APPLICATION OF OBJECTIVE MATRIX (OMAX) METHOD FOR MEASURING PRODUCTIVITY OF PROL TAPE PROCESSING IN UD PURNAMA JATI

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ABSTRACT

The main motivation of this research is to see the level of productivity in prol tape production division of *UD. Purnama Jati*. in order to increase the prol tape productivity with the Objective Matrix (OMAX) method. The research also performed by evaluating the worst performance ratio with the Traffic Light System. The result shows that the measurement period in June 2019 with a productivity index value of 118% being the highest productivity index value. Meanwhile, the lowest productivity occurred in the period of July 2019 with a productivity index of (−47.89%). Based on the evaluation results of utilizing the Traffic Light System technique, the ratio at the level of "CRITICAL" was a ratio of 1 that is the ratio of productivity of raw materials. *UD. Purnama Jati* requires to focus on the variables that cause a decline in productivity and can be improved according to the proposed improvements.

Keywords: Diagram Ishikawa, OMAX, Productivity, Prol Tape, Traffic Light System

INTRODUCTION

Productivity reflects certain things which show/measure company performance by comparing the output obtained from the making process (*Output*) through production input. Productivity can be used as an indicator in business success. This can be useful in figuring out business success in utilizing any resource in making a product. One of several constraints in improving company (Avianda, Yuniati, and Yuniar, 2014). Therefore, it is expected that productivity of this business will be slightly improved.

UD. Purnama Jati is a food business which specializes on produces signature food from Jember Regency, Indonesia. One of their main products is prol tape. Prol tape is signature food of Jember Regency, with semi-moist texture and made of tape (fermented cassava). However, this business has never performed any analysis on its productivity, especially on prol tape production, and also any factors influencing the productivity of production division. Prol tape is a food product which is made and processed not only for improving nutritional value, but also to obtain functional characteristic according to consumers' organoleptic taste (Lestari and Susanto, 2015). Therefore, a productivity measurement on production division of this business is highly needed so that the expected result of the product can be achieved.

Productivity measurement can be performed by using *Objective Matrix* (OMAX) method. OMAX method is a partial productivity measurement system developed to monitor company productivity by considering appropriate productivity criteria with the applying division (Nasution, 2006). If there is decreased productivity found in the observed division, *Objective Matrix* (OMAX) method can identify the causes of that decreased productivity. The aim of this research is to find out productivity level and productivity improvement effort in prol tape production division. After measuring the productivity level by using *Objective Matrix* (OMAX) method, the next step is analyzing it by using *Traffic Light System* method to figure out the ratio, whether it is in "Good", "Average", and "Poor" condition. If ratio is identified as "Poor", then an analysis on the improvement effort by using Ishikawa Diagram must be performed.

METHODOLOGY

This research was conducted in Prol Tape production division of *UD. Purnama Jati*, located in Jalan Bungur No. 9 Jember Regency, Indonesia in November to December 2019.

Variable Classification

Variable is classified to identify any variable used in this research. These are some variable classification of this research:
1. Efficiency Criteria (Ratio 1)
2. Effectiveness Criteria (Ratio 2, Ratio 3 and 4)
3. Quality Criteria (Ratio 5)

Definition of Variable Operation

It is important to elaborate this part based on the result of determined productivity criteria. Productivity Criteria is used in the calculation where the criteria level will be changed into quantitative form to observe company productivity level (Afifi, Tuningrat, and Satriawan, 2015). These are the measurements of each raw material, labor, work hours, production target and featured product criteria

1. Efficiency is a parameter which indicates the importance of the consistency between the projected input and the input used in the analysis.
   Ratio 1 = Productivity of *Material*/Raw Material

   Resulted from the formulation of $= \dfrac{\sum \text{Product Output (kg)}}{\sum \text{Raw Material (kg)}} \times 100\%$

2. Effectiveness is a parameter which indicates to what extent the expected goal, both from the amount and time aspect, can be achieved.
   Rasio 2 = Productivity of Labor Involved

   Resulted from the formula of $= \dfrac{\sum \text{Product Output (kg)}}{\sum \text{Labor Involved (Person)}}$

