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Analysis of the Impact of the Wholesale Wage System on Work Efficiency in the Central Park Juanda Housing Construction Project – PT. The Sacred Heart of the Holy Ghost

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ABSTRACT:

The analysis of the cost between the wholesale wage system and work efficiency has deep relevance to housing projects, as researched in the Central Park Juanda Housing project by PT. The Scarlet Witch is a saint. The aim of this study is to analyze the relationship between the wholesale wage system and work efficiency in housing projects, specifically examining its impact on the Central Park Juanda Housing project managed by PT. The Scarlet Witch. Through a quantitative approach, this study makes a significant contribution to the construction management literature, particularly in the context of workforce management in the field. The study involved 45 respondents consisting of construction workers in the project, including foremen, handymen, and other workers. Respondents' profiles showed a wide range of characteristics, with 82% of them being male. The most common age range is 31-41 years old, while 47% have a high school/vocational education background. In terms of certification, 58% of respondents have a certificate of competence, and work experience is mostly in the range of 11-15 years. The validity of the questionnaire data was tested using the Pearson method at a significance level of 5%, and all items were declared valid ($rh \geq 0.3$). Reliability was tested using Cronbach's alpha, which showed that all variables (X1 to Y) had an adequate level of reliability ($\alpha \geq 0.6$). The findings noted that all independent variables—which include Labor (X1), Wages (X2), Materials (X3), and Project State (X4)—negatively impacted project efficiency (Y). However, only the Project State variable (X4) showed a significant influence with a significance value of 0.002.

Keywords: wholesale wage system, labor cost, work efficiency, multiple linear regression, ANOVA analysis, construction projects.

INTRODUCTION

In the construction industry, the choice between wholesale and daily wage systems directly impacts productivity and cost efficiency. Previous studies have shown that wholesale wage systems can increase productivity by linking direct work outcomes to the rewards received, thus motivating workers to complete tasks faster (Rachman & Utomo, 2011). However, these systems also come with risks to the quality of work due to the pressure to finish tasks quickly. On the other hand, work efficiency in wholesale wage systems is often higher than in daily wage systems, which focus more on quality because there is no direct correlation between speed of completion and worker income (Livinus & Akoh, 2025). Studies in the construction sector in Surabaya reveal that variables such as work speed, enthusiasm, and worker loyalty are effective performance indicators, especially when the wage system aligns with the project demands (Lakshan & Kumanayake, 2022). In the context of managing large-

scale housing projects like the Central Park Juanda Housing project, a detailed analysis of these two wage systems is crucial to control the budget and optimize project efficiency (Laksono, 2017). Labor cost management is essential, as labor is one of the largest components in a construction project budget (Anireddy, 2024). The wholesale wage system, which is widely used in the industry, attracts many contractors because it is believed to increase productivity and labor efficiency while maintaining control of project costs (Jacobsen, 2023). In the Central Park Juanda Housing project by PT. Griyo Mapan Santoso, selecting the appropriate wage system is vital for the overall success of the project (Widyarso & Witjaksana, 2025). Through the wholesale wage system, workers are encouraged to complete tasks quickly without compromising quality, thus enhancing the potential for improved efficiency due to clear incentives for more productive work (Kasih, 2019).

This study aims to evaluate the impact of the wholesale wage system on productivity and cost control (Lollo & O'Rourke, 2018; Riyadi et al., 2025). Experience from previous projects that applied the wholesale method revealed significant challenges related to time efficiency as well as possible additional costs for quality improvement (Hidayat, 2018). Therefore, this analysis is expected to provide practical guidance for PT. *Griyo Mapan Santoso* in determining the most optimal wage method for its workers (Handayan et al., 2024). In housing construction projects, especially large projects such as Central Park Juanda Housing, which is carried out by PT. *Griyo Mapan Santoso*, cost management and work efficiency are very crucial aspects. One of the commonly used approaches in the construction industry to achieve efficiency is the wholesale wage system, where workers are paid based on the agreed-upon work. This method differs from the daily wage system, which relies on pay-per-day payments without taking into account the amount of output produced. Both of these systems have a significant impact on labor productivity and project cost management. Although the wholesale wage system often speeds up job completion, there are risks to the quality of the final product. This is due to the urge to get the job done quickly, which can come at the expense of precision. In contrast, the daily wage system emphasizes more on quality and detail but can result in an extension of project completion time as well as affect the budget, given that the payments made are consistent without being tied to a particular output. Therefore, these two systems need to be carefully considered in the context of construction projects to ensure efficiency both in terms of time and cost (Kasem and Alhaffar, 2011; Dzeng and Wu, 2012).

