Enhancing Employee Productivity: The Impact of Occupational Safety, Health, and Work Discipline at PT. Pelindo Parepare

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Abstract. Every operational process within a company inevitably carries potential risks of workplace accidents for employees. Therefore, companies must implement Occupational Health and Safety (OHS) programs, which must be supported by employee discipline in applying these programs to minimize the risk of workplace accidents. The objective of this research is to analyze the implementation of OHS policies and practices at PT. Pelindo identifies the factors related to OHS and work discipline that influence employee productivity and evaluates the relationship between OHS implementation and work discipline on employee productivity at PT. Pelindo Parepare using multiple linear regression analysis. The data utilized in this study includes both library research and fieldwork, comprising the distribution of questionnaires to a total of 42 respondents. The data processing technique employed is multiple linear regression analysis. The findings indicate that OHS and work discipline, when considered together, have a significant impact on employee productivity. This is evidenced by an F-value of 96.148, which exceeds the F-table value of 3.238, with a significance level of 0.000 ($p < 0.05$). This implies that higher levels of OHS and work discipline lead to increased employee productivity.

Keywords: Occupational Safety, Linear Regression, and Work Productivity.

1   1 Introduction

A company must possess high-quality resources, as these are essential assets that support the achievement of its objectives. However, each acquired resource must be optimized to enhance the company's performance. Human resources, along with advancements in modern technology in production processes and the development of supporting equipment, significantly influence workforce absorption within the company. While advanced technology facilitates employees' tasks, it also inherently carries a higher risk of workplace accidents1.

In 2007, data from Jamsostek recorded 65,474 workplace accidents in Indonesia, resulting in 1,451 fatalities, 5,326 cases of permanent disability, and 56,697 non-fatal

workers2. In this context, the company prioritizes its resources—especially its employees—by optimizing Occupational Safety and Health (OSH) programs. This approach aims to foster a secure and comfortable work environment, minimizing workplace accident risks and redirecting potential losses toward more effective and efficient resource use3. The company has implemented an Occupational Health and Safety (OHS) program to ensure comprehensive resources that support workplace safety and health. In addition to promoting occupational health, this program is essential in creating a conducive work environment 4–6. The Occupational Safety and Health (OSH) program is mandatory in every company, as governed by laws and regulatory frameworks related to workplace safety 7,8. Key regulations include:

Law No. 13 of 2003 on Employment: Article 86 mandates that all organizations implement OSH measures to ensure worker safety, while Article 87 requires integrating OSH management systems into broader organizational management systems. Occupational health refers to a state of well-being that aims to ensure workers achieve optimal physical, mental, and social health. Its primary objective is to prevent and manage health disorders or conditions arising from work-related activities, the work environment, or general surroundings 9.

PT Pelabuhan Indonesia (Persero) Parepare, a State-Owned Enterprise (SOE), plays a vital role in supporting business activities across Eastern Indonesia. PT Pelindo (Persero) manages numerous commercial areas, including essential port services such as warehousing, cargo storage, cargo handling equipment, and port facilities. Consequently, each PT Pelindo (Persero) site faces heightened risks of accidents, underscoring the need for a comprehensive Occupational Safety and Health (OSH) program to support employee productivity. Alongside safety initiatives, employee productivity is also significantly influenced by workforce discipline. 10–12. According to 13 "discipline refers to the level of adherence to established rules and the willingness to accept sanctions or penalties for violating these regulations." When every worker and employee implements measures that support occupational health and safety, job performance becomes smoother and more efficient as they feel secure and comfortable regarding potential hazards, which can significantly enhance productivity 14.

Despite significant advancements in workplace safety and health programs, many companies in the surrounding area continue to overlook the implementation of Occupational Health and Safety (OHS) measures. Additionally, employees often display a lack of adherence to these safety and health protocols. Current practices within these companies tend to create unsafe conditions and undermine productivity. Consequently, this study investigates "The Impact of Occupational Health and Safety (OHS) and Work Discipline on Employee Productivity at PT. Pelabuhan Indonesia (Persero) Parepare."

