

The Capacity Efficiency Of Production Machinery And Raw Material Supply Control : Production Process In "Galvanized Steel" Company, Bekasi City

Wartini¹, Martino Wibowo²

Universitas Indonesia, Tutor Universitas Terbuka¹

Fakultas Ekonomi, Universitas Terbuka²

*Corresponding author e-mail: tino@ecampus.ut.ac.id

Abstract: To produce a product that is of good quality with a smooth production process, it is necessary to establish a system of Machine Efficiency Capacity and Raw Material Supplies appropriately, this is intended to make it easier for companies to meet the required quantity of production and efficiency efficiently and certainly affect the smooth production. The purpose of this research is to find out and analyze the Effect of Capacity of Machine Efficiency in Production and Inventory Control of Raw Materials on the Smooth Production Process in Bekasi Branch "Galvanized Steel" Company. The type of research used is observation with a multiple linear regression analysis model with 32 samples. The regression test results show that 58.5%, the smoothness of the production process can be explained by the capacity of machine efficiency, and control of inventory of raw materials, while the remaining 41.5% is explained by other factors not examined in this study. F test results show that simultaneously the efficiency of production machinery and raw material inventory control have a significant effect on the smooth production process. The results of the t test show partially the capacity of machine efficiency has a significant effect on the smoothness of the production process while the control variables for raw material inventory have no significant effect on the smooth production process in the branch company "GALVANIZED STEEL" Bekasi

Keyword: Capacity Efficiency, Production Machinery, and Supply Control

1. Introduction

The industrial sector is one of the sectors that plays an important role in Indonesia's economic development, the role of industry in Indonesia is evident and can be felt by the Indonesian citizens themselves. This is due to the influence of Indonesia's economic growth which creates opportunities to set up businesses. One of them is in the Food & Beverages (F&B) industry sector. This can be seen from the growth rate of the Indonesian economy in the following table:

Table 1 Growth of GDP

Gross Domestic Product (GDP) Growth	Cumulative GDP Growth Rate By expenditure 2022			
	2020	2021	2022	Rata-rata
Food and Beverage Non-Restaurant	4,5%	5,4%	5,3%	5,1%
GDP for commodities	5,0%	4,8%	5,0%	4,9%

Sumber : www.bps.go.id (2022)

When looked at more deeply, data on economic growth according to the Central Statistics Agency (BPS) for the last 3 years for the F&B sector other than restaurants have always been above the average combined economic growth rate except for 2020. Based on the 2020 performance report of the ministry of industry, this decline was probably due to by fluctuations in the growth rate of several sectors over the past 5 years, thus affecting the contribution of the F&B sector to National GDP. But for the following year, the F&B sector can show an increase by contributing 9.1% of GDP for the last 2 years. Along with increasing economic growth, this is certainly a good opportunity for foreign and local entrepreneurs to build a business and invest, especially in the retail sector, so that not a few retail companies engaged in the F&B sector are competing to provide good quality in terms of products. and the services it produces, because customer satisfaction is one of the parameters in measuring the success of a company.

"Galvanized Steel" is one of the largest coffee shop companies in Indonesia, which has more than 100 cities both within the city and outside the city. The products offered from "Galvanized Steel" also vary, starting from the various types of menus offered, such as: espresso-based hot drinks, cold drinks for frappuccino blended coffee and frappuccino blended cream, and RTD (Ready to Drink) drinks. Apart from drinks, this coffee shop also offers snack products such as cakes, puffs, cookies, and sandwiches. Besides food & beverage products, "Galvanized Steel" also offers various kinds of merchandise ranging from mugs, core tumblers to special tumblers, and also via coffee ready brew (instant coffee) and whole beans that have been packaged with a roasting variant.

To maintain the condition of these machines in optimal condition when used, the company "Galvanized Steel" has a maintenance and checking schedule. This is done to find out how efficient the production of the Mastrena machine (coffee maker machine) is. To see details of Mastrena engine capacity data for the last 8 months, see the attachment page. In addition, the supply of raw materials is also the most important part in the production process and must be available when needed. All of these require supervision and control in their use and operation so that the company can produce according to a predetermined plan.