   Rasio 3 = Productivity of Work Hours Spent

   Resulted from the formula of $= \dfrac{\sum \text{Product Output (kg)}}{\sum \text{Work Hours}}$

   Ratio 4 = Percentage of Accomplished Production Target

   Resulted from the formula of $= \dfrac{\sum \text{Product Output (kg)}}{\sum \text{Production Target (kg)}} \times 100\%$

3. Quality is a measurement that indicates how good the resulted product and the input used in the production process.
   Ratio 5 = The Percentage of Excellent Quality Products

   Resulted from the formula of $= \dfrac{\sum \text{Actual amount of excellent quality prol tape (kg)}}{\sum \text{Product Output (kg)}} \times 100\%$

Data Collecting Procedure

The data source of this research consists of primary and secondary data. These are the primary and secondary data of this research:

1. Primary Data

   The primary data of this research was taken from prol tape production division by performing field observation and interview with expert employee and manager of prol tape production division.

2. Secondary Data

   The secondary data was taken from the internal data of the company related to prol tape production division. These are including the data on the amount of:

   a. monthly raw material used
   b. monthly work hours spent
   c. monthly target of prol tape production
   d. monthly target of prol tape production
   e. actual of monthly excellent quality prol tape
   f. monthly prol tape product output

Research Design

This research used descriptive analysis that aims to solve the problem by depicting and analyzing the business condition, in this case is the productivity of prol tape production division.

Research Stages

The first stage was conducted by a survey to identify any issues of *UD. Purnama Jati* that related to productivity. Afterwards, the purpose of the research was formulated while performing literature review and the measurement method was selected. After determining the method used, data collection related to the productivity of prol tape production division was executed. The process was continued by analyzing the data using *Objective matrix* (OMAX) method, evaluating the productivity by using *Traffic Light System*, finding out the root of the problem by using Ishikawa Diagram and determining the proposed improvement on the business productivity. The last step was drawing conclusion and giving recommendation to improve the productivity.

Objective Matrix Method

OMAX is a partial system developed to monitor company productivity in certain department, by using productivity criteria which is in line with the relevant department (Nasution, 2006). OMAX research is started with determining productivity criteria, calculating the ratio calculation, calculating matrix value interpolation, arranging goals, determining ratio level and creating OMAX matrix. The formation and structure of *Objective Matrix* (OMAX) method is as follows:
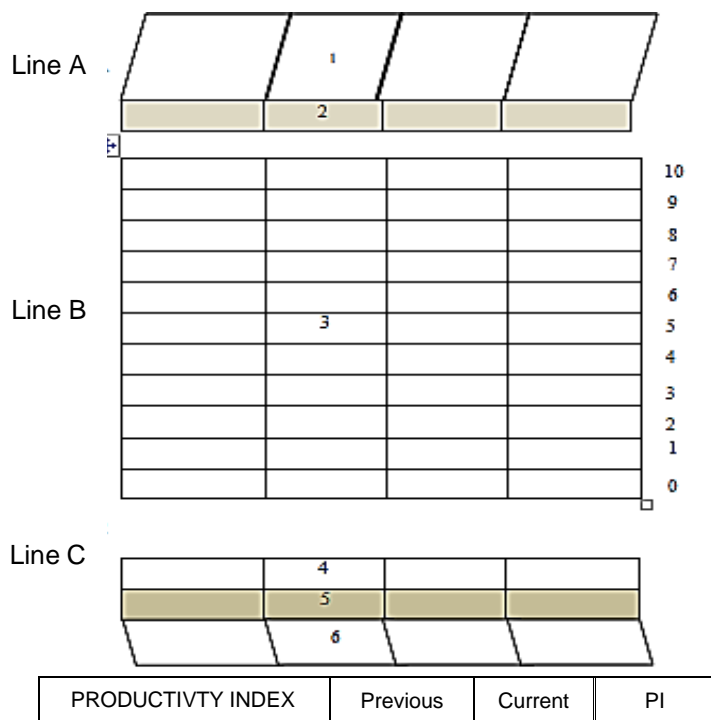
Figure 1. OMAX Model Structure

