

# Analysis Of The Influence Of Factory Layout And Production Scheduling On The Smoothness Of Production Process In Regional Public Companies (PERUMDA) Kahyangan Jember Plantations

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**Abstract:** Indonesia is a developing country that has abundant natural resources. One sub-sector that has a natural resource base is the agricultural sector. However, on the other hand, to obtain smoothness during the production process, the determination of the layout of the factory and the implementation of good production must be important factors to pay attention to. This research uses quantitative methods. The sample in this study amounted to 67 people who were employees of PerumdaPerumda Perkebunan KahyanganJember. The analytical method used is multiple linear regression analysis with tools, namely the SPSS version 26 application. Based on the results of the coefficient of determination, it shows that the layout and production scheduling variables have an influence on the smoothness of production by 90.2% in view of the first hypothesis, which states that layout X1 analysis has a positive and significant effect on smooth production. Meanwhile, the Second Hypothesis states that X2 Production Scheduling has a positive and significant effect on smooth production. So the results of the T test show that the layout and production scheduling variables have a significant effect on the smooth production of PerumdaPerumda Perkebunan KahyanganJember.

**Keywords:** Indonesia, Linear Models, Developing Countries, Multivariate Analysis, Regression Analysis

## INTRODUCTION

Development of abundant natural resources. Subsector with natural resource-based agriculture sector. The plantation subsector is one of the subsectors that plays a role in economic development as an integral part of the agricultural sector. The plantation subsector is one of the most stable growing sectors in terms of both area and production. With the rapid progress of science and technology year by year, and the competition among companies is becoming more and more intense, each company needs to tenaciously choose and decide the layout of the factory, especially the production plan, carefully in order to achieve its goals. Every business undoubtedly wants to achieve the end goal of making a profit or making a profit.

Layout is an important thing that company strategic impacts for layout affects and so on. A good layout will provide efficient flow, shorter material moving distances, short transportation times and minimum material movements. In the world of manufacturing, the layout will be seen more when it is associated with the activities that takes place in the company (Qomariah, 2012). One of them is in the production process, one of which is the problem of time and worker fatigue. With the implementation of time and costs needed in a production and the energy that must be spent by workers. To obtain smoothness during the production process, the determination of the layout or layout of the factory and the implementation of good production must be an important factor to pay attention to.

A smooth production process can occur if the company is able to carry out the production process effectively and efficiently. To obtain smoothness during the production process, determining the layout or layout of the factory and good production scheduling are important factors to pay attention to. A smooth production process can occur if the company is able to carry out the production process effectively and efficiently. The production efficiency referred to in this study is the company's ability to minimize the time and costs required to carry out production activities. In any field, planning for the placement of factory layouts and production scheduling is very basic and an important matter to pay attention to because it involves the company's success in achieving its goals (Indarto et al., 2018).

Wayan et al., (2022), Operations management is an activity or a process of organizing and coordinating the use of various resources effectively and efficiently in an effort to make products by transforming inputs (materials) into products (outputs) or adding to their uses. Meanwhile, according to Putri & Ismanto, (2019) operational management is an area of management that focuses on the production of goods, as well as using special tools and techniques to solve production problems. Aripin & Ramdaniyah, (2022), is one of the operational strategic decisions that determines company operations term. A good layout will contribute to increasing company productivity. According to Adiasa et al., (2020). Facility layout and material handling is one of the industries that can affect performance in an industry. Inappropriate layout can cause material transfer time to be ineffective and less efficient in work activities in the industry must be arranged and designed so as to create activities that support each other according to the flow of materials and the interrelationships of production activities.

According to M. Putri et al., (2022), scheduling is an overview of the time needed to carry out tasks by taking into account factors such as task requirements, demand, and available capacity. Scheduling that is carried out is not just a list of operations but can contain information about several operational activities that may be carried out at the same time. In scheduling the manager's task is to arrange or decide how long it takes for each production activity and calculate how many employees or people and raw materials are needed at each stage of the production process. The production scheduling process is something that needs to be considered because if the scheduling carried out can be relied upon properly, the smooth production process will be created and be able to provide benefits for the company.

According to Utomo et al., (2022), Layout is one of several key decisions that determine a company's operational efficiency in a relatively long term. Layout has a strategic impact because layout is able to build competitive priorities (company capabilities related to capacity, flexibility and cost). company or organization to obtain supports differentiation and creates low production costs. The differentiation in question is the production capability in sorting products quickly and accurately. Therefore, the determination of the factory layout is very important for managers to pay attention to so that the company's goals can be achieved immediately.