It is hoped that an effective and efficient production process can be achieved. Based on the background above, the writer is interested in conducting research based on what factors can influence the process.

Based on the background above, the problems in this study are formulated as follows:

- a. Does the Capacity of Production Machine Efficiency simultaneously and Control of Raw Material Inventory have a significant effect on the smoothness of the production process at the company "Galvanized Steel" Bekasi city?
- b. Partially, does the Production Machine Efficiency Capacity have a significant effect on the Smooth Production Process at the "Galvanized Steel" company, Bekasi city?
- c. Does the Raw Material Inventory Control System partially have a significant effect on the Smooth Production at the Company "Galvanized Steel" Bekasi city?

Seeing the formulation of the problem above, this study has several objectives as follows:

- a. To determine simultaneously the efficiency capacity of production machines, and raw material inventory control have a significant effect on the smooth production process at the company "Galvanized Steel" Bekasi city.
- b. To determine partially the efficiency capacity of the production machine has a significant effect on the smooth running of the production process at the company "Galvanized Steel" in Bekasi city.
- c. To find out partially the raw material inventory control system has a significant effect on the smooth production process at the company "Galvanized Steel" Bekasi city.

2. Literature Review

a. Production Machinery Efficiency Capacity

In the production process there are several production factors that complement each other to support the production process to run smoothly. Where one of them is the equipment or machine used, according to Sofjan Assauri (2004: 79) "A machine is a tool that is driven by a force or force that is used to assist humans in working on certain products or product parts" and the role of the machine according to Assauri (2004) argued that "machines really help humans in carrying out the production of goods so that goods are produced in shorter time, in larger quantities and with better quality".

From the description above, we can conclude that the existence of machines and sophisticated technology really helps human work in producing goods, but if the existence of machines cannot be optimized for their use, then they will not be able to provide added value to company profits. Therefore, to increase the use-value of a machine, the company must make the system as efficient as possible for the capacity of the production machine to produce products according to company standards without reducing the quality of the product itself. *Pengertian Kapasitas*

Heizer & Render (2007: 372) defines capacity as the result of production (throughput) or the number of units that can be retained, received, stored, or produced by a facility in a certain period of time. Meanwhile, other experts say that capacity is a measure of the ability of the production process to transform the resources owned into a product or service that will be used by consumers, (Hilton, Maher and Selto, 2003:27). So what is meant by effective capacity is the capacity that is expected to be achieved by a company with current operating limitations.

Heizer & Render (2007:374) also mentions that measurement of capacity management consists of:

- 1) Theoretical capacity is the maximum capacity to produce, regardless of the need for adjustments for preventive maintenance, unplanned breakdowns, process shutdowns, etc.
- 2) Practical capacity is theoretical capacity which is adjusted by taking into account unavoidable non-productive conditions such as set up, maintenance and damage.

- 3) Normal capacity (normal capacity) is the level of capacity utilization that can meet the average demand of consumers in several periods.
- 4) Annual budget capacity (budgeted capacity) is the expectation of the management of the level of a capacity utilization in a certain budget period which is usually in one year. Actual capacity is the amount of capacity utilization actually used in a period.

b. Definition of Effective and Efficiency

Efficiency is a measure of shows how well economic resources can be used in the production process to produce output because efficiency is closely related to a company's profits, so the company will try as much as possible to make efficiency without sacrificing service to consumers. Efficiency carried out in the company indicates that the company has used modern management for the implementation of operational activities, where efficiency is a process that measures the actual performance of resources relative to predetermined standards. Increasing efficiency in the production process will reduce the cost per unit of output, so that products can be sold at competitive prices in the market. Efficiency depends on how the facility is used and managed, but achieving 100% efficiency is likely to be difficult as efficiency is usually expressed as a percentage of effective capacity.

c. Material Inventory Control

Control is one part of management. Control is carried out with the aim that what is planned can be carried out properly so that it can achieve the target or goal to be achieved. Controlling is an important function because it helps to check for errors and take corrective action so as to minimize standard deviations and say that organizational goals have been achieved in a good way. from the organization itself. The objectives of the control itself include the following:

- 1) The implementation process is carried out in accordance with the provisions of the plan.
- 2) Check the accuracy and correctness of accounting data.
- 3) Promote efficiency in operations.
- 4) Increase accountability.
- 5) Stimulate compliance with applicable rules and regulations.

d. Conceptual Framework

The thinking framework is a conceptual model of how the theory of relations with various factors has been identified as an important problem (Sekaran in Sugiyono, 2014:60). Below is an overview of the conceptual framework used in this study.