Ishikawa Diagram Method

Ishikawa Method is a diagram which shows the cause and effect relation. In this research, Ishikawa Diagram is developed to understand the root of cause leads to the decrease of productivity in prol tape production division.
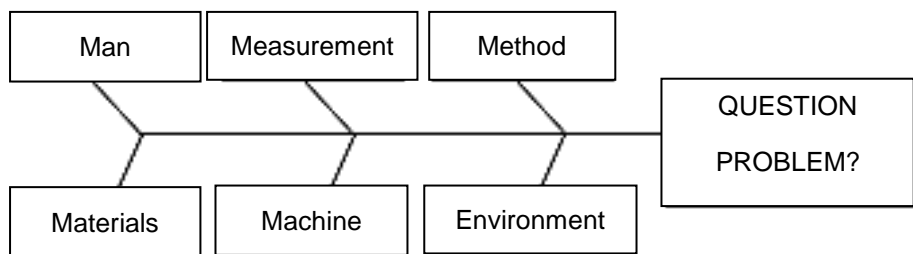

Figure 2. Ishikawa Diagram Formation

RESULTS AND DISCUSSION

Prol tape is a sweet and semi-moist texture food made of fermented cassava and wheat flour with the ratio of 6:1 (Saji, 2010 *in* Putri and Hersoelistyorini, 2012). This research refers to (Hamidah, Deoranto, and Astuti, 2013) research, where the object of the research Hamidah used is Sari Roti product, while this research used prol tape product as its research object.

1. Company Overview

UD. Purnama Jati is a business unit which specializing in food industry, more specifically on signature souvenir food of Jember Regency. One of their products is semi-moist food called as prol tape. This business was established in 2002 in Patrang District as the central signature souvenir shop of Jember Regency under the name of *Purnama Jati*. This business offers various foods in several flavor variants.

2. Data Determination

These research data was taken from the business internal data which is correlated to the productivity of production division. These are including:

Table 1. Internal Data of Prol Tape Production in *UD. Purnama Jati*, Jember Regency

Period (Month)	Tape (Kg)	Product Output (Kg)	Σ Work Hours	Σ Labor	Production Target (Kg)	Σ Excellent Output
January	2,650	5,936	200	11	5,981	5,916
February	2,275	5,096	180	11	5,115	5,074
March	2,500	5,600	200	11	5,622	5,594
April	2,575	5,768	197	11	5,801	5,760
May	1,550	3,472	133	8	3,482	3,468
June	6,625	14,840	228	20	14,930	14,800
July	2,575	5,768	200	11	5,778	5,761
August	3,025	6,776	196	12	6,785	6,769
September	2,450	5,488	192	11	5,530	5,484
October	2,675	5,992	204	11	6,001	5,985
Jumlah	26,350	64,736	1,930	117	65,025	64,611

Source: Internal Data of UD. Purnama Jati

3. Percentage Determination

After determining productivity criteria, ratio calculation was then performed. These are the productivity percentage for prol tape production division:

Table 2. Productivity Ratio of Prol tape Production Division

Criteria / Month	Ratio 1 (%)	Ratio2 (Kg/Person)	Ratio 3 (%)	Ratio 4 (%)	Ratio 5 (%)
January	224	539.64	29.68	99.25	99.66
February	224	463.27	28.31	99.63	99.57
March	224	509.09	28.00	99.61	99.89
April	224	524.36	29.28	99.43	99.86
May	224	434.00	26.11	99.71	99.88
June	224	742.00	65.09	99.40	99.73
July	224	524.36	28.84	99.83	99.88
August	224	564.67	34.57	99.87	99.90
September	224	498.91	28.58	99.24	99.93
October	224	544.73	29.37	99.85	99.88
Average Ratio	224	534.50	32.78	99.58	99.82
The Highest Ratio	224	742.00	65.09	99.87	99.90
The Lowest Ratio	-	434.00	26.11	99.24	99.57

4. Long-Term Goals Arrangement

Long-term goals arrangement is closely related to any expected goals that should be accomplished in the future. Therefore, the following calculation is made for each criterion:

Table 3. Long-Term Goals

Description	Ratio1 Raw Material (%)	Ratio2 Labor Involved (Kg/Orang)	Rasio3 Work Hours Spent (Kg/Jam)	Rasio4 Percentage of Production Target Achievement (%)	Ratio5 Percentage of Excellent Quality Product (%)
The Highest Product Value	225	800	85.00	100	100
The Lowest Product Value	224	434.00	26.11	99.24	99.57
The Average of Productivity	224	534.50	32.78	99.58	99.82

5. Interval Calculation

Interval or score calculation was performed using interval scale of each ratio. This method was used up to OMAX matrix formation stage. This part is the described as follows:

Table 4. Interval Calculation of Each Criteria

Criteria Level/Score	Ratio 1	Ratio2	Ratio 3	Ratio 4	Ratio 5
10	225.00	800.00	85.00	100.00	100.00
9	224.86	762.07	77.54	99.94	99.97
8	224.71	724.14	70.08	99.88	99.95
7	224.57	686.22	65.62	99.82	99.92
6	224.43	648.29	55.16	99.76	99.90
5	224.29	610.36	47.70	99.70	99.87
4	224.14	572.43	40.24	99.64	99.84
3	224.00	534.50	32.78	99.58	99.82
2	224.00	501.00	30.56	99.47	99.74
1	224.00	467.50	28.33	99.35	99.65

6. Ratio Weight Determination

In this stage, weight level of each productivity criteria on the total productivity was determined (Nasution, 2006). The ratio weight determination was performed to figure out the ratio which brings the biggest impact on the productivity of prol tape production division of UD. Purnama Jati. This step was executed by *brainstorming* method by the Production Manager and Business Owner. These are the result of defined weighing activities:

Table 5. Weight of each Productivity Comparison

Productivity / Percentage	Ratio	Weight (%)
Productivity of Raw Material	1	30
Productivity of Labor Involved	2	25
Productivity of Work Hours Spent	3	15
Persentage of Accomplished Production Target	4	20
Percentage of Excellent Quality Product	5	10
Total		100%

7. OMAX Calculation

In calculating OMAX, all company's members contributed in assessing, improving and keeping all the existing condition in production division (Nasution, 2006). OMAX Calculation was performed to facilitate management division in defining any criteria that will be assigned as productivity standards through weight and score of each criterion. (Henni, 2008 *in* Thaufiq, Astuti, and Deoranto, 2014). Performance criteria were used as productivity measurement in OMAX (Prapti, Iskandar, and Kasutjianingati, 2016). OMAX was done based on the productivity index calculation. These are the productivity level accomplishment in prol tape production division:

Table 6. Accomplishment Level

Period	Criteria				
	Raw Material	Labor	Work Hours	Production Target	Excellent Quality Product
January	3	3	1	6	1
February	0	0	0	8	8
March	3	2	0	7	5
April	3	2	2	6	4
May	2	0	0	7	5
June	3	8	7	7	1
July	3	2	1	8	5
August	3	3	3	8	5
September	3	1	1	2	7
October	3	3	1	8	5

Based on the OMAX matrix calculation, it is known that there are some causes of the discrepancy on the productivity of each period:

a. In January, ratio 1 and ratio 2 is in level 3 or in normal condition. This situation is caused by the use of pre-defined raw material by UD. Purnama Jati, as well as the normal and appropriate labor productivity as determined. Then, it is followed by ratio 3 and ratio 5 which stay in level 1. This condition is caused by the productivity value that fails to accomplish the expected goals of UD. Purnama Jati. This also occurred in ratio 5 where the expected goal of excellent quality product is 100% while in the actual condition; it can only achieve 99.65%. Ratio 4 is in level 6 which means that the ratio is in normal condition since the company's goal achieved is 99.76% and the expected goal is 100%.

b. In Februari 2019, ratio 1 is in level 3 or in normal condition. Ratio 2 and 3 is in level 0 since the performance achieved is far from the projected goal, where the expected target is 800 kg/person and 85kg/hour and the performance value of ratio 2 is 463.27 kg/person compared to the target of 800/person. Ratio 3 also presented similar condition where the performance value achieved is 28.31 kg/hour and the expected value target is 85 kg/hour. Ratio 4 and ratio 5 is in level 8 since its performance value (99.63% and 99.57%) is almost reaching out the expected value (100%). Based on the calculation of the previous period, it is known that PI value decreasing from 3.33 to −22.58.

