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THE EFFECT OF DISCIPLINE, TRAINING AND PREVENTIVE MAINTENANCE ON EMPLOYEE PRODUCTIVITY AT PT. BINTANG TERANG LESTARI ABADI

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Abstract

This study was motivated by the importance of improving employee productivity at PT. Bintang Terang Lestari Abadi. The purpose of this study was to analyze the effects of discipline, training, and preventive maintenance on employee productivity. This study employed a quantitative approach using a survey method through questionnaires distributed to 50 employees. The data were analyzed using multiple linear regression. The results showed that, partially, discipline did not have a significant effect on employee productivity. Meanwhile, training and preventive maintenance had positive and significant effects on employee productivity. The results also showed that discipline, training, and preventive maintenance simultaneously had a positive and significant effect on employee productivity. Based on the research findings, discipline, training, and preventive maintenance contributed 67.2% to employee productivity, while the remaining 32.8% was explained by other factors outside the research model. Therefore, effective management of discipline, improvement of training, and implementation of preventive maintenance collectively play an important role in supporting the improvement of employee productivity at PT. Bintang Terang Lestari Abadi.

Keywords: Discipline, Training, Preventive Maintenance, Employee Productivity

INTRODUCTION

Human resources (HR) constitute the primary factor determining an organization's success in achieving its established goals. HR is viewed not merely as a workforce but as a strategic asset possessing capabilities, skills, knowledge, and potential that can be continuously developed. According to Hasibuan (2020), human resources represent the integrated capacity of an individual's mental and physical faculties, with behavior influenced by both their environment and their needs. Consequently, effective HR management is crucial for enhancing organizational performance, particularly amidst global competition and rapid technological advancement. Companies are required to optimize the quality of their human resources to ensure they can adapt and compete effectively. PT Bintang Terang Lestari Abadi operates in the agro-industry sector, specifically in processing agricultural produce—converting harvested paddy into ready-to-consume rice. Established in 2000 and based in North Sumatra, the company focuses on the entire processing chain, including paddy milling, grain drying, sorting, and the packaging of high-quality rice. In its operations, the company utilizes modern machinery—such as Rice Milling Units (RMU), dryers, and sorting machines—to ensure the produced rice meets market standards. Its products are marketed across various regions, catering to both household needs and wholesale distribution.

The company's productivity data reveals year-to-year fluctuations in production output. Between 2023 and 2025, productivity levels consistently fell short of established targets. However, 2025 saw a more significant decline in performance, characterized by a drastic failure to meet targets during parts of the year. This phenomenon indicates a serious drop in organizational productivity. According to Robbins and Judge (2021), productivity declines can be influenced by work behavior factors, including discipline and employee engagement. Furthermore, suboptimal preventive maintenance can also negatively impact team working conditions and operational efficiency (Podsakoff et al., 2021). Consequently, the company's empirical data highlights a discrepancy between training efforts and actual productivity outcomes. This underscores the urgent need for a more in-depth examination of the relationships

between discipline, training, preventive maintenance, and employee productivity. At PT Bintang Terang Lestari Abadi, issues regarding employee productivity remain a primary concern for management. Preliminary observations revealed high rates of lateness and absenteeism. Furthermore, training has not been implemented optimally or equitably across the workforce, and preventive maintenance practices have not been fully maximized. These conditions have resulted in the company consistently failing to meet its production targets. This phenomenon highlights a gap between the ideal state and the reality on the ground. Consequently, research is needed to identify the factors influencing productivity in greater depth, serving as a foundation for the company's policy-making.

At PT Bintang Terang Lestari Abadi, work discipline has not yet been fully achieved, as many employees still fail to comply with all company regulations. This issue was highlighted directly by the field manager and the head of production at the company. Overall, discipline levels indicate a concerning situation, particularly in 2025. Attendance-related violations have fluctuated; starting in 2023, there were 812 recorded cases, with employee tardiness being the most frequent issue. While the total dropped to 701 cases in 2024—a year characterized primarily by unauthorized absences—cases surged to 1,116 in 2025, marking the highest figure in the last three years. Tardiness was the most prevalent issue in 2025; the number of late arrivals rose from 190 in 2024 to 462—an increase of 143%. Meanwhile, unauthorized absences rose from 233 in 2024 to 332 in 2025, representing a 43% increase. These figures highlight a serious decline in discipline at the beginning of 2025, making this study highly relevant in the current context. To boost employee productivity, companies must consider various influencing factors, one of which is training. Training is a systematic process designed to enhance employees' knowledge, skills, and abilities, enabling them to perform their jobs effectively. According to Noe (2021), training is a planned effort by an organization to facilitate employee learning regarding the competencies required for their roles. Effective training helps employees improve their performance, reduce work-related errors, and increase operational efficiency.