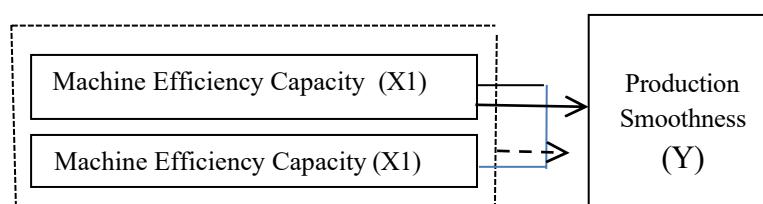


Figure 1 Conceptual Framework

3. Research Method

The method used in this research is a quantitative descriptive method. Nazir (2014: 54) suggests that the descriptive method is a method for examining the status of human groups, objects, a set of conditions, a system of thought, or a class of future events. While the qualitative method according to Sugiyono (2014: 38) can be interpreted as a research method based on postpositivism/ interpretive philosophy (as opposed to experimentation) where research is a key instrument, data collection techniques are carried out by triangulation (combined), data analysis is inductive/ qualitative, and the results of qualitative research emphasize meaning rather than generalization.

According to Sugiyono (2014: 42) data collection techniques can actually be done in several ways, namely: "There are two main things that affect the quality of research data, namely the quality of research instruments and the quality of data collection. The quality of the research instruments is related to the validity and reliability of the instruments and the quality of data collection is related to the accuracy of the methods used to collect data. Therefore, an instrument that has been tested for validity and reliability, may not necessarily be able to produce valid and reliable data, if the instrument is not used properly in data collection. Furthermore, the writer needs to convey that in conducting this research the writer collects primary data, namely original data collected by researchers to answer asset problems specifically (Sunyoto, 2014: 28). Also secondary data, namely data that does not directly come from the data source where the data is usually collected by data collection agencies and published to the data user community (Sunyoto, 2014: 42). The following is the data that the author obtained. Data consists of primary and secondary data. Obtained from the results of interviews with the company, direct observation to the company, checking documentation regarding the efficiency capacity of the machine and data collection from raw material inventory at the Galvanized Steel Bekasi company. In addition, secondary data was obtained from various literature books, articles, scientific writings, as well as websites/websites on the internet. The data obtained are in the form of opinions expressed by experts as well as recent events.

a. Variable definition

Operational definition is an aspect of research that provides information about how to measure variables. Thus, the writer will be able to know how to measure variables that are built on the basis of a concept in the form of indicators. The dimensions and indicators of this study are:

- 1) Production Machine Efficiency Capacity (X_1) Is a measure of the ability of a machine to produce / produce products efficiently. (Hilton, Maher and Selto, 2008:95), with the following statement indicators: Melakukan *Preventive Maintenance Inspection*, yaitu kegiatan *maintenance* yang dilaksanakan dengan cara memeriksa setiap bagian mesin secara berpatroli dan berurutan sesuai dengan *Galvanized Steelhedule*.

Carry out Major Overhaul (down engine), namely maintenance activities carried out by conducting thorough disassembly and research on the machine, as well as replacing spare parts according to the specifications, based on: work order system, system checklist, quarterly work plan, warrant. Menjaga Standarisasi Mesin, dimana pada mesin mastrena sudah ada ketentuan mengenai karakteristik mesin tersebut. Misalnya : temperatur *steamwand*, jumlah *powder cake* (ampas kopi yang dihasilkan), *griding*

time, extraction time, dan water quality. On the other hand, Machine Smoothness, for the smooth operation of the machine, calibration must be carried out before the machine operates, this is to find out that the machine has been set according to standards that are directly related to the quality produced.