2   Method

This quantitative study employs a descriptive method and is conducted at PT. Pelabuhan Indonesia (Persero) Parepare, located on Jl. Andi Cammi 1, Ujung Sabbang, Ujung, Parepare, South Sulawesi, Postal Code 9113. The study population includes 73

employees at PT. Pelindo (Persero) Parepare, covering roles from branch directors and managers to staff members. Using random sampling, a sample size of 42 managers or staff members is selected based on population criteria. To accurately represent the population and obtain relevant data, purposive sampling is also utilized 15.

For this research, data collection methods include observation, questionnaires, and documentation. The study examines variables such as occupational health and safety (OHS), work discipline, and work productivity through a structured questionnaire. At PT. Pelindo (Persero) Parepare, a total of 42 respondents participated in the survey. Statements in the questionnaire are crafted around key indicators of the research variables, with questions designed to gather insights on each. All respondents provide ratings (scores) that reflect the actual conditions observed.

The type of data utilized in this study is quantitative. Quantitative data encompasses numerical information, such as the ages of respondents and the total scores derived from the questionnaire responses collected from employees of PT. Pelindo (Persero) Parepare. This data is obtained through interviews with company representatives and collaboration between company informants and researchers to gather relevant information related to the study's objectives. Primary data for this research is collected through the distribution of questionnaires to the primary source of information—namely, the employees of PT. Pelindo (Persero) Parepare. Secondary data is sourced from pre-existing materials, such as company documents, literature, books, journals, and other relevant data sources. Data analysis techniques employed in this study include quality checks through validity and reliability tests, classical assumption tests, multiple linear regression analysis, coefficient of determination tests, t-tests, and F-tests.

3   Result

Data for this research were collected through questionnaires distributed to 42 respondents. To ensure the research yields valuable insights, the obtained data must undergo various tests. The first step involves evaluating the questionnaire for validity and reliability. The second step includes classical assumption tests, which encompass normality testing, multicollinearity testing, and heteroscedasticity testing. The third step involves conducting multiple linear regression analyses to examine the relationships between variables. Finally, the fourth step employs hypothesis testing, utilizing the t-test to assess partial effects and the F-test to evaluate simultaneous effects. The results of these tests are as follows:

3.1   Validity Test

A statement is deemed valid if the calculated r value exceeds the critical R-value (R-table) at a significance level of 0.05. To determine the R-table, researchers refer to the appropriate table, first identifying the degrees of freedom (df). With a sample size of n = 42, the degrees of freedom are calculated as df = n - 2 = 42 - 2 = 40. Consequently, the R-table value obtained is 0.304.

The results of the validity test for the occupational safety and health variable are presented in Table 1 as follows:

Table 1. Results of Validity Testing for Occupational Safety and Health (OSH) Variable (X1)

Item Statement	R-count	R-table	Description
$X_1.1$	0,750	0,304	Valid
$X_1.2$	0,634	0,304	Valid
$X_1.3$	0,694	0,304	Valid
$X_1.4$	0,505	0,304	Valid
$X_1.5$	0,420	0,304	Valid
$X_1.6$	0,630	0,304	Valid
$X_1.7$	0,668	0,304	Valid

The safety and health at work variable consists of seven statement items. Based on Table 1, all statement items yielded a computed R-value greater than the critical R-value at a significance level of 0.05. This indicates that all items of the safety and health at work variable are valid and can be used as research instruments.

The results of the validity test for the work discipline variable (X2) are presented in Table 2 below:

Table 2. Results of the Validity Test for Work Discipline Variable (X2)

Item Statement	R-count	R-table	Description
$X_2.1$	0,606	0,304	Valid
$X_2.2$	0,555	0,304	Valid
$X_2.3$	0,588	0,304	Valid
$X_2.4$	0,609	0,304	Valid
$X_2.5$	0,612	0,304	Valid
$X_2.6$	0,612	0,304	Valid
$X_2.7$	0,494	0,304	Valid
$X_2.8$	0,468	0,304	Valid

The work discipline variable comprises eight statement items. According to Table 4.6, the correlation coefficient for each statement item is greater than the critical value rrr (0.304), indicating that all items of the work discipline variable are valid and can be used as research instruments. This critical value is derived from the degrees of freedom calculated as $df=n-2df = n - 2df=n-2$ for a two-tailed test at a 0.05 significance level.