Based on employee training data for 2023-2025, it can be seen that the company consistently organizes training programs every year. However, employee participation in training is still limited to certain positions. Employees in subordinate positions do not have the same opportunity to participate in training. This shows that training is not given to all employees, but only to certain groups according to their position or duties. The main problem that arises from this condition is inequality in access to training where not all employees get the same opportunity to take part in training. Then employees outside certain positions (for example non-operators or non-foremen) tend not to receive formal skills improvement. This causes uneven competency development because training only focuses on some employees, so work ability improvement is also uneven. This can cause a skills gap between employees. Then it can also have an impact on the productivity of employees who do not receive training, potentially having lower productivity than those who have been trained. In fact, ideally increasing productivity occurs throughout the organization. Then there is some training that is still not carried out in certain months, for example machine maintenance training, where machine maintenance is an important effort to support smooth productivity. This is an important issue because it can affect the distribution of competencies, the effectiveness of team work, and overall employee productivity.

Based on preliminary observations conducted by the researcher at PT. Bintang Terang Lestari Abadi, the implementation of preventive maintenance is not yet optimal. Machine maintenance is generally performed only when a machine begins to malfunction or after a specific component fails, resulting in downtime that disrupts the production process. Data regarding preventive maintenance were collected through a pre-survey and interviews. These findings indicate a need to enhance preventive maintenance activities—specifically periodic inspections, early repairs, component replacements, cleaning, and machine adjustments—to ensure production machinery remains in optimal condition. Such conditions are believed to influence the smooth operation of the production process and, ultimately, impact the productivity of PT. Bintang Terang Lestari Abadi's employees. Based on the background outlined above, the problem indicators in this study can be described as follows:

1. Employee productivity is not yet optimal; internal company data indicates a continuous decline in productivity levels over the past three years (2023–2025).
2. Employee discipline is low; company discipline records show that employees are not yet fully complying with all company regulations.
3. Although training is conducted regularly, it has not been implemented optimally; an analysis of training data reveals that the training does not reach all employees comprehensively.
4. Preventive maintenance within the company has not been carried out optimally and does not align with established preventive maintenance indicators.

Referring to the background of the problem, research formulation, and objectives, the researcher can state the following hypotheses:

H1 : Discipline has a positive and significant partial effect on the employee productivity of PT. Bintang Terang Lestari Abadi.

H2 : Training has a positive and significant partial effect on the employee productivity of PT. Bintang Terang Lestari Abadi.

H3 : Preventive maintenance has a positive and significant partial effect on the employee productivity of PT. Bintang Terang Lestari Abadi.

H4 : Discipline, training, and preventive maintenance have a positive and significant simultaneous effect on the employee productivity of PT. Bintang Terang Lestari Abadi.

METHOD

This study employed an associative approach, which aims to identify the relationship or connection between one variable and another (Sugiyono, 2021). The method employed was quantitative. The data used in this study included both primary and secondary data. This research was conducted at PT. Bintang Terang Lestari Abadi, located in the Medan II Industrial Estate (Kawasan Industri Medan II), Sampali, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra 20241. The study was scheduled to take place from March 2026 to July 2026. The population for this study consisted of all permanent employees at PT. Bintang Terang Lestari Abadi, totaling 50 individuals. A saturated sampling technique—which involves utilizing the entire population—was employed for sample selection; this method was chosen due to the relatively small size of the population. Consequently, the sample consisted of 50 respondents. The analysis tool used is SPSS version 25.

RESULTS AND DISCUSSION

Results

Validity and Reliability Test Results

Table 1. Results of the Validity Test of Discipline, Training, Preventive Maintenance, Employee Productivity

Statement Item	r-count	r-table	Description
D1	0,471	0,361	Valid
D2	0,377	0,361	Valid
D3	0,648	0,361	Valid
D4	0,622	0,361	Valid
D5	0,714	0,361	Valid
D6	0,628	0,361	Valid
D7	0,553	0,361	Valid
D8	0,389	0,361	Valid
D9	0,542	0,361	Valid
D10	0,498	0,361	Valid
D11	0,681	0,361	Valid
D12	0,621	0,361	Valid
D13	0,825	0,361	Valid
D14	0,727	0,361	Valid
D15	0,390	0,361	Valid
D16	0,444	0,361	Valid
D17	0,661	0,361	Valid
D18	0,734	0,361	Valid
D19	0,824	0,361	Valid
D20	0,854	0,361	Valid
D21	0,670	0,361	Valid
T1	0,590	0,361	Valid
T2	0,482	0,361	Valid
T3	0,751	0,361	Valid
T4	0,650	0,361	Valid
T5	0,386	0,361	Valid

