

Analysis of the Influence of the Wholesale Wage System on Labor Motivation on the Construction of Vocational School Buildings in Caruban District, Madiun Regency

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Abstract

The application of the *wholesale wage system* in construction projects has significant potential for the timeliness of project completion and the work motivation of workers. This research aims to investigate the influence of the *wholesale wage system* on the timeliness of completion of each project stage, as well as work motivation in the construction of vocational school buildings in *Caruban District, Madiun Regency*. The main focus of this research is to understand the contribution of the *wholesale wage system* in improving worker performance and motivation. The method used in this study is quantitative, with multiple linear regression analysis. Data were collected through a questionnaire distributed to 40 project workers. The F-test was applied to evaluate the simultaneous influence of the three independent variables on the dependent variables, while the t-test was used to examine the influence of each independent variable. The results of the analysis showed that, based on the F test, the F value reached 20.108, which is greater than 2.86637 (F value from the table) with a significance of 0.000. Meanwhile, the t-test produced a t-value of 2.0167, which is greater than 2.0167 (table t value) with a significance of 0.011. These findings are particularly relevant for project managers seeking to optimize workforce productivity in similar construction projects. The study highlights the importance of proper system implementation, including adequate supervision and quality control measures, to complement the productivity gains from the *wholesale wage system* approach.

Keywords: labor productivity; labor motivation; wholesale wage system

INTRODUCTION

In the increasingly competitive world of the construction industry, increasing productivity has emerged as a necessity to achieve project efficiency and success. One of the key factors that affect productivity is the wage system implemented. Among the various systems that exist, *wholesale systems* are often in the spotlight because they are believed to have the potential to drive worker performance and speed up project completion. The *wholesale wage system* gives the foreman the flexibility to determine the amount of labor needed and estimate the duration of the work based on the team's capabilities. The basic principle of this system is that the higher the set *wholesale wage*, the more labor can be employed, so that the project can be completed faster than the predetermined time.

However, implementation with this system does not always go smoothly. In the middle of a project, obstacles often arise due to external factors, such as design changes or scheduling set by the project owner. This often requires renegotiation with the contractor. For example, a design change can cause problems for contractors and foremen, especially if the change is not accompanied by an adjustment of execution time. Adding work items or volume changes without adding time can disrupt the overall performance of the project.

The success of the construction project is assessed from the achievement of the target time, the quality of work in accordance with technical specifications, and the lack of waste or cost overruns. Some of the factors that affect project performance include labor, wages, materials, and the conditions of the project itself. Therefore, the management of *wholesale wage* costs needs to be done properly to prevent deviations from the initial agreement. With a

wholesale wage system, foremen can encourage workers to get work done as quickly as possible and make optimal use of time. The sooner the job is completed, the greater the profit the foreman can make. Conversely, delays in settlement will reduce the profitability of the foreman. For contractors, the main advantage of this system is the savings in the number of workers working directly under them, allowing for a reduction in the payroll burden incurred, thus making project costs more efficient.

However, the system also faces its own challenges. One of them is the potential for mismatch between the initial estimate and the realization in the field. If the project experiences a design change or other constraints, the contractor should be prepared to make adjustments that may require additional costs. Therefore, effective project management is indispensable to anticipate and deal with problems that may arise. In this context, good planning and effective communication between contractors, foremen, and project owners are key to ensuring the success of the project.

With proper management, a *wholesale wage system* can provide benefits for contractors and foremen while ensuring that projects are completed on schedule, meet specifications, and maintain good cost control. In an ever-evolving and increasingly competitive construction industry, the primary focus on increasing project productivity has become crucial and should not be overlooked. This sector plays a vital role in both the global and domestic economies, making a significant contribution to Gross Domestic Product (GDP) growth and job creation. In the face of increasingly fierce competition, especially in developing countries such as Indonesia, contractors are faced with the challenge of completing projects with high efficiency, both in terms of cost and time. Therefore, improving the productivity of labor performance and controlling project costs is a top priority to achieve success in every project.