Coffee are commodities an important role for the Indonesian economy, namely as a foreign exchange earner for the country, providing employment, maintaining environmental conservation, a source of raw materials for the food and beverage industry, and a source of income for farmers. Good control of a form of production process from coffee bean processing will produce good processed coffee and can be accepted by the community. Indonesia itself as one of the major coffee-producing countries has taken this into account in its business actions to become even better.

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Indonesian coffee producers have been recognized and ranked 4th out of 5 rankings of coffee producers throughout the world. (Sanosra et al., 2022)

Regional Public Company (Perumda) KahyanganJember Plantation the Jember district government engaged in plantation agro-industry PDP KahyanganJember has been operating since 1969 which has a vision of creating a regional plantation company that is competitive and reliable. The ability to compete needs to be developed considering that many local government-owned companies have poor performance and the lowest competitiveness. PDP KahyanganJember as a BUMD was formed based on Regional Regulation (Perda) No. 1 of 1969 concerning the establishment of regional plantation companies, with reference to Law Number 5 1962 concerning Regional Company companies. Regional Regulation Number 1 of 1969 has undergone 3 (three) amendments, namely the first amendment to Regional Regulation Number 15 of 1989, the second amendment to Regional Regulation Number 7 of 1997 was then changed again to become Regional Regulation Number 2 of 2012. In this change the material for the changes is broader, including regulating regarding the appointment of the Board of Directors through the fit and proper test mechanism, the composition of supervisory materials and expanding the scope of business in the corporate sector. And there was a change back to Perda No. 5 of 2020, namely changing the name to Perumda Perkebunan KahyanganJember. The aims and objectives of the company were established, namely, to become a contributor to the source of local revenue (PAD), to create jobs as a support for economic development and a source of income for the community in plantation areas, and to preserve natural resources (flora and fauna).

The development of coffee in Indonesia has experienced ups and downs. In 2017 the amount of coffee produced was 716.1 thousand tons. In 2018 the amount of coffee produced was 756 thousand tons. In 2019, it experienced a decline, namely coffee production of 752.5 thousand tons. In 2020 the amount of coffee produced was 753.5 thousand tons and in 2021 there was a significant increase, namely the amount of coffee produced was 774.6 thousand tons. The domestic coffee industry does not only rely on raw materials in the form of coffee beans but also on processed forms to add value and increase competitiveness, which will increase domestic consumption.

To obtain smoothness during the production process, the determination of the layout or layout of the factory and the implementation of good production must be an important factor to pay attention to. A smooth production process can occur if the company is able to carry out the production process effectively and efficiently. With the lack of regular scheduling and layout analysis that must be improved again so that it can achieve the goals of the company's production process that the researcher wants, the researcher takes the problem, namely the Analysis of the Effect of Factory Layout and Production Scheduling on Production Smoothness in the Regional Public Company (Perumda) of the KahyanganJember Plantation with the aim to assess whether the factory layout and production scheduling in the Regional Public Company (Perumda) Perkebunan KahyanganJember are able to provide a smooth production process for the company.

## METHODS

This research technique is associative with a quantitative approach. In this study, the associative research strategy is used to identify the extent of the influence of variable X (independent variable) consisting of Factory Layout (X1) and Production Scheduling (X2) on variable Y, namely the Smoothness of the Production Process (dependent variable), both partially

and simultaneously. The hypothesis in this study is that facility layout and production scheduling are able to influence the smooth production process. The population in this study were 67 employees who were in the production field of the regional public company (Perumda) kahyangan jember plantation. The sampling technique used in this study is non-probability saturated sampling where all populations are used as samples. The data collection technique is done by giving a questionnaire. The questionnaire used is a questionnaire from (Sugiyono) 2017 which was modified by the researcher. The test used in this study is multiple linear regression test. From this study there are two stages, namely, partial test (t-test) and determination test (R2). Partial Test (T-test) is conducted to determine whether the independent variables of Factory Layout (X1) and Production Scheduling (X2) individually affect the dependent variable of smooth production process (Y). The coefficient of determination test (R2 test) aims to measure the extent to which the independent variable can explain the dependent variable variation, either partially or simultaneously.

