PRODUCTIVITY MEASUREMENT IN PAK SARIKUN'S BROWN SUGAR MSME, KUBURAYA REGENCY USING THE *OBJECTIVE MATRIX* METHOD

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ABSTRACT

In this study, productivity measurement was conducted at Pak Sarikun's Brown Sugar MSME from September 2023 to February 2024. The method used was the Objective Matrix (OMAX), with the support of the Traffic Light System (TLS). This research aims to: determine the highest and lowest performance values for each productivity ratio, assess the growth of the productivity index value, and identify the input sources that require attention for evaluation purposes. The results of this study show that the highest productivity performance was achieved in September with a value of 3.74, while the lowest was in November with a value of 3.08. The highest workday productivity performance was achieved in September, at 490, and the lowest in October, at 420. The highest fuel productivity performance was achieved in September, at 3.61, and the lowest in November, at 3.15. The highest operational hour productivity performance was recorded in September, at 40.83, and the lowest in October,

at 35. The growth of the productivity index value fluctuated, with the highest value obtained in December at 923%, and the lowest in October at -84%. The input sources that need to be considered for evaluation in productivity measurement include workdays, fuel, and operational hours.

Keywords: ***Productivity, Objective Matrix, Traffic Light System (TLS), Brown Sugar, Pak Sarikun Brown Sugar MSME.***

1. Introduction

In a highly competitive industry, companies need to take immediate action by evaluating their business processes to remain competitive with other competitors. This evaluation can be conducted by monitoring productivity achievements to see whether the performance results align with the company's previous plans and targets (Ramayanti et al., 2020). Productivity becomes an alternative in evaluating performance that has been executed, and it is also a suitable method for assessing the efficiency of input usage in generating output. Therefore, companies can assess their productivity levels by conducting productivity measurements (Suparno & Hamidah, 2019).

Productivity measurement is not only necessary for large companies but also important for Micro, Small, and Medium Enterprises (MSMEs). One MSME in West Kalimantan, particularly in Kubu Raya Regency, that has never conducted productivity measurement and intends to do so is Pak Sarikun's Brown Sugar MSME. This

business operates in processing raw materials from coconut sap into brown sugar products. The goal of this MSME is to produce highly competitive brown sugar products, enabling them to reach the desired market. Additionally, the available inputs for producing brown sugar should be optimally utilized. In relation to achieving these objectives, Pak Sarikun's Brown Sugar MSME, which has never conducted productivity measurements, needs to evaluate its business by measuring productivity to determine the extent of its production success.

One of the methods used for productivity measurement in this study is the Objective Matrix (OMAX) method. OMAX is a partial productivity measurement method that assigns weights to monitor productivity in each section to obtain a productivity index. The results of this measurement provide an objective performance evaluation for each section and offer solutions for the causes of productivity decline. The flexibility in selecting appropriate productivity ratio to consider makes the OMAX method suitable for research in companies with limited data conditions, such as household-scale industries (Ramayanti et al., 2020). The advantages of the OMAX method in measuring productivity include its wide usage, simplicity, ease of understanding, availability of data, and greater flexibility (Triawan, 2023).

2. Research Methodology

The research was conducted at Pak Sarikun's Brown Sugar MSME, located on Markaban Darat Street, Sungai Rengas Village, Kubu Raya Regency, West Kalimantan. The research period took place during March 20, 2024, to April 30, 2024.

2.1 Data Collection

The data collection methods used were questionnaires, observation, and interviews. A total of 5 respondents were selected based on saturation sampling, which is a technique that involves taking all members of the population as the sample. The respondents consisted of 1 owner and 4 employees of Pak Sariku n's Brown Sugar MSME, all of whom were knowledgeable about the brown sugar production process.

2.2 Data Processing

Productivity measurement data were processed using the Objective Matrix (OMAX) method, with the assistance of the TLS. The stages in the Objective Matrix (OMAX) method, as referred to by Fradinata et al. (2022), are as follows:

A. Establishing Productivity Ratio
   The first step in measuring productivity using the OMAX method is to determine the productivity ratio. The establishment of these ratio is adjusted based on the research location where the measurement is conducted.
B. Calculating the Performance Ratio

This ratio shows the level of efficiency and effectiveness in the use of raw materials, workdays, fuel, and operational hours, as well as the resulting output.