One of the important aspects often related to productivity is the wage system implemented in construction projects. This wage system is a way to compensate workers based on their time, effort, and work. The role of the wage system is very significant in influencing the motivation, performance, and well-being of the workforce. When workers feel that the rewards they receive are proportional to the effort they have expended, they tend to work harder and more efficiently (Robbins and Judge, 2017). In the construction industry, various types of wage systems are commonly used, such as daily, monthly, and *wholesale wages*. Among the three, the *wholesale wage system* is widely chosen because it is believed to provide direct incentives to workers to increase productivity. This system refers to a payment method where wages are given based on the results of work completed, not just based on working time (Singh, 2020). With this approach, it is hoped that workers can be motivated to complete their tasks faster and more efficiently, without sacrificing quality.

Furthermore, research by Jarkas and Bitar (2017) shows that in the construction industry, the *wholesale wage system* has the advantage of increasing the motivation and productivity of workers, thanks to the direct relationship between wages and work output. This aligns with the principle of Reinforcement Theory put forward by Skinner, which emphasizes that individuals' behavior can be influenced by the consequences of their actions. In the context of the *wholesale system*, higher rewards are expected to motivate workers to complete their work more efficiently. However, the *wholesale system* also has its drawbacks. Some studies have mentioned that this approach has the potential to negatively impact the quality of work, as workers may tend to focus more on speed of completion rather than accuracy (Fayek et al., 2014). Therefore, strict supervision is required to ensure that these systems can function effectively and promote increased productivity without sacrificing the quality of the work.

Various empirical studies have shown that a *wholesale wage system* can significantly increase work productivity if implemented correctly. In his research on construction projects in Indonesia, Alwi (2016) found that workers who are paid based on the *wholesale system* are able to complete work at a 20% higher rate compared to workers who receive a daily wage.

Similar findings were also revealed by Mansur (2017), who showed that workers with a *wholesale wage system* had a higher level of motivation compared to workers who used other wage methods. Productivity in construction projects is one of the crucial aspects that determine the success of a project, especially in achieving time, cost, and quality targets. Considering that this sector is highly dependent on labor, the implementation of an effective wage system is one way to optimize productivity (Sudirman and Anggita, 2020).

Wholesale wage systems are a commonly used approach in construction projects to increase labor productivity. In this system, wages are calculated based on the volume or work results that have been agreed upon, in contrast to the daily system which is based on working time (Susanti, 2019). The *wholesale wage system* offers a number of advantages for both contractors and workers. For contractors, this system allows for more efficient budget planning because the wages paid are in accordance with the work achieved (Wibowo and Hamid, 2021). In addition, these systems tend to motivate workers to work harder and faster, since they are exposed to direct incentives to get the work done faster (Purnomo, 2020). For workers, this system provides an opportunity to earn higher wages if they are able to complete more work or faster, according to the initial agreement (Saputra, 2018).

The level of labor productivity is a key factor in the success of a construction project. In this industry, high productivity is essential to achieve time, cost, and quality targets. Therefore, the wage system is a vital instrument in motivating the workforce and increasing their productivity. In this case, the *wholesale wage system* has proven to be effective in encouraging workers to work faster and more efficiently, as the wages received depend on the results of work produced (Ismail et al., 2020).

The implementation of *wholesale systems* in construction projects has been proven effective in increasing productivity, thanks to the direct incentives given to workers based on the work they achieve (Ismail and colleagues, 2020). This system spurs work time efficiency, as workers are encouraged to complete tasks as quickly as possible without sacrificing quality (Putra and Rahman, 2019). In addition, the wholesale mechanism provides benefits for contractors by allowing for clearer cost planning, as wages are calculated based on the volume or results of pre-agreed work (Wijaya and Hartono, 2021). However, productivity in the *wholesale system* is also greatly influenced by various other factors, such as the skills and experience of the workforce, the availability of materials and equipment, and effective project management (Arief and Wahyuni, 2022). Putri (2019) explains that combining a *wholesale wage system* with adequate training can improve the skills of the workforce, which in turn contributes to increased productivity. Although the *wholesale system* has many advantages, challenges such as potential conflicts between contractors and workers regarding the determination of work volumes, as well as the issue of wage justice, also need to be considered. A study by Prasetyo (2020) shows that good communication between contractors and workers, as well as a clear understanding of the scope of work, is key to reducing the likelihood of conflicts in this system.