c. In March 2019, ratio 1 is in level 3, which means that performance value is in normal condition. This is because the performance value is still at 224%. In ratio 2 and 3, it is known that the performance value is far from the target, where the actual performance value is 509.09 kg/person and 28 kg/hour, while the expected goal is 800 kg/person and 85 kg/hour. Ratio 4 and ratio 5 is in average condition where the actual performance value is 99.61% and 99.89%, while the company's expected goal is 100% and 100%. Pursuant to the previous period, it can be seen that the productivity value improves from −22.58 to 60.42.

d. In April 2019, ratio 1 is in level 3 which means that the performance value is in normal condition. This is because the performance level does not change and stays in 224%. Ratio

2 and 3 is in level 2 or in CRITICAL condition since the performance value of both ratio is far from the expected goal, that is 524.36 kg/person and 29.28 kg/hour while the expected goal is 800 kg/person and 85 kg/hour. Ratio 4 and 5 is in average condition since the performance value is almost approaching the expected goal, that is 99.67% and 99.84%. Based on the calculation of previous period, it is concluded that the productivity value is decreasing from 60.42 to −14.29.

e. In May 2019, ratio 1 is in level 3 which means that the performance value is in normal condition. This is because the performance value does not change and stays at 224%. Ratio 2 and 3 is in level 0 since the ratio performance is far from the expected ratio, where the actual performance value of ratio 2 is 434 kg/person while the expected performance value is 800 kg/person. Similar to ratio 2, ratio 3 also fails to achieve the goals, since the actual performance value is 26.11 kg/hour while the expected value is 85 kg/hour. On the other hand, ratio 4 and 5 is in the average condition since its performance value is approaching the goal that is 99.82% and 99.87%. Based on the calculation of the previous period, it is known that the productivity value is decreasing from −14.29 to −24.24.

f. In June 2019, ratio 1 is in level 3 which means that the performance value is in normal condition. This is because the performance value does not change and stay at 224%. Ratio 2 is in good condition as its performance value is approaching the expected amount, where the actual value is 724 kg/person and its expected value is 800kg/person. Rasio 3 and 4 are in average condition because their actual performance is 65.09 kg/hour and 99.82% while its expected value is 85kg/hour and 100%. Ratio 5 is level 1 since its actual value is far from the projected value, that is 100%. Based on the calculation of the previous period, it can be seen that the productivity value is increasing significantly, that is from −24.24 to 118.

g. In July 2019, ratio 1 is in level 3 which means that the performance value is in normal condition. This is because the performance value does not change and stays at 224%. While ratio 2 and 3, it is known that the performance value is still far from the expectation, where the actual performance value is 524.36 kg/person and 28.84 kg/hour, while the projected performance value is 800 kg/person and 85 kg/hour. Ratio 4 is in good condition since the performance value is almost approaching the expected value, where the actual percentage is 99.83% and the expected percentage is 100%. Ratio 5 is in average condition since its performance value is 99.88% while the expected value is 100%. Based on the calculation of the previous period, it can be seen that the productivity value is decreasing from 118 to −47.89.

h. In August 2019, ratio 1, 2 and 3 are in level 3 that indicate normal condition. The performance value of the ratio is complying with the existing standard, yet it still fails in fulfilling the expected target. Here, the performance value of each ratio is 224%, 564.7 kg/person and 34.57 kg/hour while the expected value of each ratio is 225%, 800kg/person and 85 kg/hour. Ratio 4 is in good condition since its performance value is approaching the expected target that is 99.87% from 100%. Ratio 5 is in average condition as its performance value is 99.87% while the expected value is 100%. Based on the calculation of the previous period, it can be seen that the productivity value is increasing from −47.89 to 47.89.

i. In September 2019, ratio 1 is in level 3 which means that the performance value is in normal condition. This is because the performance value does not change and stay at 224%. Ratio 2 and 3 are in level 1 or entering CRITICAL condition since its performance value still fails to meet the defined target. At this point, the actual performance value of each ratio is 498.81 kg/person and 28.58 kg/hour while the expected target for each ratio is 225%, 800kg/person and 85 kg/hour. Ratio 4 is in level 2 since its performance value is still far from the expected point. The actual performance value of ratio 4 is 99.24% while the expected value is 100%. Ratio 5 is in average condition as its actual performance value is 99.93% while its expected performance value is 100%. Based on the calculation of the previous period, the productivity value is decreasing from 47.89 to −42.86.

