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ANALYSIS OF THE CORRELATION BETWEEN SIGMA LEVELS AND REDUCTION OF ADDED VALUE IN WET EGG NOODLE PRODUCTS

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Abstract

MSME Soponyono Noodle Mill is one of the MSMEs in Wonokusumo, Surabaya, that adds the value of wheat flour to wet egg noodle products. However, defects in its operation can cause the product to lose its added value. This study focuses on analyzing the relationship between sigma levels and decrease in added value in wet egg noodle products. The method used in this study is the calculation of level 6 sigma, the Hayami method, and simple linear regression. The results showed that the average defect value of Sigma noodles is 3,47, which states that the production process of wet egg noodles still has not reached the level of 6 Sigma. Wet egg noodle production has a high added value of Rp10.800/Kg with a ratio of 44%. The profit is Rp6.800 / Kg. The simple linear regression analysis results state the relationship (correlation) Sigma effect of 98,3% with a decrease in the added value of wet egg noodle products. This value is also evidenced by the Sig value of the sigma level variable is 0,001, more minor than alpha 0,05. As the sigma level approaches 6 (the highest quality level), the loss or reduction in its added value gets lower. This shows that efforts to increase the sigma level will positively impact the product's added value.

Keywords: *Wet Egg Noodles, Quality, Level Sigma, Added Value*

INTRODUCTION

Essentially, Agro-industrial activity involves processing agricultural products into higher-value goods. Added value can result from transformation and preservation processes with the help of physical or chemical treatments. Usually, agro-industrial products are products made for other industrial raw materials or ready-to-consumer products (Arifin, 2016). Wet egg noodles are raw instant noodles made from wheat flour (wheat flour) mixed with eggs. Before being marketed, they mix the dough with eggs and then form a round or flat (Tian, 2021).

Based on BPS (2022), Surabaya City ranked 5th in average per capita consumption per week according to the instant noodle Foodstuff Group per Regency/City in East Java Province in 2018-2022 with a value of 0,822 packs/capita/week. Figure 1 data states that the average per capita consumption of instant noodles per week per Surabaya City in 2018-2022 fluctuates. Data shows that the average per capita consumption of instant noodles in Surabaya decreased in 2018-2020 but increased again until 2022. The average per capita consumption of instant noodles with higher incomes may be influenced by selecting more expensive processed noodles that reflect better quality (Maryadiningsih, 2021).

According to Arianti & Waluyati (2019), a quality product will increase added value, foster a sense of satisfaction, and increase consumer loyalty to the company. The amount of balanced added value also affects the sustainability of supply chain activities, making it beneficial for agro-industrial supply chain actors. Six Sigma is a structured process improvement methodology focusing on reducing failures in the production process chain while reducing products that do not meet specifications. The production process chain is improved to improve product quality, maximize the added value generated, output specifications according to established standards, and meet customer satisfaction (Gaspersz, 2014). Added value (value added) is the added value of a commodity because it undergoes processing, transportation, or storage in production. Value added is the difference between the value of the product and the value of the cost of raw materials and other inputs, excluding labor. At the same time, the margin is the difference in the product's value with the price of raw materials only. This margin includes the components of production factors used, namely labor, other inputs, and the remuneration of processing entrepreneurs (Hayami, 1987).

MSME Soponyono Noodle Mill is one of the micro agroindustry MSMEs in Wonokusumo, Surabaya, established in 1999. As an MSME still developing its business, the owner is committed to producing quality wet egg noodle mill products to produce high-added value for wet egg noodle products. However, the operation still found defects in the form of failed dough and broken noodles. Both defective products can potentially reduce consumer loyalty related to quality and reduce the added value of wet egg noodle products. Additional value and profit can be obtained by improving the quality of wet egg noodle output through improvements in the production process chain. Therefore, the production process chain must be improved to produce good quality and add value to wet egg noodle products. Based on the description, This study aims to analyze the value of sigma level, added value, and the relationship between sigma level and reduced added value in wet egg noodle products.