The results of the validity test for the work productivity variable (Y) are presented in Table 3 below:

Table 3. Results of the Validity Test for the Work Productivity Variable (Y)

Item Statement	R-count	R-table	Description
Y.1	0,751	0,304	Valid
Y.2	0,612	0,304	Valid
Y.3	0,729	0,304	Valid
Y.4	0,810	0,304	Valid
Y.5	0,475	0,304	Valid
Y.6	0,672	0,304	Valid
Y.7	0,528	0,304	Valid

Y.8	0,589	0,304	Valid
Y.9	0,386	0,304	Valid

The productivity variable (Y) comprises nine statement items. From Table 3, it is observed that the correlation for each statement item has an rrr-value greater than the rrr-table value (0.304) at a significance level of 0.05. This indicates that all items in the productivity variable are valid and can be utilized as research instruments.

3.2   Reliability Test

To assess the reliability of a statement, the reliability test is conducted using Cronbach's Alpha with SPSS software. A Cronbach's Alpha value exceeding 0.6 is considered acceptable. The results of the reliability test for the variables under investigation are presented in Table 4 as follows:

Table 4. Results of the Instrument Reliability Test

Item Statement	Cronbach's Alpha	Description
Occupational Safety and Health (OSH) (X1)	0,729	Reliable
Work Discipline (X2)	0,698	Reliable
Work Productivity (Y)	0,797	Reliable

Based on Table 4, the Cronbach's alpha values for variable X1 are 0.729, for variable X2 are 0.698, and for variable Y are 0.797. All these values exceed the threshold of 0.6, indicating that the items in the statements are reliable and suitable for use in the research.

3.3   Classical Assumption Test

Normality Test (Third Level). To assess whether the residuals in a regression model follow a normal distribution, normality testing is employed. In this study, the Normal P-P Plot of Regression Standardized Residuals is used for this purpose. The resulting plot displays a scatter of points along with a diagonal reference line. If the scatter of points closely follows or aligns with the diagonal line, it indicates that the residuals are normally distributed. Conversely, if the scatter deviates significantly from the diagonal line, it suggests a deviation from normality. The Normal P-P Plot is illustrated in Figure 1 below:

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Y_1
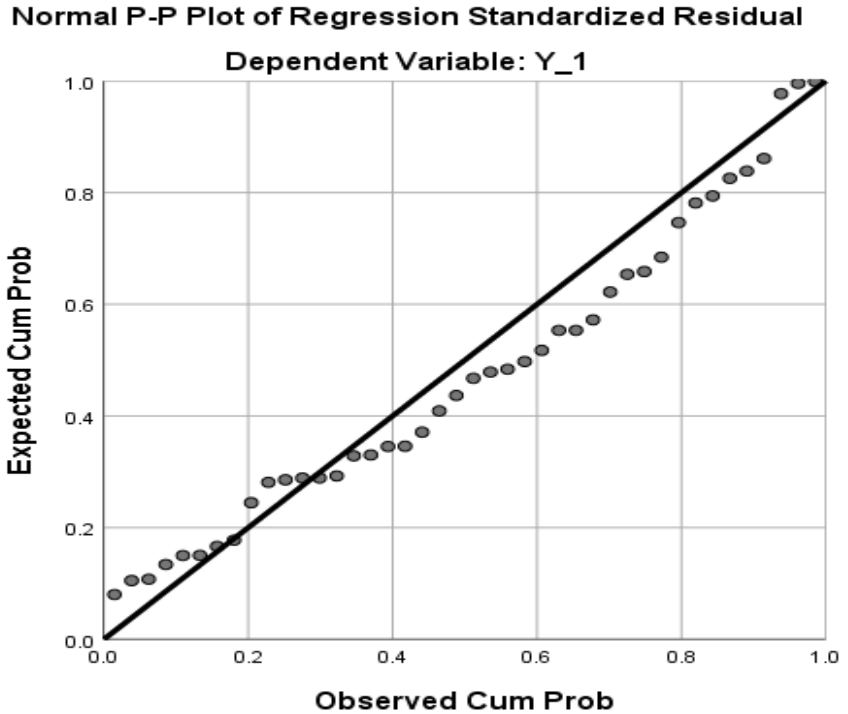
Fig. 1. Normal Probability-Probability Plot of Standardized Residuals in Regression Analysis