The problems that arise in the construction project of a vocational school building in *Caruban District, Madiun Regency*, are closely related to labor productivity and work time efficiency. In construction projects, especially those involving educational facilities such as school buildings, there are demands to complete the work within strict deadlines and with high quality standards. However, there is often a decrease in worker productivity in the field, which impacts delays in project completion and inefficient budget use. In the implementation of this school building construction project, a number of challenges have been identified, especially related to worker performance. One of the main issues is low work productivity, which affects the quality and speed of project completion. Workers who are paid with a daily wage system tend to be less motivated to complete their tasks faster or better, as the wages received do not depend on the volume of work completed.

Wholesale wage systems, which are commonly applied in construction projects, offer a potential solution to this problem. In a *wholesale system*, workers are paid based on the volume of work they successfully complete, which is expected to motivate them to work faster and more efficiently. However, the implementation of this system also presents challenges, one of which is how to ensure that the quality of work is maintained despite the urge to complete the work faster. This study aims to analyze in depth the influence of the *wholesale wage system* on the productivity and performance of the vocational school building construction project. By identifying the factors that affect the success of the *wholesale system*, the results of the research are expected to provide solutions to productivity problems faced and offer recommendations for project managers in choosing a more effective wage system, to improve efficiency and work results in similar projects in the future.

This study aims to identify the impact of the implementation of the *wholesale wage system* on the timeliness of the completion of each stage of the vocational school building construction project in *Caruban District, Madiun Regency*. In addition, this study will also analyze how the *wholesale wage system* affects the level of labor motivation. This motivation measurement is done by looking at the job completion rate per shift on the same project. The results of this study are expected to provide practical benefits for contractors in improving project efficiency, as well as becoming a reference for policymakers in formulating labor regulations. In addition, the study highlights the importance of training and supervision to maintain the quality of work amid the push to get work done faster. Thus, the *wholesale wage system* can be optimized to support worker productivity and welfare.

METHOD

This research adopted a quantitative approach to evaluate the impact of the *wholesale wage system* on labor productivity in a school building construction project in *Caruban District, Madiun Regency*. The study focused on projects managed by PT. Panca Putri, including the construction and rehabilitation of SMK Negeri 1 Mejiyan, SMK Negeri 1 Wonoasri, and SMK PGRI 1 Mejiyan. The population consisted of all construction workers involved in these projects, and samples were selected through random sampling. The research was conducted in November 2024 and involved field surveys, secondary data collection, observations, interviews, and questionnaire distribution.

Data were collected using questionnaires, interviews, and direct observations. The questionnaire, tested for validity and reliability, gathered quantitative data on workers' perceptions of the *wholesale wage system*, covering motivation, work speed, and productivity. Semi-structured interviews were conducted with supervisors and project managers to explore the system's impact on work quality and efficiency. Direct observations monitored daily productivity, work efficiency, worker interactions, and quality of work at the project site.

Data analysis employed quantitative statistical methods using software such as SPSS or Excel. Initial data cleaning ensured accuracy and consistency. Descriptive analysis calculated means, medians, standard deviations, and frequency distributions. Correlation tests (Pearson or Spearman, depending on data distribution) assessed the relationship between the *wholesale wage system* (independent variable) and work productivity (dependent variable). Simple linear regression analyzed the effect of the *wholesale wage system* on productivity, with significance evaluated by a t-test. Statistical assumptions, including normality, heteroscedasticity, and multicollinearity, were tested to validate regression results.

This research aimed to provide insights into the effectiveness of the *wholesale wage system* in increasing labor productivity, offering a reference for similar construction projects.

RESULTS AND DISCUSSION

The results of this research have been processed and analyzed according to the methods applied. The findings are interpreted to answer research questions by linking existing data to relevant objectives and theories. Thus, this study provides an in-depth understanding of the implications.

Variable Validity Test

The validity test of the statement was carried out by applying the Pearson Correlation Product Moment method using the SPSS version 27 program. The purpose of this validity test is to assess the extent to which each statement in the questionnaire can measure the variable in question. The study involved 40 respondents, in which the correlation value between the score of each statement and the total score was calculated. At a significance level of 5%, the r-value of the table used for 40 respondents was 0.312.