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Statement Item	r-count	r-table	Description
T6	0,870	0,361	Valid
T7	0,668	0,361	Valid
T8	0,650	0,361	Valid
T9	0,628	0,361	Valid
T10	0,776	0,361	Valid
T11	0,650	0,361	Valid
T12	0,469	0,361	Valid
T13	0,779	0,361	Valid
T14	0,648	0,361	Valid
T15	0,786	0,361	Valid
T16	0,786	0,361	Valid
T17	0,549	0,361	Valid
T18	0,701	0,361	Valid
T19	0,580	0,361	Valid
T20	0,652	0,361	Valid
T21	0,678	0,361	Valid
T22	0,400	0,361	Valid
T23	0,656	0,361	Valid
T24	0,766	0,361	Valid
PM1	0,707	0,361	Valid
PM2	0,486	0,361	Valid
PM3	0,525	0,361	Valid
PM4	0,497	0,361	Valid
PM5	0,489	0,361	Valid
PM6	0,707	0,361	Valid
PM7	0,645	0,361	Valid
PM8	0,777	0,361	Valid
PM9	0,750	0,361	Valid
PM10	0,548	0,361	Valid
PM11	0,391	0,361	Valid
PM12	0,379	0,361	Valid
PM13	0,828	0,361	Valid
PM14	0,548	0,361	Valid
PM15	0,435	0,361	Valid
PM16	0,620	0,361	Valid
PM17	0,462	0,361	Valid
PM18	0,445	0,361	Valid
EP1	0,600	0,361	Valid
EP2	0,481	0,361	Valid
EP3	0,608	0,361	Valid
EP4	0,493	0,361	Valid
EP5	0,729	0,361	Valid
EP6	0,600	0,361	Valid
EP7	0,513	0,361	Valid
EP8	0,734	0,361	Valid
EP9	0,629	0,361	Valid
EP10	0,703	0,361	Valid
EP11	0,745	0,361	Valid
EP12	0,618	0,361	Valid
EP13	0,726	0,361	Valid
EP14	0,745	0,361	Valid
EP15	0,618	0,361	Valid
EP16	0,585	0,361	Valid
EP17	0,432	0,361	Valid
EP18	0,469	0,361	Valid
EP19	0,481	0,361	Valid

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Statement Item	r-count	r-table	Description
EP20	0,605	0,361	Valid
EP21	0,734	0,361	Valid

Source: SPSS version 25 (2026)

Referring to Table 1, it is known that the corrected item total correlation value is > 0.361, so all statement items are stated to be valid/legitimate.

Table 2. Results of the Reliability Test of Discipline, Training, Preventive Maintenance, Employee Productivity

Variable	*Cronbach Alpha*	Description
Discipline	0,752	Reliable
Training	0,755	Reliable
Preventive Maintenance	0,747	Reliable
Employee Productivity	0,752	Reliable

Source: SPSS version 25 (2026)

Referring to Table 2, it is known that the Cronbach's alpha value for all variables is > 0.60, so all variables items are stated to be reliable.

Normality Test Results

Table 3. Kolmogorov-Smirnov Test Results

		Unstandardized Residual
N		50
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	6.19221110
Most Extreme Differences	Absolute	.119
	Positive	.119
	Negative	-.071
Test Statistic		.119
Asymp. Sig. (2-tailed)		.074[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Source: SPSS version 25 (2026)

Referring to Table 3. above, it is known that the results of the Kolmogorov-Smirnov test have a significance value of 0.074 > 0.05 so it can be concluded that the data tested is normally distributed.

Multicollinearity Test Results (Tolerance and VIF)

Table 4. Multicollinearity Test Results

Coefficients[a]							
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	**Tolerance**	**VIF**
1 (Constant)	6.266	3.928		1.595	.117		
Discipline	.164	.177	.161	.926	.359	.235	4.253
Training	.302	.144	.338	2.091	.042	.274	3.654
Preventive Maintenance	.470	.210	.372	2.240	.030	.258	3.869

a. Dependent Variable: Employee Productivity

Source: SPSS version 25 (2026)

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Referring to Table 4, it is known that the results of the multicollinearity test for the variables discipline, training and preventive maintenance have a tolerance value > 0.10 and VIF < 10, so this study is declared free from multicollinearity problems.