Figure 1 above shows that the distribution of points is relatively spread out, approaching the diagonal line, indicating that the residual data is normally distributed. In addition to using graphs, normality tests can also be identified using the Kolmogorov-Smirnov normality test. The results of the normality test with Kolmogorov-Smirnov are shown in Table 5 below:

Table 5. Normality Test Results with One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		42
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.01095516
Most Extreme Differences	Absolute	.117
	Positive	.117
	Negative	-.076
Test Statistic		.117
Asymp. Sig. (2-tailed)		.171[c]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Based on the Kolmogorov-Smirnov normality test in Table 5, a significance value of 0.171 was obtained, which is greater than the alpha level of 0.05. Therefore, it can be concluded that the data meets the assumption of normal distribution.

Multicollinearity Test. The results of the multicollinearity test are presented in Table 6 as follows:

Table 6. Multicollinearity Test Results

Model	Collinearity Statistics	
	Tolerance	VIF
K3	0,261	3,833
Disiplin Kerja	0,261	3,833

In Table 6 above, the Tolerance value for each variable is 0.261, which is greater than 0.1, and the VIF value is 3.833, which is less than 10. This indicates that there are no symptoms of multicollinearity between the occupational health and safety (OHS) and work discipline variables.

Heteroscedasticity Test. The results of the heteroscedasticity test can be seen in the scatterplot presented in Figure 2 as follows:
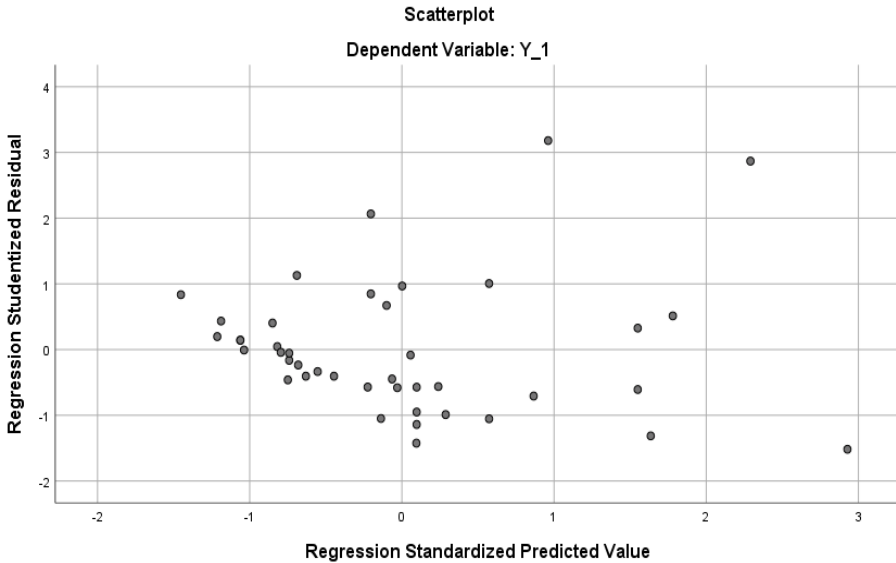
Fig. 2. Heteroscedasticity Test with Scatterplot

Based on Figure 2, the data does not exhibit heteroscedasticity, as there is no discernible pattern (such as wavy lines or a widening and then narrowing shape) in the scatterplot.

Instead, the points are irregularly dispersed, appearing both above and below the number 0 on the Y-axis.

Multiple Linear Regression Test. Multiple linear regression is a statistical technique used to evaluate the relationship between two or more independent variables—in this case, occupational safety and health (OSH) and work discipline—and a dependent variable, which is work productivity. This model helps to determine both the direction and magnitude of the influence that the independent variables exert on the dependent variable. The results of the multiple linear regression analysis are summarized in Table 7 below:

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Table 7. Multiple Linear Regression Test Results
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Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	.003	.017		.152	.880		
X_1_1	2.302E-6	.000	.021	.166	.869	.261	3.833
X_2_2	1.120	.155	.930	7.225	.000	.261	3.833

a. Dependent Variable: Y_1

Based on Table 7, the following regression equation is obtained:

$$\hat{Y} = 0{,}003 + 2{,}302 \times 10^{-6}X_1 + 1{,}120X_2 + e \qquad (1)$$

Description:
Y   = Work Productivity
α = Constant
β_1, β_2 = Regression Cooefficient
X_1 = Occupational safety and health (K3)
X_2 = Work Disciple