Hypotheses tested

- **H₀:** $r_{count} < 0.312$, which means that the questionnaire statement item is invalid
- **H₁:** $r_{count} \geq 0.312$, which means that the questionnaire statement item is valid

Table 1. Item Validity Test

Factor	Variable	Question	Calculation	Information
Wage System X1	X1.1	Are you satisfied with the wholesale wage system implemented in this project?	0,928	Valid
	X1.2	How often do you receive wages on time?	0,775	Valid
	X1.3	Do you feel that the wages you receive are commensurate with the amount of work you complete?	0,882	Valid
	X1.4	How much does a wholesale wage system affect your job satisfaction?	0,794	Valid

Source: Processed Researcher, 2024

Table 2. Item Validity Test (Advanced)

Wage System X1	X1.5	How important do you value the wholesale wage system in the success of the project?	0,706	Valid
	X1.6	Do you feel that there is sufficient quality control of the work being done?	0.708	Valid
Communication X2	X2.1	How good is the communication between the project manager and the workers in the project?	0,919	Valid
	X2.2	Do you get constructive feedback from your employer regarding your work?	0,913	Valid
Work Environment X3	X3.1	Does working conditions at the project site affect your productivity?	0,878	Valid
	X3.2	How much impact does the work environment have on your performance?	0,734	Valid
	X3.3	How good is teamwork among the workers in this project?	0,749	Valid

Productivity and Work Motivation Y	Y2.1	Do you feel like the wholesale wage system motivates you to work more productively?	0,809	Valid
	Y2.2	Have you experienced an increase in work productivity since the implementation of the wholesale wage system?	0,793	Valid
	Y2.3	How often do you feel burdened by work targets in this wholesale wage system?	0,661	Valid

Source: Processed Researcher, 2024

Based on Table 4. 6, the validity test results for the statement variable using the Product Moment Pearson Correlation method in the SPSS 27 program involved 40 respondents and used a significance level of 5% ($r_{table} = 0.312$). From this analysis, it is known that all statement items have a calculated r -value greater than or equal to 0.312. Thus, all items of the statement met the validity criteria and were declared valid and suitable for use in the study, as they showed a significant correlation to the total score.

Grain Reliability Test

The reliability test of the statement items was carried out using Cronbach's Alpha method through the SPSS 27 program. The purpose of this test is to assess the extent to which the items in the questionnaire provide consistent results when measured repeatedly. In this study, questionnaires were tested on 40 respondents to analyze the items of statements. The Cronbach's Alpha value obtained was 0.70, which was used to determine the quality level of the questionnaire. This assessment follows the established reliability value interpretation guidelines.

- *Cronbach's Alpha* ≥ 0.70 indicates that the questionnaire has good reliability.
- *Cronbach's Alpha* < 0.70 indicates that the questionnaire is not good

Table 3. Reliability Test Item

Factor	Crobach's alpha	r-critical	Information
X1 Wage System	0,865	0,7	<i>Reliable</i>
X2 Communication	0,815	0,7	<i>Reliable</i>
X3 Work Environment	0,824	0,7	<i>Reliable</i>
Productivity and Work Motivation Y	0,829	0,7	<i>Reliable</i>

Source: Processed Researcher, 2024

The results of the analysis showed that the Cronbach's Alpha value for this questionnaire exceeded 0.70, which means that all the statements in the questionnaire were declared reliable. In other words, this questionnaire can provide consistent and reliable measurement results for future research purposes.

Descriptive Statistical Test

This analysis aims to identify the trend of the data through statistical values such as mean, median, standard deviation, and minimum and maximum values for each statement item. In this study, each statement item was analyzed using the SPSS 27 program, and the descriptive results can be seen in the following table.

Table 4. Descriptive Statistical Test

Factor	N	Min	Max	Mean	Std. Deviation
Total Wage System (X1)	40	14	30	23.55	4.248
Total Work Communication (X2)	40	5	10	7.93	1.607
Total Working Environment (X3)	40	7	15	11.68	1.940
Total Productivity and Work Motivation (Y)	40	8	15	12.08	1.886
Valid N (listwise)	40				

Source: Processed Researcher, 2024

The results of the analysis indicated that most of the questions had a high average score, which reflected the tendency of positive responses from the respondents. In addition, the relatively low standard deviation indicates that the data tends to be homogeneous, meaning that the respondents' answers are relatively consistent.

Correlation Test

This test aims to determine the degree of relationship between two or more variables. In this study, a correlation test was carried out to analyze the strength and direction of the relationship between the X and Y variables.