## RESULTS AND DISCUSSION

### 1. Distribution of Answer

**Table 1 Distribution of answers to Factory Layout variables**

Variable	Indicator	Distribution of answers										Total (N)	Total Frequency (%)
		STS		TS		N		S		SS			
		F	%	F	%	F	%	F	%	F	%		
Factory Layouts	X1.1	0	0,00	1	1,50	9	13,40	29	43,30	28	41,80	67	100%
	X1.2	0	0,00	3	4,50	13	19,40	29	43,30	18	26,90	67	100%
	X1.3	0	0,00	2	3,00	7	10,40	35	52,20	23	34,30	67	100%
	X1.4	0	0,00	0	0,00	16	23,30	33	49,30	18	26,90	67	100%
	X1.5	0	0,00	0	0,00	13	19,40	37	55,20	17	25,40	67	100%
	X1.6	0	0,00	2	3,00	8	11,90	34	50,70	23	34,30	67	100%
	X1.7	0	0,00	1	1,50	13	19,40	30	44,80	23	34,30	67	100%
	X1.8	0	0,00	0	0,00	11	16,40	34	50,70	22	32,80	67	100%
	X1.9	0	0,00	0	0,00	9	13,40	34	50,70	25	37,30	67	100%
	X1.10	0	0,00	0	0,00	9	13,40	36	53,70	22	32,80	67	100%

It can be seen from the table above that the distribution of respondents' answers to the factory layout variable both on indicators X1.1-X1.10 the majority are collected at options 4 (agree) and 5 (strongly agree), which means that respondents generally agree with the statement of each indicator on this variable. This is in line with the average value of answers in the range of > 3, which means that respondents relatively agree. With the highest frequency of 55.20% at X1.4, while the lowest frequency was 1.50% at X1.1.

**Table 2 Distribution of answers to the Production Scheduling variable**

Variable	Indicator	Distribution of answers										Total (N)	Total Frequency (%)
		STS		TS		N		S		SS			
		F	%	F	%	F	%	F	%	F	%		
Production Scheduling	X2.1	0	0,00	0	0,00	13	19,40	30	44,80	24	35,80	67	100%
	X2.2	0	0,00	0	0,00	9	13,40	38	56,70	20	29,90	67	100%
	X2.3	0	0,00	2	3,00	6	9,00	36	53,70	23	34,0	67	100%
	X2.4	0	0,00	0	0,00	10	14,90	35	52,20	22	32,80	67	100%
	X2.5	0	0,00	1	1,50	13	19,40	38	56,70	15	22,40	67	100%
	X2.6	0	0,00	0	0,00	9	13,40	33	49,30	25	37,30	67	100%
	X2.7	0	0,00	1	1,50	12	17,90	33	49,30	21	31,30	67	100%
	X2.8	0	0,00	1	1,50	10	14,90	30	44,90	26	38,80	67	100%
	X2.9	0	0,00	3	4,50	10	14,90	38	56,70	16	23,90	67	100%
	X2.10	0	0,00	0	0,00	4	6,00	41	61,20	22	32,80	67	100%

It can be seen from the table above that the distribution of respondents' answers to the Production Scheduling variable both on indicators X2.1-X2.10 the majority are collected at options 4 (agree) and 5 (strongly agree), which means that respondents generally agree with the statement of each indicator in this variable. This is in line with the average value of answers in the range of > 3, which means that respondents relatively agree. With the highest frequency of 61.20% at X2.10, while the lowest frequency was 1.50% at X2.5

**Table 3 Distribution of answers to the smooth production variable**

Variable	Indicator	Distribution of answers										Total (N)	Total Frequency (%)
		STS		TS		N		S		SS			
		F	%	F	%	F	%	F	%	F	%		
Smooth Production	Y1.1	0	0,00	0	0,00	13	19,40	29	43,30	25	37,30	67	100%
	Y1.2	0	0,00	0	0,00	10	14,90	38	56,70	19	28,40	67	100%
	Y1.3	0	0,00	2	3,00	5	7,50	36	53,70	24	35,80	67	100%
	Y1.4	0	0,00	0	0,00	13	19,40	30	44,80	24	35,80	67	100%
	Y1.5	0	0,00	0	0,00	16	23,90	32	47,80	19	28,40	67	100%
	Y1.6	0	0,00	0	0,00	13	19,40	29	43,30	25	37,30	67	100%
	Y1.7	0	0,00	0	0,00	15	19,40	29	43,30	24	37,30	67	100%
	Y1.8	0	0,00	1	1,50	10	14,90	29	43,30	27	40,30	67	100%
	Y1.9	0	0,00	3	4,50	10	14,90	38	56,70	16	23,90	67	100%
	Y1.10	0	0,00	0	0,00	4	6,00	41	61,20	22	32,80	67	100%

It can be seen from the table above that the distribution of respondents' answers to the Smooth Production variable both on indicators Y1.1-Y1.10 the majority are collected in options 4 (agree) and 5 (strongly agree), which means that respondents generally agree with the statements of each indicator in this variable. This is in line with the average value of answers in the range of > 3, which means that respondents relatively agree. With the highest frequency of 61.20% in Y1.10 while the frequency of.