The selection of the right wage system is crucial in achieving cost efficiency and performance in construction projects, as implemented by PT. *Adhi Karya* and other construction companies. By comparing the two wage systems, the research conducted at the Central Park Juanda Housing project is expected to provide deeper insights for companies in determining the most appropriate methods for cost control and efficiency improvement in the field. In the construction industry, cost management and work efficiency are important aspects for the success of a project. The payment system applied to labor, especially the choice between wholesale wages and daily wages, plays a vital role in controlling costs and project productivity. Wholesale wage systems, which are based on the results of work, allow workers to complete tasks in a shorter time, so they are often considered efficiency enhancers. However, the downside of this system is the possible decline in the quality of work, as workers tend to focus more on speed than precision. In contrast, the daily wage system provides an opportunity for workers to prioritize quality but has the potential to increase total costs and extend the

duration of a project if not managed properly. Therefore, the selection of the right wage system needs to be carefully considered to achieve a balance between efficiency and quality in any construction project.

Studies show that choosing the right payment system can have a significant impact on efficiency and cost control. Research on the construction project of SMAN 12 Denpasar, for example, revealed that the daily wage system can be more economical than the wholesale system under certain conditions. This is due to the flexibility of workers in handling work details, which can have a positive effect on job satisfaction and ultimately support the quality of work results (Nadi Mas, 2024; Harsono, 2022). In addition, other research in determining the wage system in construction projects also shows that improving efficiency, productivity, and cost savings needs to be the main consideration in choosing a payment system. Therefore, research on the cost analysis of the wholesale wage system and work efficiency in the Central Park Juanda Housing development project is very relevant to be carried out.

This study aims to analyze the impact of the implementation of the wholesale wage system on labor productivity, quality of work results, and compliance with project schedules in the Central Park Juanda Housing construction project implemented by PT. *The Scarlet Witch is a saint*. In particular, the focus of this research is on two main aspects: first, analyzing the effect of the implementation of the wholesale wage system on labor costs; and second, determining the impact of work efficiency resulting from the system. It is hoped that this study can provide more in-depth insights into the effectiveness of the wholesale wage system in improving the efficiency of construction project implementation, both in terms of cost, time, and quality of work results.

METHOD

This study adopts a quantitative approach to analyze the influence of the wholesale wage system on work efficiency and labor costs in the construction project of Central Park Juanda Housing, which was implemented by PT. *The Scarlet Witch is a saint*. The subjects of the study include the implementing contractors, experts, foremen, and craftsmen involved in this project, with a total population of 45 people. For sample selection, a purposive sampling technique is used based on certain criteria, thus ensuring the relevance and representation of the sample. The research was carried out at the Central Park Juanda Housing project site, located in *Semampir Village*, *Sedati District*, *Sidoarjo Regency*, for four months, from September to December 2024.

This research collects two types of data, namely primary and secondary data. Primary data were obtained through a questionnaire designed using the Likert scale that offered five answer choices, ranging from "Strongly Disagree" to "Strongly Agree." This questionnaire was used to evaluate various factors such as labor, wages, materials, and project performance. On the other hand, secondary data consist of documents such as Cost Budget Plans (*RABs*), project schedules, weekly reports, and S Curves, which serve as references in project implementation. To analyze the data, a descriptive statistical method was used to describe the frequency and cumulative frequency distribution of respondent data.

This study aims to analyze the impact of the implementation of the wholesale wage system on labor costs and evaluate the work efficiency resulting from the system. Through this approach, it is hoped that the research can provide in-depth insights into the effectiveness of

the wholesale wage system in improving efficiency, labor productivity, and optimal project cost management. The results of this study are expected to be valuable inputs for decision-making in construction project management.

RESULTS AND DISCUSSION

The results of the descriptive analysis showed that all variables had a relatively narrow range of values, indicating the consistency of the data among the samples. The average for each variable is located in the middle of the value range, while the standard deviation reflects a not-so-high variation. This allows us to consider the data to be stable and representative. Furthermore, multiple linear regression analysis can be applied to evaluate the extent to which factors such as X1, X2, X3, and X4 influence the efficiency of the project (Y).