Table 5. Correlation Test

		Total Wage System (X1)	Total Work Communication (X2)	Total Working Environment (X3)	Total Productivity and Work Motivation (Y)
Total Wage System (X1)	Pearson Correlation	1	.907**	.797**	.788**
	Sig. (2-tailed)		.000	.000	.000
	N	40	40	40	40
Total Work Communication (X2)	Pearson Correlation	.907**	1	.740**	.738**
	Sig. (2-tailed)	.000		.000	.000
	N	40	40	40	40
Total Working Environment (X3)	Pearson Correlation	.797**	.740**	1	.602**
	Sig. (2-tailed)	.000	.000		.000
	N	40	40	40	40
Total Productivity and Work Motivation (Y)	Pearson Correlation	.788**	.738**	.602**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	40	40	40	40

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Processed Researcher, 2024

The relationship between two variables, with a value of **r** indicating the strength and direction of the relationship can be seen in the table below

Table 6. Correlation test guide

Interval Value r	Interpretation
0.00 - 0.19	Very weak relationships
0.20 - 0.39	Weak relationships
0.40 - 0.59	Relationship is in place
0.60 - 0.79	Strong relationships
0.80 - 1.00	Strong relationships
-0.19 - 0.00	Very weak (negative) relationships
-0.39 - -0.20	Weak (negative) relationships
-0.59 - -0.40	Medium (negative) relationship
-0.79 - -0.60	Strong (negative) relationships
-1.00 - -0.80	Very strong (negative) relationships

Source: Field, A. (2016).

In table 4.9, the r-value is in the range of 0.80 – 1.00, indicating a very strong relationship between the two variables tested. Positive interpretation indicates a direct relationship (the two variables move in tandem)

4.2.5 Multiple Regression Test

Regression tests were carried out to evaluate the relationship between independent variables (predictors) and dependent variables (dependents). In this study, regression analysis was carried out using the SPSS 27 program, aiming to measure the extent of the contribution of independent variables in predicting dependent variables. The methods used are:

Table 7 Multiple Regression Results

Type	Coefficient		t	Sig.	Collinearity Statistics		
	Unstandardized Coefficients	Standardized Coefficients			Tolerance	VIVID	
	B	Std. Error					Beta
1 (Constant)	4.090	1.199	3.412	.002			
Total Wage System (X1)	.323	.120	.728	2.691	.011	.142	7.039
Total Work Communication (X2)	.158	.285	.134	.553	.584	.176	5.682
Total Working Environment (X3)	-.075	.164	-.077	-.454	.652	.363	2.753

a. Dependent Variable: Total Productivity and Work Motivation (Y)

Source: Processed Researcher, 2024

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

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$$

$$Y = 4.090 + 0.323 (X_1) + 0.158 (X_2) + 0.075 (X_3) + e$$

From the table above, the results for multiple regression results can be concluded as follows:

- a. Analysis of the influence between X1 on Y based on the result of *the constant value* (a) is 4.090 while the value of X1 is 0.323. It can be interpreted that the value of the regression

- coefficient of the X1 variable is 0.323 so that the t value of 2.691 and the significance value of $0.011 < 0.05$ can be interpreted so that the variable factor of the wholesale wage system has a significant effect on work productivity and motivates workers
- Analysis of the effect between X2 on Y based on the result of *the constant value* (a) of 4.090 while the value of X2 is 0.158. It can be interpreted that the value of the regression coefficient of the X2 variable is 0.158, so that a calculated t value of 0.553 and a significance value of $0.584 > 0.05$ can be interpreted to mean that the communication variable between workers does not have a significant effect on work productivity and motivates workers.
 - Analysis of the influence between X3 on Y based on the result of *the constant value* (a) is 4.090 while the value of X3 is 0.075. It can be interpreted that the value of the regression coefficient of the X2 variable is 0.075, the t-value is -0.454 and the significance value is $0.652 > 0.05$, meaning that the work environment variable does not have a significant effect on the variable Work productivity and motivates workers

Significance Testing (t-test)

This test was conducted to test whether the influence of the wholesale wage system on productivity is statistically significant.

Hypotheses tested:

H0: There is no significant effect of the wholesale wage system on work productivity.

H0: There was no significant relationship between independent and dependent variables ($p >$ value 0.05).

H1: There is a significant influence of the wholesale wage system on work productivity.

There was a significant relationship between independent and dependent variables ($p \leq$ value of 0.05).