C. Determining Standard Performance and Performance Scale
   1) Level 3 : This value is determined based on the initial standard value. At this stage, the standard performance value is obtained by calculating the average of each performance ratio and is placed at level 3.
   2) Level 10 : The level 10 value is determined based on the company's desired target. Level 10 is obtained from the maximum value of each ratio for each ratio, plus the target for productivity improvement desired by the company.
   3) Level 0 : The level 0 determination represents the worst possible productivity value that might occur in the company.
   4) Realistic Productivity Values (Levels 1-2 and 4-9)
   5) Realistic productivity values are those expected to be achieved before reaching the final target, known as the performance scale. These values are obtained between levels 1-3 and levels 4-10, calculated using the following method: (further explanation follows): :

Scale 1-2 $\frac{level3-level0}{3-0}$

Scale 4-9 $\frac{level10-level3}{10-3}$

D. Determination of Scores, Weights, and Values
Scores are obtained by matching the performance value to the level closest to the values ranging from level 0 to level 10. The weight indicates the importance of a particular ratio according to management; the higher the weight of a ratio, the more important that ratio is. The weight is calculated by dividing the sum of the product of each row by the total product of all rows. To do this, select all the cells in the worksheet that are expected to contain the product of the matrix. Then, use the formula: mmult (matrix 1, matrix 2). The result will appear after pressing Shift, Enter, and Ctrl simultaneously. To scale the weight to 100, multiply the result by 100. The value is the product of the weight and the score.

E. Determination of *Performance* Indicators
The performance indicator is obtained by summing the values from ratio 1 to ratio 5 in the OMAX matrix. The performance indicator reflects the overall performance of the production floor across all ratio in the production process.

F. Calculating the Productivity Index
The productivity index is calculated to determine whether the company's productivity is increasing

or decreasing. The productivity index is calculated using the following formula: (further explanation follows):

$$Index = \frac{IP_i - IP_{i-1}}{IP_{i-1}} \text{ x } 100\%$$

3. Results

To determine the actual value of each productivity ratio used in the production process at Pak Sarikun's Brown Sugar MSME over a 6-month period, the performance value of each ratio can be analyzed. The following table presents the performance values for each productivity ratio at Pak Sarikun's Brown Sugar MSME.

Table 1. Performance Values for Each Ratio

Time	Coconut Sap (L)	Workdays	Fuel (kg)	Operational Hours
September	3,74	490	3,61	40,83
October	3,16	420	3,21	35
November	3,08	427,86	3,15	35,65
December	3,66	469,31	3,58	39,11
January	3,22	435,17	3,32	36,26
February	3,61	483,33	3,43	40,28
Average	3,41	454,28	3,38	37,86
Maximum Value	3,74	490	3,61	40,83
Minimal Value	3,08	420	3,15	35

To observe whether the productivity of the business has decreased or increased, the productivity

index value can be used as a reference. Below is the calculation of the productivity index obtained by Pak Sarikun's Brown Sugar MSME from September 2023 to February 2024, which can be seen in Figure 1.

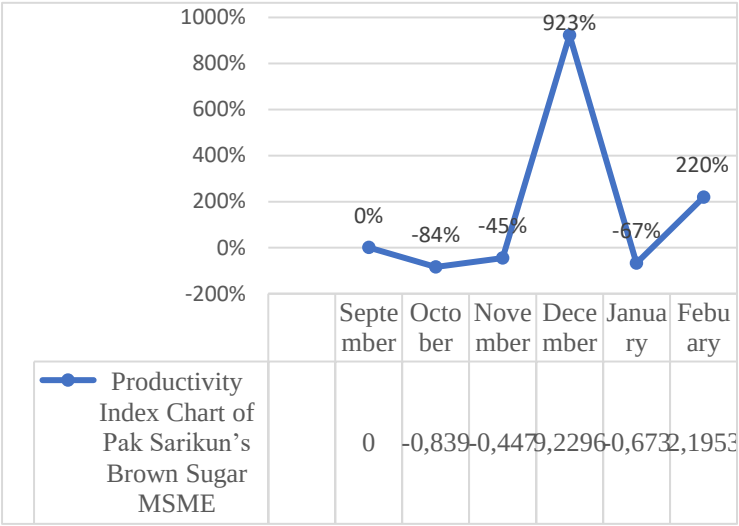

Figure 1. Productivity Index Chart of Pak Sarikun's Brown Sugar MSME

The following table shows the scores for each input in the brown sugar production process, used to identify which input sources need attention by Pak Sarikun's Brown Sugar MSME for the period of September 2023 to February 2024, as presented in Table 2.

4. Discussion

4.1 Performance Value for Each Ratio

The performance values comparing the use of coconut sap raw material, employee workdays, wood fuel, and production operational hours obtained during the measurement period from September 2023 to February 2024 varied each month. This variability is due to the different amounts of coconut sap obtained and the amount of brown sugar produced after processing each month. The difference in the amount of coconut sap to be processed and the amount of other inputs used each month leads to fluctuating production output. This is also supported by previous research conducted by Fadhilah et al. (2023).

