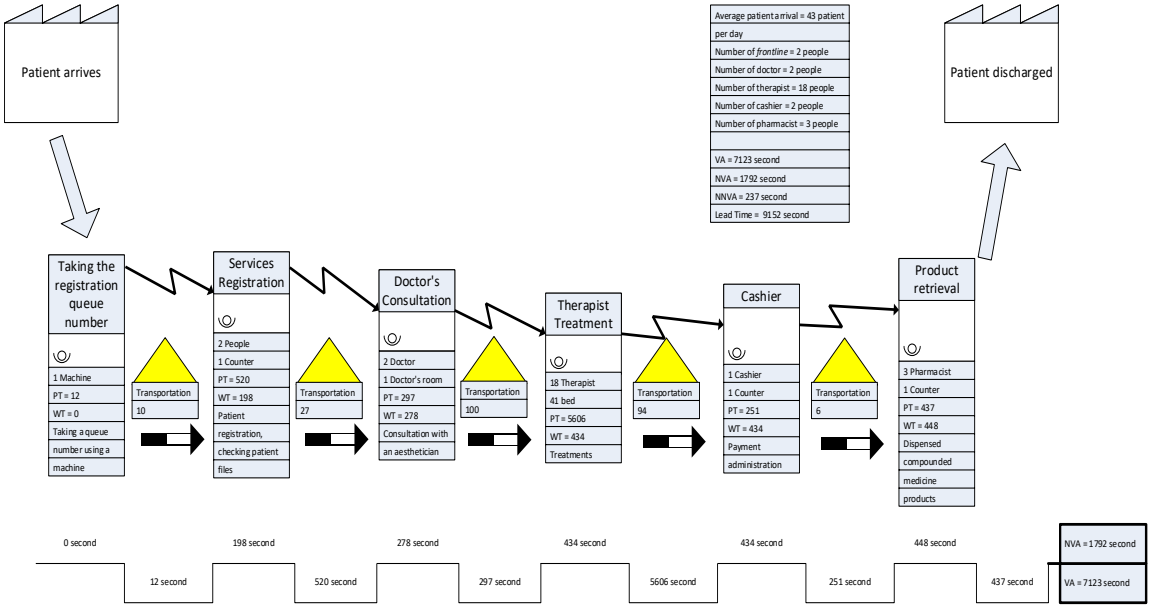

Figure 1. Current State Value Stream Mapping Patient Treatment

Based on the VSM results, there are still several wastes that can be identified from the time the patient arrives until the patient is served. NVA in this service is something that cannot be avoided but can be optimized by reducing activities that are not important when doing work. In the Value Stream Mapping (VSM) of this study, it only focuses on providing a complete description of the process flow and the time required to serve patients. So that the role of each service division is clearly visible.

5.2 Rating Factor

The results of the calculation of the rating factor in the frontline, doctors, therapists, pharmacists, and cashiers can be seen in Table 1. below:

Table 1. Result of Rating Factor Calculation

Division	Value of Rating Factor				P
	S	E	Cn	Cs	
Frontline	0,03	0,02	0,06	0,01	1,12
Doctor	0,15	0,05	0,06	0,01	1,27
Therapist	0,11	0,08	0,06	0,01	1,26
Pharmacist	0,13	0,05	0,06	0,01	1,25
Cashier	0,03	0,02	0,06	0,01	1,12

Based on Table 1. the calculation of the rating factor value with the westinghouse method, the P value in the frontline, doctors, therapists, pharmacists, and cashiers is 1,12; 1,27; 1,26; 1,25; 1,12.

5.3 Cycle Time

The results of the calculation of the cycle time in the frontline, doctors, therapists, pharmacists, and cashiers can be seen in Table 2 below:
Based on Table 2(APPENDIX -A). the results of the calculation of cycle time in each division, the average normal time in the frontline, doctors, therapists, pharmacists, and cashiers is 8,65 minutes; 4,89 minutes; 92,57 minutes; 6,75 minutes; 4,04 minutes.

5.4 Normal Time

The results of the calculation of the normal time in the frontline, doctors, therapists, pharmacists, and cashiers can be seen in Table 3 below:

Table 2. Result of Normal Time Calculation

Division	Normal Time (Minute)
Frontline	9,69
Doctor	6,21
Therapist	116,64
Pharmacist	8,43
Cashier	4,52

Based on Table 3. the results of the calculation of normal time in each division, the average normal time in the frontline, doctors, therapists, pharmacists, and cashiers is 9,69 minute; 6,21 minute; 116,64 minute; 8,43 minute; 4,52 minute.