The results of the multiple linear regression analysis yielded an equation indicating positive regression coefficients for the two independent variables, occupational safety and health (OSH) and work discipline (β_1, β_2). This suggests that when both OSH and work discipline are adequately addressed, there will be an increase in employee productivity. Conversely, if these variables are not sufficiently met, it will lead to a decrease in employee productivity. This equation highlights the importance of maintaining high standards in both occupational safety and work discipline to enhance overall work performance. Specifically, it can be interpreted as follows:

1. The constant value (a) in the regression equation is 0.003, which indicates a positive value. This positive sign signifies a unidirectional influence between the independent variables—occupational safety and health (OSH) (X_1) and work discipline (X_2)—and the dependent variable, employee productivity. Specifically, this means that if

all independent variables are at 0 percent or remain unchanged, the work productivity value would be 0.003. This constant illustrates the baseline productivity level that exists even when the independent variables do not exert any influence.

2. The regression coefficient for the occupational safety and health (OSH) variable (X_1) is $2{,}302 \times 10^{-6}$, indicating a positive value. This means that if occupational safety and health increases by 1%, work productivity is expected to increase by $2{,}302 \times 10^{-6}$. assuming that all other independent variables remain constant. This positive relationship highlights the significant role that effective OSH practices play in enhancing employee productivity.

3. The regression coefficient for the work discipline variable (X_2) is 1.120 which is a positive value. This indicates that if work discipline increases by 1%, work productivity is expected to increase by 1.120 assuming that all other independent variables remain constant. This finding suggests that higher levels of employee work discipline contribute to improved work productivity, emphasizing the importance of fostering a disciplined work environment for enhancing overall performance.

Determination Coefficient Test. The results of the determination coefficient calculation are presented in Table 8 as follows:

Table 8. Results of Determination Coefficient Test

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.912[a]	.831	.827	.01110

a. Predictors: (Constant), X_2_2

Based on Table 8, the coefficient of determination R Square is 0.831 or 83.1% This indicates that the combined effect of the independent variables, occupational safety and health (X_1) and work discipline (X_2), accounts for 83.1% of the variance in work productivity (Y). Conversely, the remaining 16.9% of the variance is attributed to other factors outside this regression model, highlighting that additional variables not included in this study may also influence employee productivity.

T Test. The t-test is utilized to evaluate the significance of each independent variable's impact on the dependent variable within the regression model. A significance value of less than 0.05 (sig < 0.05) or a calculated t value greater than the t table value indicates that the independent variable has a significant partial effect on the dependent variable. The results of the t-test for each independent variable are explained as follows:

For the Occupational Safety and Health (OSH) variable, the statistical results of the t-test presented in Table 7 indicate a t-count value of 0.166 which is smaller than the t-table value of 2.023 Additionally, the significance value is 0.839, which is greater than 0.05. Therefore, it can be concluded that, partially, the Occupational Safety and Health (OSH) variable does not have a significant effect on work productivity.

For the Work Discipline variable, the statistical results of the t-test presented in Table 4.11 show a t-count value of 7.225, which is greater than the t-table value of 2.023. Additionally, the significance value is 0.000, which is smaller than the alpha level of 0.05. Therefore, it can be concluded that, partially, the work discipline variable has a significant effect on work productivity.

F Test. Multiple linear regression analysis using the F test aims to determine the effect of all variables including occupational safety and health (OSJ) and work discipline together (simultaneously) on the work productivity of employees of PT. Pelabuhan Indonesia (Persero) Parepare. The results of the F test are presented in Table 9 as follows:

Table 9. F Test Calculation Results

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.024	2	.012	96.148	.000[b]
	Residual	.005	39	.000		
	Total	.029	41			

a. Dependent Variable: Y_1

b. Predictors: (Constant), X_2_2, X_1_1

From the test results in table 9, the calculated F value is 96.148, which is greater than the F table of 3.238 and the significance is 0.000, which is smaller than alpha 0.05. It can be concluded that simultaneously, the occupational safety and health variables and work discipline have a significant influence on work productivity

3.4   Hypothesis Testing Determining the Variables That Have a Dominant Influence

Partial testing reveals that not all independent variables significantly influence employee productivity. Specifically, the variable of Occupational Safety and Health (OSH) (X1) does not have a significant partial effect on employee productivity, whereas the variable of Work Discipline (X2) does exert a significant partial effect on productivity. To determine which variable has the more dominant effect, we examine the beta coefficients of the independent variables, with the highest value indicating the most influential variable. The results of the beta coefficient testing for the independent variables are presented in Table 10.