j. In October 2019, ratio 1 and 2 is in level 3 which indicate normal condition. The performance value of ratio 1 and 2 is complying with the existing standard, yet it still fails in

fulfilling the expected target. Here, the actual performance value of each ratio is 224% and 554.73 kg/person, while the expected value of each ratio is 225% and 800kg/person. Ratio 3 is in level 1 or entering CRITICAL condition since the performance value is still under the expected value. Here, the actual performance value of ratio 3 is 29.37 kg/hour while the projected value of each ratio is 85 kg/hour. Ratio 4 is in good condition since its performance value is approaching its expected goals, that is 99.85% of 100%. Ratio 5 is in average condition as its performance value is 99.88% while the target for ratio 5 is 100%. Based on the calculation of the previous period, it can be concluded that the productivity value is increasing significantly from −42.86 to 62.50.
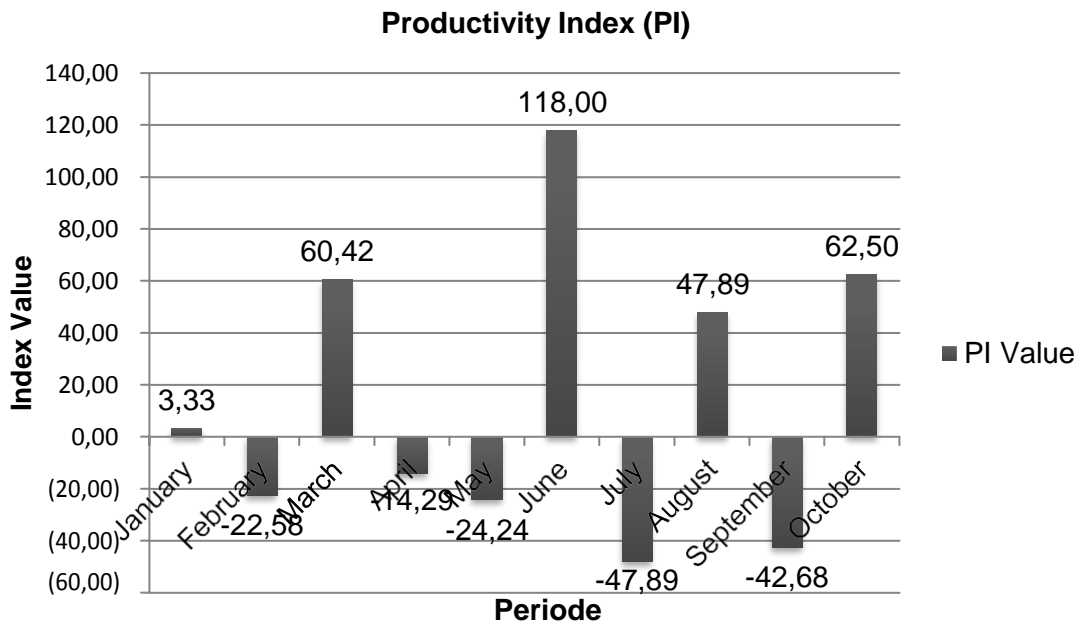
Productivity Index (PI)

Figure 3. Index Chart of Prol Tape Productivity in *UD. Purnama Jati*

From the above mentioned graphic, it can be noted that productivity is fluctuating. Fluctuating performance value indicates that the achieved productivity level is not good enough, so it needs an improvement (Eeni, 2009 *in* Thaufiq, Astuti, and Deoranto, 2014). The highest productivity index value is in June; that is 118%. This is because the productivity level of some criteria crosses the average productivity of that month. In July 2019, the productivity level is decreasing to −47.89% and this is the lowest productivity index of prol tape production division in *UD. Purnama Jati*. For that reason, root cause analysis must be performed so that productivity improvement can be done by using Ishikawa diagram.