LITERATURE REVIEW

MSME (Micro, Small and Medium Enterprises)

According to Sanjaya & Nuratama (2021), small entrepreneurs generally pay less attention to business strategies and do not even have a business development plan. They focus on how to sell goods without thinking about improving the products they market so that they are better. Most MSME entrepreneurs focus only on selling their goods, and their business results will usually be spent on personal and family consumption. We can imagine that if all MSME actors spend their profits only on personal consumption, their businesses will not be developed. Micro, Small, and Medium Enterprises (MSMEs) have a strategic role in National Economic Development and employment. Small businesses

also contribute significantly to Indonesia's economic growth in industry, trade, and transportation (Hasanah et al., 2020).

Wet Egg Noodles

Wet egg noodles are raw noodles made from wheat flour (wheat flour) mixed with eggs before being marketed by mixing the dough with eggs and then forming round or flat. The moisture content of wet egg noodles is about 35% (Tian, 2021). The moisture content of wet noodle dough can also affect the texture of the resulting noodles. The more water is added to the dough, the resulting noodles become mushy and make the noodles become sticky to each other. The less water added to the dough, the resulting noodles become rigid and can complicate the molding process into strands of noodles (Auliana, 2013).

Quality

According to Gaspersz (2014), quality can continuously improve the operational or process-level performance of all functional areas of the organization with available resources and capital. Quality is inversely proportional to variability. This means that the quality of the product will increase as the variability of Product Characteristics decreases. The production process chain is improved to improve product quality, maximize the added value produced, output specifications according to established standards, and obtain satisfaction to meet consumer satisfaction.

Six Sigma

According to Syukron & Kholil (2013), Six Sigma is a structured process improvement methodology that focuses on reducing process variability while reducing errors (out-of-specification products/services) using statistics and problem-solving tools intensively. Six Sigma can be converted as a process with a probability of error of 0.00034% or 3,4 parts in 1 million products. Six Sigma as a metric is a reference to achieve a state almost free of defects.

Table 1 shows differences in percentage and DPMO between Sigma

Specification Limit	Percentage	DPMO (Defects Per Million Opportunities)
±1-sigma	30.23%	697.700
±2-sigma	69.13%	308.700
±3-sigma	93.32%	66.810
±4-sigma	99.3790%	6.210
±5-sigma	99.97670%	233

±6-sigma	**99.99966%**	3.4

Source: Gaspersz, 2017

Added Value

Value added is the value a company adds to materials or services purchased through the production and marketing process. The added value is known by looking at the difference between an industry's output and input values. Furthermore, treatments and services that can add to the usefulness of the commodity are called functional inputs. Functional Input can be a process of changing the form utility, saving (time utility), or through the process of moving place (place utility) and ownership (Zaini et al., 2019).

METHOD

This research was conducted at MSME milling Mie Soponyono Jl. Wonokusumo No. 85, Wonokusumo, District. Semampir, SBY City, East Java 60154, East Java, Indonesia. This research was conducted on June 1 – July 1, 2023. The population of this study is owners and employees, with a total of 11 respondents. The sampling method uses a census method that includes all population members as a sample (Arianti & Waluyati, 2019). This study used primary data collection techniques and secondary data. Primary Data were collected using interviews, documentation, and observation methods. Secondary Data were collected using literature studies from various sources such as books, articles, and internal documents of Soponyono Noodle milling MSMEs. The data analysis method used to find the relationship between sigma level and value-added In this study namely:

1. Quantitative analysis of Six Sigma level to calculate the wet egg noodle production quality level through the measuring stage using Microsoft Excel, determining CTQ (Critical to Quality), and calculating DPMO and Sigma level values. The following calculation method, according to Montgomery (2005), namely:
   a. DPMO (defects Per Million Opportunities)

   $$\text{DPMO} = \frac{\text{Jumlah Cacat}}{\text{Jumlah Unit x CTQ}} \text{X } 1.000.000$$

   b. Sigma-level calculation formula (Microsoft Excel)

      Sigma level calculation formula (2) is a DPMO conversion value calculated using Microsoft Excel tools.

   Level sigma = NORMSINV((1.000.000-DPMO)/1.000.000)+1,5

The data from the analysis of this calculation will be used as an independent variable (X). In this article, The define, analyze, and control stages are ignored because they are out of the focus of discussion about the relationship between sigma levels and added value.