2) Material Inventory Control (X_2)

Is an activity that determines the level of composition of the inventory of parts, raw materials, and finished goods/products, so that the company can protect the smooth production and sales as well as the company's spending needs effectively and efficiently (Assauri, 2008: 248), with the statement indicator as follows : (i) Record the initial inventory of raw materials; Record the ending inventory of raw materials; (ii) Determine the amount of raw material purchases; (iii) Predicting the amount of raw materials needed for a certain period; (iv) Calculating the total raw materials produced into materials ready for use; (v) Controlling raw material stocks for transfer in and transfer out systems (vi) Conducting inventory when stock is of name.

3) Production Process Capability (Y)

what is meant is that all production process activities can run smoothly and timeliness is achieved in completing work. The research indicators include: (i) workforce training by holding training in operating processor machines; (ii) There is a recording system, method procedures and reporting in the production process; (iii) There are standards or norms in the use of raw materials, the length of machine hours in production, the capacity of the machine and its production results in accordance with the accuracy of production and the smoothness of the production process.

b. Data Analysis

Data analysis aims to answer the problem formulation and research hypotheses that have been formulated previously. The data that has been collected will be processed so that conclusions can be drawn according to the type of test that will be used later. At the end of the conclusion, it will be known how the influence of the independent variables and the dependent variable used in this study.

$$Y = a + b_1X_1 + b_2X_2 + e$$

Note:

Y=Dependent Variable(smooth production); a = Intercept (point of intersection with the Y axis)
 b_1, b_3 = Regression Coefficient (constant) X_1 = Machine Production Efficiency Capacity ; X_2 =
Inventory Control; e = Standard error

4. Result and Discussion

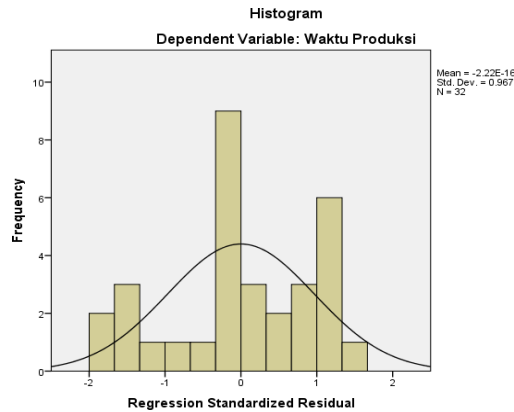


Figure 2 Histogram

The classic assumption test is a test that must be performed before someone performs multiple linear regression analysis. The classical tests carried out in this study include: (1) normality test, (2) multicollinearity test and (3) heteroscedasticity test. In the histogram graph above, it can be seen that the variables are normally distributed. This is shown by the histogram image which is not skewed to the right or left, which means that the data can be analyzed further.

Table 2 Multicollinearity Test

VARIABEL	COLLINEARITY STATISTICS			
	TOLERANCE		VIF	
	value	conclusion	value	conclusion
Machine Efficiency Capacity	0,997	>0,1	1,003	<5
Raw material inventory control	0,997	>0,1	1,003	<5

The data above shows that all the tolerance values for the independent variables are above 0.1 and the VIF values for the independent variables are all below 5, which means that there is no multicollinearity.

After all the data is declared feasible for further testing, the final step is to test the hypothesis. This test aims to answer the formulation of the problem as well as a temporary guess on the answer to the formulation of the problem contained in the hypothesis. Some of the things included in this hypothesis test include the regression equation, the F test (simultaneous test), the coefficient of determination (R^2) and the t test (partial test). The result shows:

$$Y = -4,602 + 0,962X_1 - 0,131X_2$$

- a. The regression coefficient of the engine efficiency capacity variable obtained a value of 0.962, which means that if the engine efficiency capacity variable

decreases while the raw material inventory control variable is assumed to be constant, then purchasing decisions will also increase by 0.962.

- b. The regression coefficient of the raw material inventory control variable obtained a value of -0.131, which means if the raw material inventory control variable is experiencing.

The constant is -4.602, which means that if the variable capacity, machine efficiency and inventory control, the table above shows that the Fcount value processed using SPSS is 22.841. Meanwhile, the Ftable value seen in the table of values for the F distribution is 4.171. Thus, it can be said that the value of $F_{count} = 22.841 > F_{table} = 4.171$. This means that the independent variables consisting of machine efficiency capacity and raw material inventory control have a significant effect on the smooth production process at the "Galvanized Steel" company in Bekasi city. If the raw material is considered zero then the production process variable Std. The Error of the Estimate is only -4.602.