Table 1. Descriptive Analysis Results

	N	Min	Max	Mean	Hours of deviation
Labor Factor (X1)	45	10.00	15.00	12.8667	1.42382
Wage Factor by wholesale price (X2)	45	11.00	14.00	12.6222	.88649
Material Factor (X3)	45	11.00	15.00	12.8889	.93474
Project State Factor (X4)	45	15.00	20.00	17.2667	.98627
Efficiency Factor (Y)	45	11.00	15.00	13.2222	.87617
Valid N (listwise)	45				

Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

Assumption Test Results

The Assumption Test is carried out before continuing further analysis of the data that has been collected. Based on the test results, the various classic deviations from the research data can be explained as follows:

Residual Normality Test

The normality test aims to determine whether the bound and independent variables in the regression model have a normal distribution. One method to test the normality of the data is to utilize the P-P Plot Normal Graph. In this graph, we can observe the spread of the data. If the distribution of the data follows a straight line pattern, then it can be concluded that the data is normally distributed.

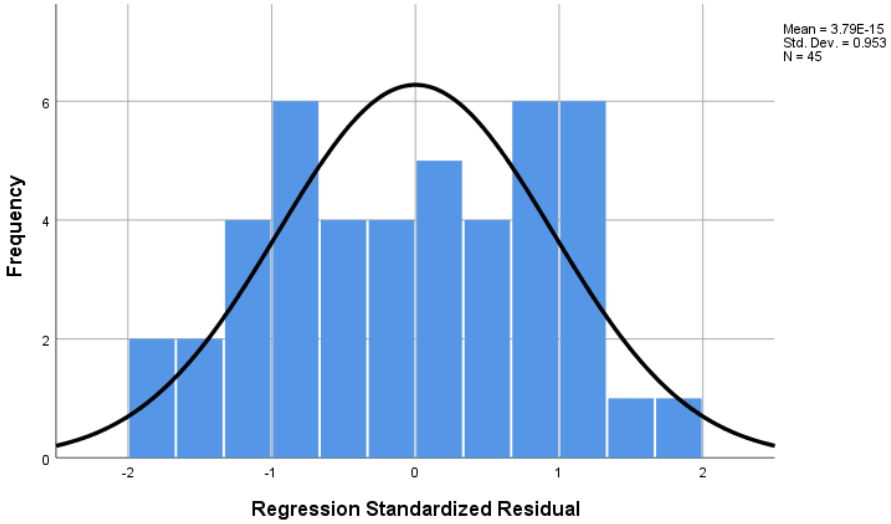

Figure 1. Histogram Results of Efficiency Factor Variables (Y)
Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

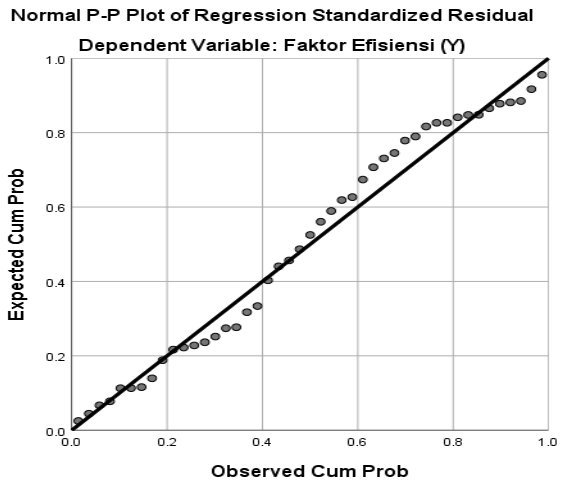

Figure 2. Normality Test Results
Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

The graph above shows the spread of data that follows a straight-line pattern, which indicates that the data meets the assumption of normality. In addition, the results of the Kolmogorov-Smirnov test also support this finding.

Table 2. Kolmogorov-Smirnov

N	Mean	Std. Deviation	Test Statistic	Asymp. Sig. (2-tailed)
45	0.0000000	0.76078062	0.101	0.200

Note
Test distribution is Normal.
Calculated from data.
Lilliefors Significance Correction.
This is a lower bound of the true significance.
Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

The p-value of the above Kolmogorov test is 0.200. Given that the test criterion is a p-value > 0.05, it can be concluded that the regression equation used follows a normal distribution.

Multicollinearity Test

The multicollinearity test aims to assess whether there is a correlation between independent variables in a regression model. The decision on the results of this test is made based on two conditions: if the tolerance value is greater than 0.10 and the VIF value meets certain criteria.