2. Value Added analysis of the Hayami method is used to estimate the change in the value of raw materials after treatment. The added value that occurs in the processing process is the difference between the value of the product and the cost of raw materials and other inputs (Hayami, 1987).

Table 2 The added value calculation in this study was carried out in one day of wet egg noodle production in the wet egg noodle milling MSME Agro-Industry.

No	Variable	Unit	Formula
I.	**Output, Input, Price**		
1.	Output	Kg/ Production	A
2.	*Raw Material Input*	Kg/ Production	B
3.	*Labor Input*	HOK	C
4.	Conversion Factor		D = A/ B
5.	Coefficient of Labor	HOK/Kg	E = C/B
6.	Product Price	Rp/Kg	F
7.	Labor Wages	Rp/HOK	G
II.	**Reception and profits**		
8.	Raw Material Input Price (Intermediate Cost)	Rp/Kg	H
9.	*Other material inputs*	Rp/Kg	I
10.	Product Output Value	Rp/Kg	J = D x F
11.	a. Added Value	Rp/Kg	K = J - H – I
	b. Value-Added Ratio	Rp/Kg	L% = K/J x 100%
12.	a. Labor Income	Rp/Kg	M = E x G
	b. Labor Ratio	Rp/Kg	N% = M/K x 100%
13.	a. Profit	Rp/Kg	O = K – M
	b. Profit Ratio	Rp/Kg	P% = O/K x 100%
III.	**Remuneration for factors of production**		
14.	Margin	Rp/Kg	Q = J - H
	a. Labor Income	(%)	R% = M/Q X 100%
	b. Other Input Contributions	(%)	S% = I/Q X 100%

	c. Advantages	(%)	T% = O/Q X 100%

Source: Hayami, 1987

According to Sudiyono (2004), there are three measures of value-added ratio: (1) low value-added If the value-added ratio is <15%, (2) medium when it has a ratio of 15% -40%, (3) and high if the value-added ratio >40%.

3. Quantitative analysis of simple linear regression using SPSS version 29. Simple linear regression is a statistical calculation method describing the linear relationship between one independent variable (X) and the dependent variable (Y). This study will describe the linear relationship between variables, which means that changes in the variable level sigma (X) will be followed by changes in the variable value-added reduction (Y) regularly. The Data used in this study were obtained from the analysis of sigma level calculation and the added value accumulated against the defect of wet egg noodle products. So that the model becomes:

$$\mathbf{Y = b + x^1 + e}$$

Description:

Y	= subtraction of added value	x^1	= sigma Level (quality level)
b	= constant	e	= error

RESULTS AND DISCUSSION

Value Analysis Of Six Sigma Level (Quality Level) Of Wet Egg Noodle Products

Six Sigma methodology is a method of continuous improvement in creating goods or services up to zero defect stage (zero failure) with the possibility of 3,4 defective products in one million production opportunities or defects per Million Opportunities (DPMO) (Gaspersz, 2017). The value of DPMO (Defect Per Million Opportunity) and sigma level is calculated to determine how many product defect opportunities are in each wet egg noodle processing process at Soponyono Noodle milling SMEs. MSMEs can use This calculation information as a guideline for quality control of CTQ (Critical to Quality) caused.

1. Critical to Quality (CTQ)

   CTQ (Critical to Quality) in this study is a type of critical damage to wet egg noodle products that affect the quality and will impact the product's value (Gaspersz & Fontana, 2011). CTQ is a characteristic of products that do not meet the expectations of owners and customers. The research results show that two CTQs include dough fails and crushed products (broken).