**2. Multiple Linear Regression Analysis**

Multiple linear regression analysis is an analysis to determine the effect of variables independent (independent) which is more than one to one dependent variable (dependent). The multiple linear regression analysis model is used to explain the relationship and how the influence of the independent variables (independent) on the dependent variable (dependent) (Ghozali, 2018). Based on testing using the SPSS 26.0 program the result were obtained as follow:

**Table 4 Multiple Linear Regression**

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.229	1.631		1.367	.176
	Factory Layouts	.638	.138	.652	4.608	.000
	Production Scheduling	.310	.143	.307	2.167	.034

a. Dependent Variable: Smooth Production Procces

From the regression data above we can see that:

1. 2.229, a constant value indicating that the smooth production score has a fixed value of 2.229 points when all independent variables in the constructed model are zero and other factors outside the model are considered constant.

2. Factory layout factor is 0.638. This means that each factory layout increases by 1 point increases the smooth production value by 0.638 points, if other factors outside the model are held constant.
3. The production planning factor is 0.310. This means that, assuming other factors outside the model are held constant, every 1 point increase in the production plan increases the frictionless production value by 0.310 points.

#### 4. Hypothesis Testing

##### Partial Test (T-test) and Determinant Test R (R<sup>2</sup>)

**Table 5 partial test (T test)**

No	Variable	t-hitung	t-tabel	Sig	Information
1.	Layout Analysis (X1)	4,608	0,2404	0,000	Signifikan
2.	Scheduling (X2)	2,167	0,2404	0,034	Signifikan

The table above shows that the results of the significance test (t test) can be known the magnitude of the influence of each independent variable on the dependent variable is as follows:

1. significance value for the Layout effect on smooth production is  $0.000 < 0.05$  and the tcount is  $4.608 > t$  table  $0.2404$  so that it can be concluded that  $H_a$  is accepted and  $H_0$  is rejected which means Layout has a significant influence on the smooth production.
2. significance value for the effect of scheduling on smooth production is  $0.002 < 0.05$  and the tcount is  $2.167 > t$  table  $0.2404$  so that it can be concluded that  $H_a$  is accepted and  $H_0$  is rejected which means Scheduling has

A significant influence on the smooth production. The coefficient of determination test (R<sup>2</sup> test) aims to measure the extent of the variable independent variable can explain the variation of the dependent variable, either partially or simulta neosly.can explain the variation of the dependent variable, either partially or simultaneously.

**Table 6 Determinant test R (R<sup>2</sup>)**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.951 <sup>a</sup>	.904	.902	1.608
a. Predictors: (Constant), Production Scheduling, Factory Layout				

The coefficient of determination of the model is 0.902. This coefficient of determination represents the contribution of the variable to the value formation of the dependent variable. From this value, we can conclude that the factory layout and production schedule contribute 90.2% to shaping the variation in smoothness production (Y) values, with the remaining 9.8% of his being explained by other factors besides the regression model.

#### 5. Discussion

##### Discussion

Based on the results of statistical tests, it can be said that each independent variable has a partial effect on the dependent variable. The positive significant influence of both variables means that better layout analysis and production planning have a positive impact on smooth production. Based on the test results, it can be concluded that the first and second hypotheses can be accepted, namely

"affecting the smooth production of Permuda, Permuda, Plantation, Kahyangan and Jember in terms of layout analysis and production planning".

According to R. E. Putri & Ismanto, (2019) a poor facility layout will cause delays in the product process and can increase production costs. Meanwhile, in terms of scheduling, the schedule affects the smooth production process. This is in line with the statement from Azara, (2020) which states that operational and production efficiency can be created if company managers or leaders are able to schedule all production and operational activities effectively.

Similar research has been conducted by Utomo et al., (2022) and (Qomariah et al., 2022) which examines the effect of factory layout and production scheduling on the smooth process at the ptcokrojoyo farming partner company. The results of this study indicate that the layout of production facilities and scheduling has a positive effect on the smooth production process partially or simultaneously.

### CONCLUSION

The conclusions from the results of research conducted on production scheduling variables and production facility layout analysis on the variables of the smoothness of the production process at the Regional Public Company Perumda Perkebunan Kahyangan Jember are of the layout analysis of production facilities are able to influence the smooth production process. So if the placement of production facilities is appropriate, the production process will run smoothly and according to what the company wants. The production process said to be smooth if the production process carried out can run effectively and efficiently in terms of time and cost. Production scheduled with smooth production, it has a positive influence on the smooth production process. So if the production scheduling is done properly, the production process will run smoothly and well.

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