Table 8. T Test Results

Model		Coefficients			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	4.090	1.199		3.412	.002
	Total Wage System (X1)	.323	.120	.728	2.691	.011
	Total Work Communication (X2)	.158	.285	.134	.553	.584
	Total Working Environment (X3)	-.075	.164	-.077	-.454	.652

a. Dependent Variable: Total Productivity and Work Motivation (Y)

Source: Processed Researcher, 2024

From the table above, the results for the T Test results can be concluded as follows:

a) Wage System Variables (X1):

The value of $t_{\text{calculated}} = 2.691 > t_{\text{table}} = 2.0167$ with significant = $0.011 < 0.05$ then H_a is accepted and H_0 is rejected. This shows that the variable Wage System (X1) has a positive and significant effect on Total Productivity and Work Motivation (Y).

b) Total Work Communication Variable (X2)

The value of $t_{\text{count}} = 0.553 < t_{\text{table}} = 2.0167$ with significance = $0.584 > 0.05$, then H_a is rejected, and H_0 is accepted. This shows that the variables Total Work Communication (X2) do not have a significant effect on Total Productivity and Work Motivation (Y).

c) Total Work Environment Variable (X3):

The value of $t_{\text{count}} = -0.454 < t_{\text{table}} = 2.0167$ with significant = $0.652 > 0.05$ then H_a is rejected, and H_o is accepted. This shows that the variable Total Work Environment (X3) has a negative and insignificant effect on Total Productivity and Work Motivation (Y).

Determination testing (R2)

By using the coefficient of determination (R2) to measure the ability of the regression model to explain the value of variation of its dependent variables.

Table 9. Determination test regression results (R2)

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.791a	.626	.595	1.200	.626	20.108	3	36	.000

a. Predictors: (Constant), Total Work Environment (X3), Total Work Communication (X2), Total Wage System (X1)

Source: Processed Researcher, 2024

Based on the results shown in the table above, the Adjusted R Square value of 0.626 or 62.6% was obtained. This figure reflects the extent to which independent variables—namely the wage system (X1), work communication (X2), and work environment (X3)—are able to explain productivity and work motivation. In other words, 62.6% of the variation in productivity and work motivation can be explained by these three variables, while the remaining 37.4% are influenced by other variables outside the study model.

Statistical Assumption Testing

Testing to ensure that the data and models used in the analysis meet certain assumptions in order for the results obtained to be valid and reliable, in the context of linear regression, this test involves several main assumptions, namely Normality, Heteroscedasticity, Multicollinearity

1. Data Normality Test

Ensure that residual data is distributed normally. This is important for the validity of the test to be significant on the regression parameters. Tests such as Kolmogorov-Smirnov or Shapiro-Wilk can be used.

Table 10. Kolmogorov results
One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		40
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	1.15320351
Most Extreme Differences	Absolute	.117
	Positive	.100
	Negative	-.117
Test Statistic		.117
Asymp. Sig. (2-tailed) ^c		.184
Monte Carlo Sig. (2-tailed) ^d	Sig.	.183

One-Sample Kolmogorov-Smirnov Test		Unstandardized Residual
99% Confidence Interval	Lower Bound	.173
	Upper Bound	.193

a. Test distribution is Normal.
 b. Calculated from data.
 c. Lilliefors Significance Correction.
 d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.

Source: Processed Researcher, 2024

Based on the results of the analysis in the table, a significance value of $0.183 > 0.05$ was obtained. This value indicates that the null hypothesis (H_0), which states that the distribution of the sample data does not differ significantly from the normal distribution, is accepted. In other words, the sample data showed no deviation from the normal distribution. Therefore, it can be concluded that the data on the tested variables meet the assumption of normality, which is an important prerequisite in parametric statistical analysis, such as linear regression and other hypothesis tests.