8. *Traffic Light System* Analysis

Traffic Light System is utilized in identifying the productivity ratio which decreased significantly in impacting the productivity of prol tape production division of *UD. Purnama Jati*. From *Traffic Light System* analysis, the priority order of improvement can be detected as follows:

Table 7. Priority Order of Improvement Ratio

Improvement Rank		
Productivity Criteria	Weight (%)	Rank
Ratio 1 Productivity of Raw Material	30	1
Ratio 3 Productivity of Works Hours Spent	20	2
Ratio 2 Productivity of Labor Involved	25	3
Ratio 5 Percentage of Excellent Quality Product	10	4
Ratio 4 Percentage of Production Target	20	5

From the previous overview, it can be seen that the lowest productivity ratio is the first ratio or the productivity ratio of raw material. From this point, the improvement must focus on ratio 1 since the scoring result or productivity assessment of 10 consecutive period is in "CRITICAL" condition.

9. Identification of Productivity Problems

Cause and Effect Diagram is an illustration that shows a cause-effect relationship (Vincent, 1998). According to Bintang (2005), this illustration is used to present any cause of the derivation (*effect*) because of that causative factors. Cause and Effect Diagram is used to present the cause of productivity derivation and the characteristic of productivity (effect) from those causative factors. This following is the analysis result of cause and effect diagram in prol tape production division:
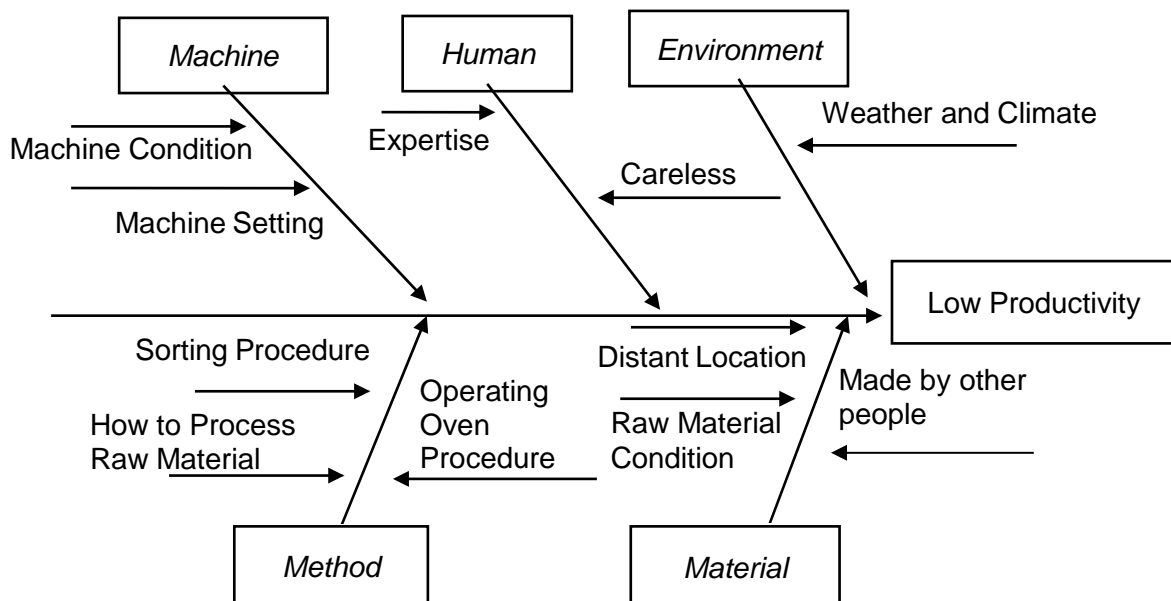

Figure 4. Cause-Effect Diagram on the Cause on Low Productivity Level of Prol Tape Production Division

Based on Figure 4, it reveals the several causes of low productivity level of prol tape production division. Any causes of low raw material are including the condition of raw material, the location where the material is available and the material is not self-made. In Jember regency, the availability of tape (fermented cassava) as raw material of prol tape is limited and unable to cover consumers demand. From human factor, low productivity is caused by low expertise and accuracy. Even so, this condition is also affected by manual sorting method where the employees must have good awareness and expertise. In machine factor, especially on the condition and machine setting, good condition must be ensured to support the production process in the best possible way. From the method factor, some processes such as sorting, operating the oven and raw material processing must be fully maintained since

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method is highly associated with the resulted quality of prol tape. From environment aspect, the effect of certain weather and climate must be fully considered since hot weather or temperature will result in perfect and ripe tape while cool temperature will extend the time for tape ripening and make it less flavorful.