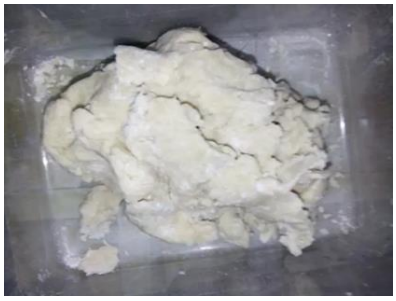

Figure 1 Failed wet egg noodle dough
Source: MSME Soponyono Noodle Mill, 2023

Figure 2 Product broken wet egg noodles
Source: MSME Soponyono Noodle Mill, 2023

a. Failed Dough

The failed dough is a defect found in wet egg noodle products. The characteristics of the dough otherwise fail on this product are too smooth and too dry dough (less water). The dough is smooth in making wet egg noodles and can produce sticky wet egg noodles output, while the dough that lacks water will be dry and difficult to form.

b. Broken Products

Broken products are defects found in wet egg noodle products. Broken products can cause The Shape of the noodle strands are not whole lengthwise, and the product will be cut off when the wet egg noodles are pulled, lifted, or moved. Wet egg noodles will also become brittle when packaging is done.

2. Calculating DPMO and Sigma levels

Calculations of DMPO and sigma levels are determined using Microsoft Excel tools. Table 3 is a recapitulation of the results of DPMO calculations and sigma levels of possible defects in wet egg noodle products in June 2023. Based on the calculation results, it is known that the average DPMO value of wet egg noodle products in June 2023 is 24.598, which can be interpreted that from one million opportunities for the wet egg noodle production process, there will be 24.598 possible failed products produced.

Table 3 Accumulated DPMO and Sigma Level calculations of wet egg noodle production and defects at Soponyono Noodle milling SMEs in June 2023

Date	Number Of Defects (Kg)	Amount of Defect (Kg)	% Defects	CTQ	DPMO	Sigma Level
1	30	1,5	6,8%	2	25000	3,46
2	30	1,7	7,1%	2	28333	3,41
3	30	1,7	7,1%	2	28333	3,41
4	30	1,8	7,2%	2	30000	3,38

5	30	1,5	6,8%	2	25000	3,46
6	30	1,2	6,0%	2	20000	3,55
7	30	1,1	5,8%	2	18333	3,59
8	30	1,2	6,3%	2	20000	3,55
9	30	1,4	6,7%	2	23333	3,49
10	30	1,5	6,8%	2	25000	3,46
11	30	1,7	7,1%	2	28333	3,41
12	30	1,3	6,5%	2	21667	3,52
13	30	1	5,3%	2	16667	3,63
14	30	1,2	6,0%	2	20000	3,55
15	30	1,2	6,0%	2	20000	3,55
16	30	1,6	7,0%	2	26667	3,43
17	30	1,7	7,1%	2	28333	3,41
18	30	1,7	7,1%	2	28333	3,41
19	30	1,5	6,8%	2	25000	3,46
20	30	1,2	6,0%	2	20000	3,55
21	30	1,7	8,9%	2	28333	3,41
22	30	1,3	6,5%	2	21667	3,52
23	30	1,6	7,0%	2	26667	3,43
24	30	1,9	7,6%	2	31667	3,36
25	30	1,8	7,2%	2	30000	3,38
26	30	1,2	6,0%	2	20000	3,55
27	30	0,9	4,7%	2	15000	3,67
28	30	1,8	7,2%	2	30000	3,38
29	**IDUL ADHA (Tidak ada Produksi)**					
30	30	1,9	7,6%	2	31667	3,36
Rata-rata	**30**	**1,5**	**6,7%**	**2**	**24598**	**3,47**

Source: primary data processing, 2023

The average sigma defect value of wet egg noodle products in June 2023 was 3,47. The value still does not meet the standard value of 6 Sigma to suppress failed products in the production process of wet egg noodles. Based on Table 3 of the Sigma value data for wet egg noodle production in June 2023, Soponyono Noodle milling SMEs are in Indonesia's average industrial sigma values. According to Gaspersz (2017), the average industry in Indonesia has a level of sigma value between 2-3.

Sustainable improvement needs to be improved so that the product failure of wet egg noodles can be minimized and maximize the added value and profits obtained.

Value-Added Analysis Using Hayami Method

Processing wheat flour into wet egg noodles is one of the activities to increase the added value of wheat flour. The Hayami method is used to analyze the processing of wheat flour into various types of products. This analysis is used by outlining the processing of raw materials according to the influence of each factor of production which will be known as the distribution of added value for the workforce and the processor (Hayami, 1987).

Table 4 Calculation of value-added analysis of wet egg noodle production in MSME Soponyono Noodle Mill in the production period in June 2023.