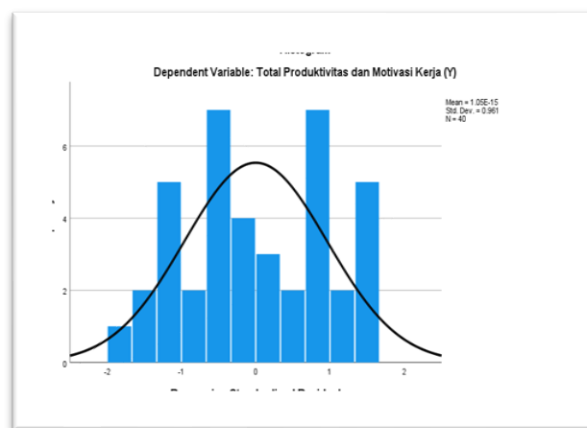


Figure 1. Histogram

Source: Processed Researcher, 2024

Based on the histogram graph, the distribution of the data shows a shape that resembles a normal curve, where the highest frequency is located around the mean value. The graph also shows a symmetrical decrease in frequency towards both tails of the distribution, both on the left and right sides. There is no indication of extreme spikes or distribution imbalances. This indicates that the data has a distribution pattern that is close to normal, supporting the fulfillment of normality assumptions in statistical analysis.

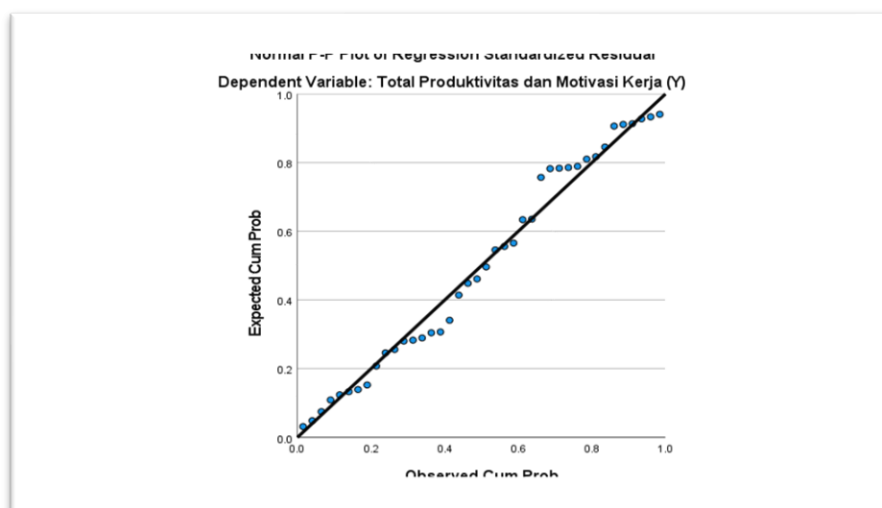


Figure 2. P-Plot

Source: Processed Researcher, 2024

Based on the P-P plot (Probability-Probability plot) figure, it can be seen that the dots representing the sample data are located quite close to the diagonal line indicating the normal distribution. Most of the points are along those lines, with slight deviations at the ends. This shows that the sample data has a distribution that is close to normal. The small deviations seen on the left and right tails can be considered variations that are still within reasonable limits and do not indicate any major problems assuming normality. Overall, the P-P of this plot supports the fulfillment of the normality assumptions in the tested data.

2. Multicollinearity Test

For models with more than one independent variable, this test ensures there is no strong linear relationship between independent variables. Tolerance and Variance Inflation Factor (VIF) are common indicators.

Table 11. Multicollinearity Test Results

		Coefficient						
Type		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	4.090	1.199		3.412	.002		
	Total Wage System (X1)	.323	.120	.728	2.691	.011	.142	7.039
	Total Work Communication (X2)	.158	.285	.134	.553	.584	.176	5.682
	Total Working Environment (X3)	-.075	.164	-.077	-.454	.652	.363	2.753

a. Dependent Variable: Total Productivity and Work Motivation (Y)

Source: Processed Researcher, 2024

The table above shows that the tolerance values for each independent variable are as follows: Wage system (X1) is 0.142, work communication (X2) is 0.176, and work

environment is 0.363. Thus, the tolerance value of all independent variables is greater than 0.1. The output results also show the value of *the Variance Inflation Factor* (VIF) for the variable Wage System (X1) of 7,039, Work Communication (X2) of 5,682 and Work environment of 2,753. Since the VIF value of all independent variables is less than 10, it can be concluded that the data does not suffer from multicollinearity problems.

3. Heteroskedasticity Test

Heteroscedasticity testing is carried out to test whether in a regression equation there is a residual variance disparity from one observation to another.