Table 2. TLS of Pak Sarikun's Brown Sugar MSME

Time	Coconut Sap Raw Material	Employee Workdays	Wood Fuel	Operational Hours
Sept	4	4	4	4
Oct	1	0	1	0
Nov	0	1	0	1
Dec	4	3	4	3
Jan	1	1	2	1
Feb	4	4	3	4

At Pak Sarikun's Brown Sugar MSME, the amount of coconut sap available for processing can decrease, primarily due to extreme weather conditions with frequent heavy rainfall. This condition makes it difficult

for farmers to tap the coconut sap, resulting in a reduced amount of sap for brown sugar production. Weather conditions can also affect the quality of the brown sugar produced. During rainy conditions, some rainwater mixes with the tapped coconut sap, reducing its sugar content and lowering its quality. Furthermore, during the rainy season, the pH of coconut sap tends to be higher compared to the dry season. This is influenced by the higher environmental temperatures and sunlight exposure during the dry season. Therefore, Pak Sarikun's Brown Sugar MSME must prioritize the coconut sap raw material to improve brown sugar production productivity each month.

4.2 Productivity Growth Index Value

The highest productivity growth achieved by Pak Sarikun's Brown Sugar MSME during the measurement period from September 2023 to February 2024 occurred in December, with an increase in the productivity index of 923% compared to the previous month. This increase was due to the rise in productivity index values across all measured ratio. The growth in December was attributed to the optimal use of raw materials, as evidenced by the higher brown sugar output compared to the previous period, while using fewer raw materials.

On the other hand, the highest productivity decline occurred in October, with a value of -84%. During this month, the productivity ratio for employee workdays and operational hours were at their lowest level (Level 0), while the productivity ratio for raw materials and

wood fuel were at Level 1. The decline in October was caused by lower brown sugar production, but the inputs used in the production process were higher than in the previous period. This imbalance was due to the coconut sap being tapped too long before processing. Coconut sap has a very short shelf life and is prone to be fermented due to microbial activity. Fermented sap increases acid content, which negatively affects the quality of the sap, resulting in cloudy color, strong odor, and sour taste. Consequently, processing this sap produces brown sugar that cannot be molded or has a soft texture, leading to unsatisfactory brown sugar production and wasteful use of coconut sap raw material.

Pak Sarikun's Brown Sugar MSME still uses traditional household-scale methods and lacks a clear vision and mission. Additionally, no Standard Operating Procedures (SOPs) have been established, which has resulted in suboptimal employee performance in processing coconut sap. So far, all employees produce brown sugar based on knowledge passed down through generations within their families.

4.3 Inputs That Need Attention

With the help of the TLS, it is evident that several inputs are still below standard productivity levels and need attention, as indicated by the colors in the table. The inputs with the most below-standard (minimum) productivity and in need of attention are employee workdays, wood fuel, and operational hours. The

frequent occurrence of red indicators is due to the fluctuating amount of coconut sap available for processing into brown sugar. Consequently, there is an imbalance, where the MSME employees continue to work with nearly the same number of workdays, wood fuel usage, and operational hours each day, but the amount of coconut sap processed varies, sometimes being less than usual, leading to wasteful use of inputs during the production process. Therefore, Pak Sarikun's Brown Sugar MSME must pay attention to the supply and quality of coconut sap to meet production standards and implement Standard Operating Procedures (SOPs) for employees to optimize the brown sugar production process and prevent waste of all inputs used.

Based on Table 7, there are no actual scores that received a green color. This indicates that the productivity of brown sugar at Pak Sarikun's Brown Sugar MSME has not yet reached the desired level of productivity, and all inputs used in the production process need improvement. However, certain inputs require extra attention due to the dominance of red color, particularly employee workdays, wood fuel, and operational hours. Since raw materials significantly affect the use of other inputs and are prioritized by the MSME, the suboptimal processing of coconut sap also contributes to the decline in productivity.

Irregular raw material availability and poor quality influence productivity declines, as they can reduce production output and lead to the waste of other inputs used. The inconsistent supply of raw materials is

caused by extreme rainy weather, which affects coconut sap tapping activities. During the rainy season, coconut sap yields are lower because no tapping activities are conducted. The quality of the processed sap also decreases due to the reduction in sugar content caused by tapping during the rain and the extended period between tapping and processing.

5. Conclusion

Based on the research conducted on Pak Sarikun's Brown Sugar MSME in Kubu Raya District, the following conclusions can be drawn:

A. The highest and lowest performance values for each ratio are as follows:
   1) The highest raw material productivity ratio was in September, with a value of 3.74, and the lowest was in November, with a value of 3.08.
   2) The highest employee workday productivity ratio was in September, with a value of 490, and the lowest was in October, with a value of 420.
   3) The highest fuel productivity ratio was in September, with a value of 3.61, and the lowest was in November, with a value of 3.15.
   4) The highest operational hours productivity ratio was in September, with a value of 40.83, and the lowest was in October, with a value of 35.

B. The growth in the productivity index showed both increases and decreases (fluctuations). The highest productivity index value was achieved in December, with a value of 923%, while the lowest was in October, with a value of -84%.

C. The input sources that need attention for evaluating productivity measurement are workdays, fuel, and operational hours.

6. Acknowledgements

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