No	Variable	Unit	Formula	Value
I.	**Output, Input, Price**			
1.	Output	Kg/ Production	A	30
2.	*Raw Material Input*	Kg/ Production	B	20
3.	*Labor Input*	HOK	C	2
4.	Conversion Factor		D = A/ B	1,5
5.	Coefficient of Labor	HOK/Kg	E = C/B	0,1
6.	Product Price	Rp/Kg	F	16.500
7.	Labor Wages	Rp/HOK	G	40.000
II.	**Reception and profits**			
8.	Raw Material Input Price (Intermediate Cost)	Rp/Kg	H	8.800
9.	*Other material inputs*	Rp/Kg	I	
	Additional material costs			3.463
	Packaging cost			330
	Depreciation cost of tools			919
	Operating costs			438
	Total			5.150
10.	Product Output Value	Rp/Kg	J = D x F	24.750
11.	a. Added Value	Rp/Kg	K = J - H – I	10.800
	b. Value-Added Ratio	Rp/Kg	L% = K/J x 100%	44%
12.	a. Labor Income	Rp/Kg	M = E x G	4.000

	b. Labor Ratio	Rp/Kg	N% = M/K x 100%	37%
13.	a. Profit	Rp/Kg	O = K – M	6.800
	b. Profit Ratio	Rp/Kg	P% = O/K x 100%	63%
III.	**Remuneration for factors of production**			
14.	Margin	Rp/Kg	Q = J - H	15.950
	a. Labor Income	(%)	R% = M/Q X 100%	25%
	b. Other Input Contributions	(%)	S% = I/Q X 100%	32%
	c. Advantages	(%)	T% = O/Q X 100%	43%

Source: primary data processing, 2023

Table 4 shows that the average use of raw materials for the wet egg noodle production process per day (throughout June 2023) is 20 Kg of wheat flour with an average output of 30 Kg of wet egg noodles sold and packaged kilograms. The wage system for workers in the micro agroindustry of Soponyono Noodle milling MSMEs uses a daily system. The average working hours per day is 2 hours per production day. The coefficient of labor required to process 20 Kg of wheat flour into wet egg noodles takes an average time per day is 0,1. The coefficient of Labor and wages provided affect the amount of labor benefits. The greater the coefficient of Labor and wages of Labor, the greater the benefits of Labor. All MSME workers at Soponyono Noodle Mill come from the surrounding communities of Wonokusumo Village and are paid in full to find out the benefits of the labor provided. The average value of the employee benefit ratio is 37%. This shows that Soponyono Noodle milling MSMEs can play a role in providing income for their workers, which is Rp4.000/Kg.

The price of wet egg noodles is Rp16.500/Kg, and the conversion factor of 1,5, then the average output value of the products obtained is Rp24.750 per day of production. The added value of wet egg noodles is obtained from the Product Value reduced by other inputs. In the micro agroindustry, MSME Soponyono Noodle milling in producing wet egg noodles obtained an added value of Rp10.800 per Kg with a percentage of 44%. Based on the level of value-added ratio according to Sudiyono (2004), the ratio of added value given to wheat flour processing into wet egg noodle products in MSMEs Soponyono Noodle Mill is high (more than 40%). Further analysis showed an average profit of Rp6.800 per Kg or 63%. The Margin obtained from one Kg of wet egg noodles is Rp15.950 with a labor income of 25%, and other input contributions of 32%, so the producers' profit is 43%. So it can be concluded that MSMEs grinding Soponyono noodles on Wonokusumo Street No.85, Semampir District (60154), Surabaya City, East Java, Indonesia is still feasible to be developed.

The Correlation Between Sigma Levels and Reduction of Added Value

Waste is a form of loss of various resources such as material, time (labor and equipment), and capital caused by activities that do not add value to inputs and outputs. The six sigma Level is a unit of quality measurement level of the process of reducing failed/defective products in a good or service (Gaspersz, 2017). Value added is the provision of value by producers to raw materials through a production process or the addition of other inputs used during the production process (Zaini et al., 2019).