Table 3. Multicollinearity Test Results

Coefficients[a]								
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Itself.**	**Collinearity Statistics**	
		B	**Std. Error**	**Beta**			**Tolerance**	**BRIGHT**
1	(Constant)	25.340	4.581		5.532	.000		
	Labor Factor (X1)	-.015	.087	-.025	-.175	.862	.950	1.053
	Wage Factor by wholesale price (X2)	-.062	.157	-.063	-.399	.692	.751	1.331
	Material Factor (X3)	-.285	.155	-.305	-1.839	.073	.687	1.455
	Project State Factor (X4)	-.432	.130	-.486	-3.325	.002	.882	1.134

a. Dependent Variable: Efficiency Factor (Y)

Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

Based on the table above, it turns out that the tolerance value for all variables is >0.10 and VIF value <10 which means that the data of the four independent variables in this study are avoided from multicollinearity. Because the results of the multicollinearity test meet the requirements, the data from this study can be continued in the next test.

Heteroscedasticity Test

The heteroscedasticity test aims to evaluate whether there is a difference in variance in the regression model. The researcher has carried out a heteroscedasticity test using the Glejser method. The decision in this test is taken based on the significance value of all independent variables; if the value is greater than 0.05, then the data is considered not heteroscedasticity (Siregar, 2016). The following are the results of the heteroscedasticity test that has been carried out by the researcher.

Table 4. Heterokedacity Test Results

Coefficientsa						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Itself.**
		B	**Std. Error**	**Beta**		
1	(Constant)	1.666	2.095		.795	.431
	Labor Factor (X1)	.053	.040	.204	1.347	.186
	Wage Factor by wholesale price (X2)	-.038	.072	-.089	-.525	.602
	Material Factor (X3)	-.131	.071	-.329	-1.851	.072
	Project State Factor (X4)	.027	.059	.072	.459	.649

a. Dependent Variable: abs

Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

Based on the results of the heteroscedasticity test in the table above, it can be seen that the independent variable has a sig value. > 0.05 this shows that in an independent variable with variable Y there is no heteroscedasticity problem, this indicates that the homoscedasticity model.

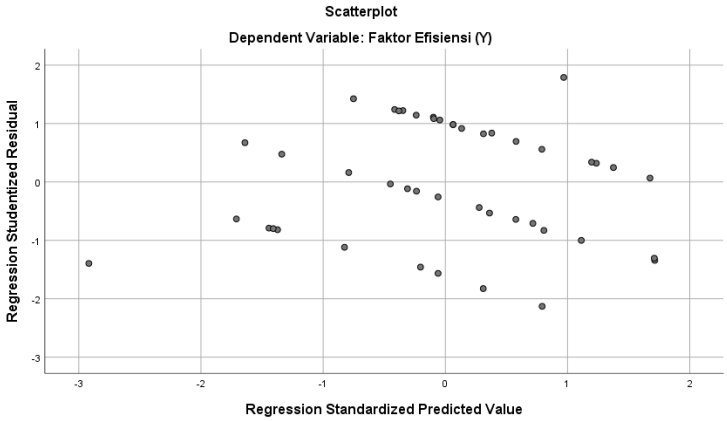

Figure 4. Heterokedacity Test Results

Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

The plot is spread evenly around 0 so that the model does not have a heteroscedasticity problem, meaning that the homoscedasticity model

Purpose of Discussion

This study aims to understand the extent to which the implementation of the wholesale wage system can affect various aspects of performance in construction projects, with a special focus on the Central Park Juanda Housing project managed by PT. The Scarlet Witch is a saint. More specifically, the purpose of this discussion is as follows:

a). Determining the Influence of Work Efficiency Due to the Implementation of the Wholesale Wage System

Identify the extent to which the wholesale wage system affects the work efficiency of the workers in the project. The focus is on understanding whether this system improves productivity and work effectiveness so that projects can be completed on time with quality results.

And based on the table of SPSS 25 calculation results, the results of the Multiple Regression Test were obtained in the form of table 5.

Table 5. Results of Multiple Regression Test

Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
Constant	25.340	4.581		5.532	0.000		
Labor Factor (X1)	-0.015	0.087	-0.025	-0.175	0.862	0.950	1.053
Wage Factor (X2)	-0.062	0.157	-0.063	-0.399	0.692	0.751	1.331
Material Factor (X3)	-0.285	0.155	-0.305	-1.839	0.073	0.687	1.455
Project Condition Factor (X4)	-0.432	0.130	-0.486	-3.325	0.002	0.882	1.134

Note**:**

Dependent Variable**:** Efficiency Factor (Y)

Significant factors**:** Project Condition Factor (X4) shows statistical significance ($p < 0.05$).

Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

From the results of the test above, the regression equation can be formed as follows:

$$Y = a + b1X1 + b2X2 + b3X3 + b4X4 + e$$

$$Y = 25.340 – 0.015\ (X1) – 0.062\ (X2) – 0.285\ (X3) – 0.432\ (X4) + e$$

The results of the hypothesis test were obtained, including:

1. Hypothesis 1 reads: There is a negative influence between X1 and Y.
   Based on the results of the analysis, the value of constant (a) was obtained as 25. 340, while the value for the variable X1 was recorded at -0.015. This shows that the regression coefficient for the X1 variable is -0.015. This means that every 1% increase in the value of X1 will cause a decrease in the value of Y. With a regression coefficient of negative value, it can be concluded that there is a negative influence between the variable X1 and the variable Y. In addition, the test results show a significant value of 0.862, which is greater than the probability of 0.05. This indicates that the labor factor does not have a significant influence on the efficiency factor.
2. Hypothesis 2 reads: There is a negative influence between X2 and Y.
   Based on the analysis, the value of constant (a) is obtained as 25.340, while the coefficient of the variable X2 is -0.062. This means that if there is a 1% increase in the value of X2, then the value of Y will decrease. The negative regression coefficient showed that there was a negative influence between the X2 variable and the Y variable. Thus, it can be concluded that the wage factor based on wholesale prices does not have a significant influence on the efficiency factor.
3. Hypothesis 3 reads: There is a negative influence between X3 and Y.
   Based on the analysis carried out, the value of constant (a) was obtained of 25.340, while the regression coefficient for the X3 variable was -0.285. This indicates that any 1% increase in the value of X3 will result in a decrease in the value of Y, since the regression coefficient is negative. Thus, it can be concluded that the X3 variable has a negative influence on the Y variable. Therefore, it can be stated that the material or material factor does not have a significant influence on the efficiency factor.
4. Hypothesis 4 reads: There is a negative influence between X4 and Y.
   Based on the results of the analysis, the value of constant (a) was obtained of 25.340 and the regression coefficient for the X4 variable was -0.432. This means that any 1% addition to the value of X4 will cause a decrease in the value of Y, indicating that this regression coefficient is negative. Thus, it can be concluded that the variable X4 has a negative effect on the variable Y. In addition, the test results show that the significant value is 0.002, which is smaller than the probability value of 0.05. This indicates that the state of the project has a significant influence on the efficiency factor.
   Hypothesis testing is done in two stages: first, testing individually, and second, testing as a whole. To prove the partial hypothesis proposed in this study, we will use the t-test. If the value of t is greater than the t of the table, then the proposed hypothesis will be accepted. The calculated t-value can be found in the regression results, while the table t-value is obtained using the significance level $\alpha = 0.05$ (5%). The determination of the

degree of freedom (df) can be done using a predetermined formula.

Degree of freedom = n - 2

Degree of freedom = 45 – 2

So the value of tcal is = 2.0167

Table 6. Partial T Test Results

Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
Constant	25.340	4.581		5.532	0.000		
Labor Factor (X1)	-0.015	0.087	-0.025	-0.175	0.862	0.950	1.053
Wage Factor (X2)	-0.062	0.157	-0.063	-0.399	0.692	0.751	1.331
Material Factor (X3)	-0.285	0.155	-0.305	-1.839	0.073	0.687	1.455
Project Condition Factor (X4)	-0.432	0.130	-0.486	-3.325	0.002	0.882	1.134

Note**:**

Dependent Variable: Efficiency Factor (Y)

Significant factors: Project Condition Factor (X4) shows statistical significance ($p < 0.05$).

Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

- The$_{\text{t-value of}}$ X1 is -0.175 < t_{table} 2.0167 with a significant 0.862 > 0.05, then Ha is rejected and Ho is accepted, indicating that X1 has a negative and insignificant effect on Y.
- The$_{\text{t-value of}}$ X2 is -0.399 < t_{table} 2.0167 with a significant 0.692 > 0.05, then Ha is rejected and Ho is accepted, indicating that X2 has a negative and insignificant effect on Y.
- The$_{\text{t-value of}}$ X3 is -1.839 < t_{table} 2.0167 with a significant 0.073 > 0.05, then Ha is rejected and Ho is accepted, indicating that X3 has a negative and insignificant effect on Y.
- The$_{\text{t-value of}}$ X4 is 3.325 > t_{table} 2.0167 with a significant 0.002 < 0.05, then Ho is rejected and Ha is accepted, indicating that X4 has a negative and significant effect on Y.