The results above show that the Adjusted R Square value is 0.585 or 58.5%. This means that the independent variables in the form of machine efficiency capacity and raw material inventory control can explain the smooth production process at the "GALVANIZED STEEL" company in Bekasi city by 58.5% while the remaining 41.5% is explained by other variables not included in this study, such as machine maintenance, speed of service, and so forth. The Efficiency Capacity of Machines for Raw Material Inventory Control increases while the vari indicates that the machine efficiency capacity is assumed to be constant, so the smooth production process will also decrease by -0.131, X_1 to Y : $t_{statistics} = 6.678 > t_{table} = 1.699$; $p\text{-value} = 0.000$; $\alpha < 0.05$, significant effect. X_2 to Y : $t_{statistics} = -0.690 < t_{table} = 1.699$; $p\text{-value} = 0.496$; $\alpha > 0.05$, no significant effect

Table 3 Simultaneous Regression

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.426	2	1.213	22841	.000 ^b
Residual	1.540	29	.053		
Total	3.966	31			

In order to determine which H_0 and H_1 are rejected or accepted, the tcount value above can be compared with the ttable value at the 5% significance level ($\alpha = 0.05$). The ttable value at a significance level of 5% ($\alpha = 0.05$) is 1.980. By comparing tcount and ttable, the following conclusions can be drawn, as follows:

- a. Partially the efficiency capacity of the machine has a positive and significant effect on the smooth running of the production process at the "**Galvanized Steel**" company in Bekasi city because $t_{count} (6.678) > t_{table} (1.699)$ and its significance value is below 0.05.
- b. Partially raw material inventory control has no positive and insignificant effect on the smooth production process at the "GALVANIZED STEEL" company in Bekasi city because $t_{count} (-0.690) < t_{table} (1.699)$ and its significance value is above 0.05.

In accordance with the background previously presented, where until now there are still obstacles in the "Galvanized Steel" company in Bekasi city, especially regarding the smooth process of the production process so that research needs to be carried out including using the variable engine efficiency capacity and raw material inventory control, so at least these problems starting to answer. Of the two independent variables used, there is one variable that has a significant effect on the smooth production process at the "Galvanized Steel" company in Bekasi city, namely the efficiency capacity of the machine. While other independent variables, namely raw material inventory control, have no significant effect on the smooth production process at the "Galvanized Steel" company in Bekasi city.

The raw material inventory control variable has no effect on the smooth production process at the "Galvanized Steel" company in Bekasi City, most likely because this variable does not have a strong impact on the dependent variable, where the benchmark for the dependent variable is related to the time the machine is in production. Therefore, the efficiency capacity of the machine is the most dominant variable affecting the smooth production process at the "Galvanized Steel" company in Bekasi city.

When compared with various studies that have been carried out by previous researchers, of course this will further strengthen these studies where apart from the machine maintenance factor and service speed, another factor that influences the smooth production process is the efficiency capacity of the machine.

By looking at the description above, it can be said that high raw material inventory control will not automatically improve the smooth production process at the "Galvanized Steel" company in Bekasi city. There is a certain point where raw material inventory control will affect the smooth production process but if there is a certain point where raw material inventory control will not affect the smooth production process. Therefore, as an industrial sector company engaged in retail food & beverage, "Galvanized Steel" companies must be able to analyze and see this matter well.

5. Conclusion

Based on the analysis and evaluation of the data that has been carried out on the variables in this study, it can be concluded that following the results of the analysis and interpretation of the data previously described, the following conclusions can be drawn:

- a. Simultaneously the capacity of machine efficiency and raw material inventory control has a significant effect on the smooth running of the production process at the "Galvanized Steel" company in Bekasi city.
- b. Partially, the efficiency of the engine capacity has a significant effect on the smooth running of the production process at the "Galvanized Steel" company in Bekasi city.
- c. Partially, raw material inventory control has no significant effect on the smooth production process at the "Galvanized Steel" company in Bekasi city.

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