Supervision of the production process should be carried out to produce the output of wet egg noodles of high quality and value-added products. Action plans need to be carried out continuously to maximize both aspects. The results of the sigma level analysis in Soponyono Noodle milling MSMEs presented in Table 3 shows that the level of performance of the wet egg noodle production process in producing failed products is still away from level 6 sigma. Calculation of added value in Table 4 states that the added value generated by MSMEs milling Soponyono noodles in producing wet egg noodles amounted to Rp10.800/Kg with a percentage of 44% of the overall output value of wet egg noodle products.

Based on the accumulated calculations in Table 5, the reduction of added value is the number of failed outputs multiplied by the added value (Rp) of wet egg noodle products. Calculations in Table 5 shows that the average sigma value and loss of added value in wet egg noodle failure products in June 2023 was 3,47, with a loss of added value of Rp15.312. The Data shows that the highest sigma level was produced on June 27, 2023, which was 3,67, with a defect percentage of 3% from 30 Kg of the total daily production of wet egg noodles and a total loss of added value of Rp9.612. At the same time, the lowest sigma level was produced on June 24 and 30, 2023, at 3,36 with a defect percentage of 6,2% from 30 Kg of the total daily production of wet egg noodles and a loss of added value of Rp20.112. Table 4 shows that there appears to be a correlation between sigma level and value-added reduction. As the sigma level approaches 6 (the highest quality level), the loss or reduction in its added value gets lower. This indicates that efforts to increase sigma levels will positively impact the product's added value. Both data were used as simple linear regression analysis variables to find the relationship between the sigma level (X) and the reduced added value (Y) in wet egg noodle products at MSME Soponyono Noodle Mill.

Table 5 Sigma Level accumulation and loss of added value of wet egg noodle products at Soponyono Noodle milling SMEs in June 2023

Date	Number Of Defects (Kg)	Percentage Of Defects	Sigma Level	Loss (Rp)	Reduction In Value Added (Rp)
1	1,5	5,0%	3,46	24.552	16.070
2	1,7	5,6%	3,41	27.720	18.144
3	1,7	5,5%	3,41	27.225	17.820

Date	Number Of Defects (Kg)	Percentage Of Defects	Sigma Level	Loss (Rp)	Reduction In Value Added (Rp)
4	1,8	5,8%	3,38	28.875	18.900
5	1,5	4,9%	3,46	24.008	15.714
6	1,2	4,1%	3,55	20.130	13.176
7	1,1	3,8%	3,59	18.810	12.312
8	1,2	3,9%	3,55	19.140	12.528
9	1,4	4,6%	3,49	22.737	14.882
10	1,5	4,9%	3,46	24.090	15.768
11	1,7	5,5%	3,41	27.390	17.928
12	1,3	4,4%	3,52	21.905	14.338
13	1,0	3,3%	3,63	16.286	10.660
14	1,2	3,9%	3,55	19.117	12.513
15	1,2	4,0%	3,55	19.701	12.895
16	1,6	5,5%	3,43	27.093	17.734
17	1,7	5,8%	3,41	28.826	18.868
18	1,7	5,6%	3,41	27.926	18.279
19	1,5	5,0%	3,46	24.519	16.049
20	1,2	3,9%	3,55	19.487	12.755
21	1,7	5,5%	3,41	27.464	17.977
22	1,3	4,4%	3,52	21.905	14.338
23	1,6	5,5%	3,43	27.093	17.734
24	1,9	6,2%	3,36	30.726	20.112
25	1,8	6,0%	3,38	29.865	19.548
26	1,2	4,1%	3,55	20.196	13.219
27	0,9	3,0%	3,67	14.685	9.612
28	1,8	6,0%	3,38	29.601	19.375
29	**IDUL ADHA**				
30	1,9	6,2%	3,36	30.726	20.112
TOTAL	**42,5**			**701.798**	**459.359**
Rata-rata	**1,5**	**4,9%**	3,47	**23.393**	**15.312**

Source: primary data processing, 2023

Table 6 Result of simple linear regression analysis between sigma level variable and value-added

Correlations

		reduction of added value	sigma level
Pearson Correlation	reduction of added value	1.000	-.991
	sigma level	-.991	1.000
Sig. (1-tailed)	reduction of added value	.	<,001
	sigma level	.000	.
N	reduction of added value	29	29
	sigma level	29	29