5.5 Allowance

The results of determining allowances based on discussions and interviews with the Operations Manager using the table for determining allowances in each division, namely the frontline, doctors, therapists, pharmacists and cashiers, which is 7% across all division. Each division gets personal allowance and careful/precise attention. In Table 4. the following are the results of determining the percentage of allowances in each division

Table 3. Determination of Allowance Percentage

Division	Allowance	
	Personal Allowance	**Careful/Precise Attention**
Frontline	5%	2%
Doctor	5%	2%
Therapist	5%	2%
Pharmacist	5%	2%
Cashier	5%	2%

5.6 Standard Time

The results of the calculation of the standard time in the frontline, doctors, therapists, pharmacists, and cashiers can be seen in table 5 below:

Table 4. Result of Standard Time Calculation

Division	Standard Time (Minute)
Frontline	10,36
Doctor	6,65
Therapist	124,80
Pharmacist	9,02
Cashier	4,84

Based on Table 5. the results of the calculation of standard time in each division, the average normal time in the frontline, doctors, therapists, pharmacists, and cashiers is 10,36 minutes; 6,65 minutes; 124,80 minutes; 9,02 minutes; 4,84 minutes.

5.7 Determination The Optimal Number of Manpower

The results of calculating the optimal number of workers in the frontline, doctors, therapists, pharmacists and cashiers can be seen in Table 6 below:

Based on Table 6. the average optimal number of manpower is obtained by considering 1 day off a week for each frontline division employee, doctor, therapist, pharmacist and cashier at the Jogja-1 branch at PT XYZ which refers to sales in January - December 2023, which is 2 workers; 2 workers; 16 workers; 2 workers; 2 workers

5.8 Productivity

Based on the results of the calculation of therapist productivity, the highest percentage was obtained in April 2023 at 107.88%. And the average percentage of therapist productivity is 76.03%.

5.9 Cost Analysis

The results of the annual labor cost analysis calculation for the current system are IDR 1,952,811,000. Meanwhile, the results of the cost analysis based on the number of manpower in a year taking into account 1 holiday a week is IDR 836,919,000.00. Based on the recommendation for the optimal number of manpower, the company can save labor costs of IDR 1,115,892,000.

Table 5. Determination The Optimal Number of Manpower

Month	Frontline	Doctor	Therapist	Pharmacist	Cashier
January	2	1	16	2	1
February	2	1	14	1	1
March	2	1	14	1	1
April	2	2	22	2	1
May	2	1	16	2	1
June	2	1	16	2	1
July	2	1	16	2	1
August	2	1	14	1	1
September	2	1	16	2	1
October	2	1	15	2	1
November	2	1	15	2	1
December	2	1	16	2	1

.

6. Conclusion

The optimal number of workers obtained by the Jogja-1 branch at PT XYZ, which refers to sales in January – December 2023, is 2 workers; 2 workers; 16 workers; 2 workers; 2 workers. Meanwhile, in the system currently running, the amount of power is 4 workers; 3 workers; 20 workers; 4 workers; 3 workers. Furthermore, the productivity level of therapists at the Jogja-1 branch of PT XYZ in January, February, March, April, May, June, July, August, September, October, November, and December in 2023 is 75.26%, 69.15%, 68.18%, 107.88%, 75.44%, 77.94%, 75.09%, 67.96%, 75.37%, 71.53%, 70.06%, 78.51% respectively. The average level of therapist productivity is 76.03% during 2023. Furthermore, the results of labor cost analysis calculations in a year can save 175%.

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APPENDIX-A

Table 6. Result of Cycle Time Calculation

Observation	***Frontline***	**Doctor**	**Therapist**	**Pharmacist**	**Cashier**
	Minute	**Minute**	**Minute**	**Minute**	**Minute**
1	7,50	5,05	93,25	6,83	4,15
2	9,88	4,57	95,60	6,35	4,60
3	7,08	4,47	94,68	6,75	3,85
4	9,58	5,72	100,38	6,38	4,22
5	9,55	3,80	98,70	6,07	3,62
6	7,57	4,50	86,07	7,40	4,05
7	9,40	4,22	95,37	7,17	3,85
8	7,60	3,78	86,65	6,70	3,97
9	8,25	5,82	94,13	6,20	4,20
10	6,97	5,72	86,05	6,08	4,05
11	9,97	4,18	84,87	6,88	4,47
12	9,80	3,85	96,67	7,32	4,17
13	8,72	5,47	87,77	6,77	4,65
14	9,02	6,00	96,33	6,50	3,45
15	7,67	3,92	89,73	7,48	4,10
16	8,22	4,52	98,43	7,43	4,43
17	7,40	6,55	93,95	5,90	3,77
18	8,57	6,63	92,65	7,45	3,85
19	9,75	4,90	85,20	6,72	3,43
20	8,60	3,52	93,18	7,13	4,17
21	9,80	5,08	97,83	6,30	3,45
22	7,60	4,87	93,05	7,18	4,63
23	7,68	4,45	85,98	7,22	4,05
24	6,85	3,70	101,83	7,28	3,48
25	9,47	6,12	95,55	6,68	3,62
26	8,97	6,07	91,98	6,38	4,65
27	9,82	4,53	88,00	6,10	3,42
28	9,77	4,10	93,38	7,50	4,10
29	8,87	4,68	95,10	6,02	4,48

30	9,57	6,00	84,67	6,22	4,15
Average Cycle Time	**8,65**	**4,89**	**92,57**	**6,75**	**4,04**