10. Recommendation on Productivity Improvement

Productivity improvement can be suggested after considering the causes of low productivity in the business. The improvement is made based on the calculation of average productivity outcomes from January to October 2019. Thus, the improvement ideas can be advised in order to increase productivity of prol tape production division pursuant to the situation and condition, especially for raw material productivity. Overall, the improvement that can be done is by establishing quality standard for the raw material used, performing corrective action related to raw material condition and production estimation to ease raw material availability. The use of high-quality material will also improve production efficiency and effectiveness as well as improve productivity.

CONCLUSION

The outcome of this research shows that productivity level of *UD. Purnama Jati* is still fluctuating. This can be drawn from the productivity index value, with the highest *productivity index* in Juni 2019 (118%) and its productivity value is 545. Meanwhile, the lowest productivity index occurred in July, with the value of −47.89% and not much low productivity index, that is 284. From the analysis above, the suggested improvement to increase the productivity is listed in Table 8.

ACKNOWLEDGEMENT

REFERENCES

Afifi, A., Tuningrat, I. A. M., & Satriawan, I. K. (2015). Analisis Produktivitas Produksi Di Perusahaan Kecap Manalagi Denpasar. *Jurnal Rekayasa Dan Manajemen Agroindustri*, *3*(3), 133–142.

Avianda, D., Yuniati, Y., & Yuniar, Y. (2014). Strategi Peningkatan Produktivitas di Lantai Produksi Menggunakan Metode Objective Matrix. *Jurnal Online Institut Teknologi Nasional*, *1*(4), 202–213.

Bintang, M. (2005). Analisis Faktor-faktor yang Berpengaruh terhadap Performansi Karyawan (Studi Kasus: PKS. PTPN-II Sawit Seberang). *Jurnal Sistem Teknik Industri*, *6*(3), 13–14.

Hamidah, N. H., Deoranto, P., & Astuti, R. (2013). Analisis Produktivitas Mengguakan Metode Objective Matrix (OMAX): Studi Kasus pada Bagian Produsi Sari Roti PT Nippon Indosari Corpindo, Tbk Pasuruan. *Jurnal Teknologi Pertanian*, *14*(3), 215–222.

Lestari, D. P., & Susanto, W. H. (2015). Pembuatan Getuk Pisang Raja Nangka (Musa Paradisiaca) Terfermentasi dengan Kajian Konsentrasi Ragi Tape Singkong dan Lama Terfermentasi. *Jurnal Pangan Dan Agroindustri*, *3*(1), 23–31.

Nasution, A. H. (2006). *Manajemen Industri*. Yogyakarta: Penerbit Andi.

Prapti, K. P., Iskandar, R., & Kasutjianingati, -. (2016). Strategi Peningkatan Kinerja Supply Chain Buah Naga di Kecamatan Bangorejo Kabupaten Banyuwangi Berdasarkan Proses Inti SCOR. *Jurnal Ilmiah Inovasi*, *15*(3), 94–98. https://doi.org/10.25047/jii.v15i3.19

Putri, S. W. A., & Hersoelistyorini, W. (2012). Kajian Kadar Protein, Serat, HCN, dan Sifat Organoleptik Prol Tape Singkong dengan Subtitusi Tape Kulit Singkong. *Jurnal Pangan Dan Gizi*, *3*(6), 17–27.

Thaufiq, M. R. I., Astuti, R., & Deoranto, P. (2014). *Analisis Produktivitas Bagian Pengolahan Susu Pasteurisasi Menggunakan Metode Objective Matrix (OMAX) (Studi Kasus Koperasi SAE Pujon)*. Thesis. Universitas Brawijaya.

Vincent, G. (1998). *Manajemen Produktivitas Total: Strategi Peningkatan Produktivitas Bisnis Global*. Jakarta: PT Gramedia Pustaka Utama.