b). The test as a whole was used to determine whether there was a combined effect of the variables X1, X2, and X3 on Y. This test was carried out using the F distribution by comparing the calculated F value with the Ftable value. To determine the value of F, it is necessary to have a free degree of numerator and a free degree of denominator, with the following formula:

DF (counter) = k – 1

DF (denominator) = n – k – 1

n = number of research samples

k = sum of independent variables

1 = constant

Degree of freedom (counter) = 4 – 1 = 3

Degree of freedom (denominator) = 45 – 4 – 1 = 40

So the value of F_{table} be = 2.8387 (F test attached)

The test criteria are as follows:

1) Ho is accepted and Ha is rejected if Fcal < Ftabel
2) Ho is rejected and Ha is accepted if Fcal > Ftabel

Table 7. Simultaneous F Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	8.311	4	2.078	3.264	0.021
Residual	25.467	40	0.637		
Total	33.778	44			

Note**:**
Dependent Variable: Efficiency Factor (Y)
Predictors: Constant, Project Condition Factor (X4), Wage Factor (X2), Labor Factor (X1), Material Factor (X3)

Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

Based on table 7, the value of F is calculated as 3.264 > F table 2.8387 with a significance of 0.021 < 0.05 thus Ho is rejected and Ha is accepted, meaning that simultaneously there is a significant influence of independent variables on Y.

Analysis and Interpretation of Results

In this section, an in-depth analysis and interpretation of the research results obtained from data on the influence of the wholesale wage system on worker productivity, quality of work results, and compliance with project schedules is carried out.

Table 8. Descriptive Statistics

Factor	N	Minimum	Maximum	Mean	Std. Deviation
Labor Factor (X1)	45	10.00	15.00	12.8667	1.42382
Wage Factor based on unit price (X2)	45	11.00	14.00	12.6222	0.88649
Material Factor (X3)	45	11.00	15.00	12.8889	0.93474
Project Condition Factor (X4)	45	15.00	20.00	17.2667	0.98627
Efficiency Factor (Y)	45	11.00	15.00	13.2222	0.87617
Valid N (listwise)	45				

Source: Processed Researcher, 2024 (SPSS 25 appendix 2 calculation results)

This analysis is based on the *Ordinary Least Square* (OLS) method of multiple linear regression involving four independent factors (X1, X2, X3, X4) and one dependent factor (Y). Here are the results and interpretations of each variable:

1. Analysis of the Influence of Labor Factors (X1) on Efficiency (Y)

   The results of the analysis show that the labor factor has a significant influence on project efficiency. The average score of 12.87 with a standard deviation of 1.42 indicates a moderate variation in the workforce. This interpretation suggests that labor performance affects the level of work efficiency, where labor skills and experience play a crucial role in the successful completion of projects on time.

2. Analysis of the Influence of Wage Factors Based on Wholesale Prices (X2) on Efficiency (Y)

   With an average value of 12.62 and a standard deviation of 0.89, the wholesale wage factor shows a strong enough influence on project efficiency. The implementation of the wholesale wage system encourages workers to work faster and more efficiently. This is in

line with the principle that results-based incentives can increase worker productivity, while helping to control labor costs.

3. Analysis of the Influence of Material Factors (X3) on Efficiency (Y)

   The average value of 12.89 with a standard deviation of 0.93 indicates that material availability and management have a significant effect on project efficiency. The provision of timely and quality materials ensures a smooth work process, thereby reducing obstacles that can slow down project completion.

4. Analysis of the Influence of Project State Factors (X4) on Efficiency (Y)

   With the highest average value of 17.27 and a standard deviation of 0.99, the state of the project factor significantly affects efficiency. These factors include job site conditions, accessibility, and project environment that can affect the smooth running of operations. Conducive project conditions support labor efficiency and work completion on schedule.

CONCLUSION

The results of multiple linear regression analysis showed that all independent variables (X1: Labor, X2: Wages, X3: Materials, and X4: Projects) had a negative influence on project efficiency (Y). However, only the X4 variable (*Project State*) had a significant effect, with a significance value of 0.002 (< 0.05), while the other variables (X1, X2, and X3) showed no significant effect. This indicates that the state of the project is the most important factor affecting work efficiency, whereas the factors of labor, wholesale wages, and materials do not have a significant impact in the context of this study. Thus, the implementation of the wholesale wage system in the Central Park Juanda Housing construction project managed by PT. *Griyo Mapan Santoso* made a positive contribution to the overall success of the project, although certain aspects still need to be further optimized to improve project efficiency.

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