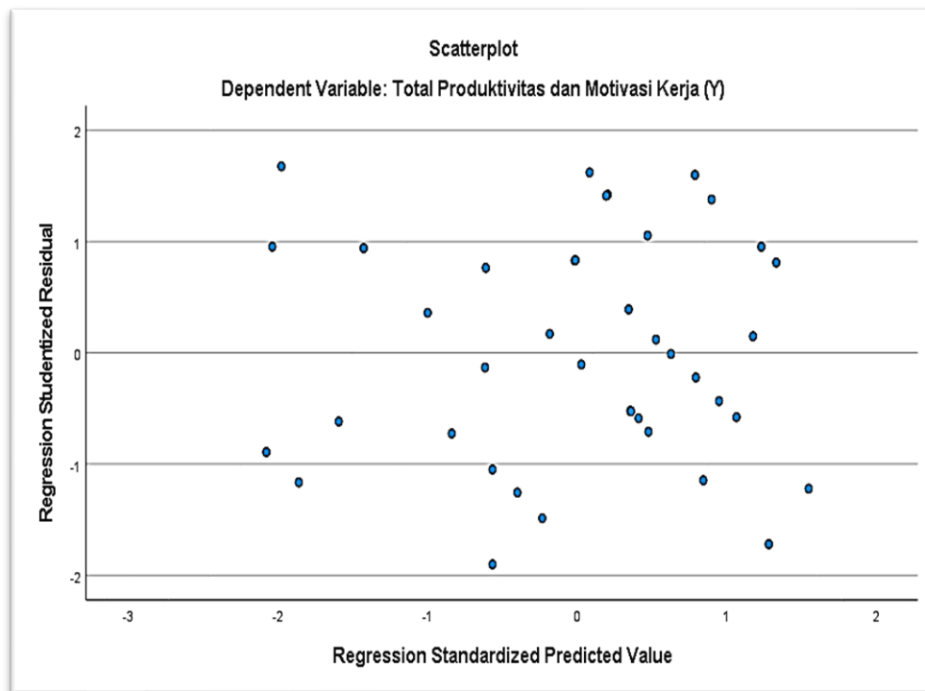


Figure 3. *Scatter Plot*
Source: Processed Researcher, 2024

Based on the image showing the pattern of the distribution of the residual points to the predicted value, it can be seen that the points are randomly scattered around the horizontal axis without forming a specific pattern, such as constricting, widening or systematically patterning. This random spread indicates that the residual variance is constant across the data range. Thus, it can be concluded that the data do not experience heteroscedasticity, and the assumption of homogeneity in the regression analysis is met.

Analysis and Interpretation of Results

1. The influence of the wage system on productivity and motivation

The wage system has been shown to have a significant effect on worker productivity and motivation, with a t-value of 2.691 and a significance of $0.011 < 0.05$. This shows that a clear, fair, and worker-performance-compliant wage policy can encourage better work results and increase worker motivation, while contractors need to prioritize a transparent and competitive wholesale wage system. Additional incentives such as bonuses or rewards can strengthen the relationship between worker productivity and compensation received.

2. The Effect of Communication Between Workers on Productivity and Motivation

Communication between workers had no significant effect on productivity and motivation, with a t-value of 0.553 and a significance of $0.584 > 0.05$. These findings indicate that

communication between workers, while important for collaboration, is not a major factor driving productivity or motivation, and although not significant, contractors still need to ensure effective communication channels. This can be done by providing communication and conflict management training to keep the work running smoothly.

3. The Influence of the Work Environment on Productivity and Motivation

The work environment also had no significant influence on worker productivity and motivation, with a t-value of -0.454 and a significance of 0.652 (> 0.05). These findings suggest that work environment factors are not the main determinants in influencing productivity or motivation, despite these results, contractors must still maintain safety and comfort standards of the work environment. A safe and adequate work environment contributes to work stability and worker welfare indirectly.

CONCLUSION

The study found that the *wholesale wage system* significantly improves both the timeliness of project completion and labor motivation, as evidenced by an F value of 20.108 ($p < 0.05$), indicating that wage system, work communication, and work environment collectively enhance productivity and motivation. The T test further confirmed the wage system's positive effect, with a t value of 2.691 ($p = 0.011$), showing that workers are incentivized to complete tasks faster to increase their earnings. These results demonstrate the *wholesale wage system* as an effective approach for boosting workforce efficiency in construction projects. Future research could explore how this wage system interacts with other factors such as skill development, supervision quality, and technological adoption to optimize productivity and work quality further.

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