Table 10. Beta Coefficient Value

Variabel	Standardized Coefficients Beta
K3	0,021
Disiplin Kerja	0,930

From table 10 above, it shows that the highest beta coefficient value is the work discipline variable (X2) of 0.93. Thus, the work discipline variable (X2) has a more dominant influence and relationship to employee productivity. This is in line with the results of the partial test where the K3 variable does not have a significant effect on work productivity and the discipline variable has a significant effect on work productivity.

4   Discussion

Occupational safety and health (OSH) and employee discipline at PT. Pelabuhan Indonesia (Persero) Parepare can be considered pivotal to the successful achievement of its established objectives. Effective implementation of OSH and discipline can lead to increased employee productivity, thereby contributing to the company's goal attainment. OSH and discipline are crucial aspects to be developed within PT. Pelabuhan Indonesia (Persero) Parepare due to their significant impact on employee productivity. Research findings, using an F-test, revealed a significance value of 0.000 < 0.05, indicating that collectively, OSH and discipline have a significant effect on employee productivity.

However, the t-test results show that the significance value for the OSH variable is 0.839 > 0.05, suggesting that OSH does not have a partial effect on employee productivity. Conversely, the significance value for the discipline variable is 0.000 < 0.05, indicating that, on a partial basis, employee discipline has a significant impact on productivity.

4.1   Influence of Occupational Health and Safety (X1) on Employee Productivity (Y)

The research findings indicate that the variable of occupational health and safety (X1) does not have a significant effect on employee productivity, with a calculated t-value of 0.166, which is less than the critical t-value of 2.023 and a significance level greater than 0.05. Therefore, PT. Pelindo (Persero) Parepare is advised to enhance aspects related to occupational health and safety for its employees. PT. Pelabuhan Indonesia (Persero) Parepare should focus on the development of occupational health and safety (OSH) programs and the factors influencing them to improve both occupational health and safety and employee productivity.

4.2   Influence of Occupational Health and Safety (X1) on Employee Productivity (Y)

The research findings show that the variable of work discipline (X2) has a significant impact on employee productivity, with a calculated t-value of 7.225, which is greater than the critical t-value of 2.023, and a significance level of 0.000, which is less than

0.05. This indicates that higher work discipline among employees leads to increased productivity, meaning that Hypothesis 1 of this study is accepted. By improving work discipline, organizational goals can be achieved, which benefits both the employees and the company.

4.3   Influence of Occupational Health and Safety and Work Discipline on Employee Productivity

The results of the F-test show that, simultaneously, both occupational health and safety (X1) and work discipline (X2) have a significant impact on employee productivity (Y). This is evidenced by the calculated F-value of 96.148, which exceeds the critical F-value of 3.238, and a significance level of 0.000, which is less than 0.05. This implies that an increase in occupational health and safety (OSH) and work discipline will lead to increased employee productivity, validating Hypothesis 2 of this study.

5   Conclusion

The variable of Occupational Health and Safety (OHS) individually does not have a significant effect on employee productivity at PT. Pelabuhan Indonesia (Persero) Parepare, as evidenced by a t-value of 0.166, which is less than the t-table value of 2.023, or a significance value of 0.839, which is greater than 0.05. Conversely, the variable of work discipline (X2) has a significant impact on employee productivity at PT. Pelabuhan Indonesia (Persero) Parepare. This is demonstrated by a t-value of 7.225, which exceeds the t-table value of 2.023, or a significance value of 0.000, which is less than 0.05. Additionally, when considering both independent variables—Occupational Health and Safety (OHS) and work discipline—together (simultaneously), they significantly influence employee productivity. This is indicated by an F-value of 96.148, which is higher than the F-table value of 3.238, or a significance value of 0.000, which is less than 0.05. Thus, it can be inferred that higher levels of both Occupational Health and Safety (OHS) and work discipline contribute to increased employee productivity.

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