Model Summary

Model	R	R Square	Adjusted R Square	Std. The error in the Estimate
1	.991[a]	.983	.982	401.758

a. Predictors: (Constant), sigma level

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	246007953.110	1	246007953.110	1524.125	<,001b
	Residual	4358050.890	27	161409.292		
	Total	250366004.000	28			

a. Dependent Variable: value-added

b. Predictors: (Constant), sigma level

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	138570.981	3144.605		44.066	<,001
	level sigma	-35330.539	904.982	-.991	-39.040	<,001

a. Dependent Variable: value-added

The results of the analysis of simple linear regression data in Table 6, obtained the value of R Square or R^2, where R Square is a value that indicates the percentage contribution of variable sigma level (quality level) in influencing the variable reduction of value-added. In contrast, other variables influence

the rest or epsilon symbolized Ɛi. R Square (the value of the coefficient of determination) obtained a value of 0.983 means that the amount of contribution variable sigma level (quality level) influencing the value-added reduction variable equals 98.3%. In contrast, other variables influence the remaining 1.7%. Thus, the reduction of value-added wet egg noodle products can be explained by the sigma level (quality level) of 98.3%, and the rest is influenced by other factors besides the quality level. Through the table, the regression equation can be arranged as follows:

$$\mathbf{Y = 138570{,}981 – 35330{,}539X}$$

The obtained constant value of 138570.981 means that in the absence of X (sigma level), the amount of value-added reduction is 138570,981. Obtained value coefficient variable x negative means the sigma level negatively affects the reduction of added value. The higher the sigma level (quality level) of wet egg noodles, the lower the reduced added value and vice versa. Suppose the sigma level variable rises (one). In that case, it will cause a decrease (negative sign) of 35330,539 in reducing the added value of wet egg noodle products at Soponyono Noodle milling SMEs.

Obtained Sig value variable sigma level of 0,001 is more minor than alpha 0,05, which means Ho rejected. The test result through probability is also relevant to the test through the statistic t. The t count equals -39,040, while the t table is obtained from 0,05;28 equals 1,70113. Because t count > t table (-39,040 > 1,70113) then, Ho rejected, meaning that the effect of X on Y is proved to be significant based on statistical testing. The effect of the sigma level on the reduced value added is significant, so the alternative hypothesis (Ha) is accepted.

The results of regression analysis are in line with The Theory of (Gaspersz, 2017), which states that lean six sigma is a continuous improvement process to eliminate waste and increase the added value (value added) of a product in the form of goods or services in order to provide value to customers (customer value). Research courtesy of (Trimarjoko et al., 2020), also stated that The Six Sigma level is widely used in manufacturing and service industries in reducing defects, and variations, eliminating errors to achieve product excellence, exceed customer expectations, and obtain enterprise efficiency performance can reduce human and system transactional errors and non-value-added activities.

CONCLUSION

Wet egg noodle production process at MSME Soonyono Noodle Mill has two types of defects or failed products: failed dough and broken noodles (crushed). On average, in June 2023, there were 24.598 chances that the wet egg noodle production process produced a failed output of one million occasions. On average, the Sigma defect value of noodles is 3,47, which states that the production process of wet egg noodles still has not reached the level of 6 Sigma.

One-time production of wet egg noodles at MSMEs Soponyono Noodle Mill requires 20 Kg of wheat flour as the primary raw material with an output of 30 Kg in one production. Faithful 1 (one) kilogram of raw materials cost Rp8.800. Other contributing costs include input cost of supporting materials, packaging costs, equipment depreciation, and operational costs. The wet egg noodles production has a high value of Rp10.800/Kg with a value-added ratio of 44%. The profit obtained is Rp6.800 / Kg.

There is a correlation between the sigma level and the reduced added value in the production of wet egg noodles in MSMEs grinding Soponyono noodles. The simple linear regression analysis results state a relationship (correlation) of 98,3% effect of sigma level with a reduction in the added value of wet egg noodle products. This value is also evidenced by the Sig value of the sigma level variable of 0,001, more minor than alpha of 0,05. Continuous improvement is needed to raise sigma and value levels.

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