Heteroscedasticity Test Results (Glejser)

Table 5. Glejser Heteroscedasticity Test Results

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	**t**	**Sig.**
1	(Constant)	3.365	2.277		1.478	.146
	Discipline	-.110	.102	-.319	-1.074	.289
	Training	.101	.084	.331	1.202	.235
	Preventive Maintenance	.039	.122	.091	.320	.750
a. Dependent Variable: Abs_res						

Source: SPSS version 25 (2026)

Referring to Table 5. above, the results of the Glejser test above, the significance value of the three independent variables is discipline, training and preventive maintenance > 0.05, so it can be concluded that there is no heteroscedasticity.

Multiple Linear Regression Test Results

Table 6. Multiple Linear Regression Test Results

		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	t	Sig.
1	(Constant)	6.266	3.928		1.595	.117
	Discipline	.164	.177	.161	.926	.359
	Training	.302	.144	.338	2.091	.042
	Preventive Maintenance	.470	.210	.372	2.240	.030

Source: SPSS version 25 (2026)

Referring to Table 6, the regression equation for the above values is:

Y = 6,266 + 0,164 (X1) + 0,302 (X2) + 0,470 (X3) + e

1. The regression equation shows a constant value of 6.266, meaning that if discipline, training, and preventive maintenance are assumed to be zero, the predicted value for employee productivity is 6.266.
2. The regression equation for discipline (X1) shows a regression coefficient of 0.164. A positive coefficient indicates that discipline has a positive influence on employee productivity. This means that for every one-unit increase in the discipline score, the employee productivity score increases by 0.164 units, assuming training and preventive maintenance remain constant.
3. The regression equation for training (X2) shows a regression coefficient of 0.302. A positive coefficient indicates that training has a positive influence on employee productivity. This means that for every one-unit increase in the training score, the employee productivity score increases by 0.302 units, assuming discipline and preventive maintenance remain constant.
4. The regression equation for preventive maintenance (X3) shows a regression coefficient of 0.470. A positive coefficient indicates that preventive maintenance has a positive influence on employee productivity. This means that for every one-unit increase in the preventive maintenance score, the employee productivity score increases by 0.470 units, assuming discipline and training remain constant.

Hypothesis Testing
Partial Test Results (t-Test)

Table 7. Partial Test Results (t-Test)

Coefficients[a]								
	Unstandardized Coefficients		Standardized Coefficients			Correlations		
Model	B	Std. Error	Beta	**t**	**Sig.**	Zero-order	Partial	Part
1 (Constant)	6.266	3.928		1.595	.117			
Discipline	.164	.177	.161	.926	.359	.751	.135	.078
Training	.302	.144	.338	2.091	.042	.771	.295	.177
Preventive Maintenance	.470	.210	.372	2.240	.030	.779	.314	.189

a. Dependent Variable: Employee Productivity

Source: SPSS version 25 (2026)

Referring to Table 7, it is known that the independent variables influence each other on the dependent variable.

1. For the discipline variable (X1), the calculated t-value is 0.926 (less than the t-table value of 2.013) and the significance value is 0.359 (greater than 0.05); the regression coefficient is 0.164, indicating a positive influence. Thus, H0 is accepted and H1 is rejected, meaning that discipline (X1) does not have a significant effect on employee productivity.
2. For the training variable (X2), the calculated t-value is 2.091 (greater than the t-table value of 2.013) and the significance value is 0.042 (less than 0.05); the regression coefficient is 0.302, indicating a positive influence. Thus, H0 is rejected and H2 is accepted, meaning that training (X2) has a significant effect on employee productivity.
3. For the preventive maintenance variable (X3), the calculated t-value is 2.240 (greater than the t-table value of 2.013) and the significance value is 0.030 (less than 0.05); the regression coefficient is 0.470, indicating a positive influence. Thus, H0 is rejected and H3 is accepted, meaning that preventive maintenance (X3) has a significant effect on employee productivity.

Simultaneous Test Results (F-Test)

Table 8. Simultaneous Test Results (F-Test)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	**F**	**Sig.**
1	Regression	3843.670	3	1281.223	31.369	.000[b]
	Residual	1878.830	46	40.844		
	Total	5722.500	49			

a. Dependent Variable: Employee Productivity
b. Predictors: (Constant), Discipline, training and preventive maintenance

Source: SPSS version 25 (2026)

Referring to Table 8. it is known that the calculated F-value of 31.369 exceeds the F-table value of 2.81, with a significance level of 0.000 (which is less than 0.05). Since the significance value is below 0.05, this indicates that Discipline (X1), Training (X2), and Preventive Maintenance (X3) simultaneously exert a positive and significant influence on the employee productivity of PT. Bintang Terang Lestari Abadi. This suggests that the regression model employed is suitable for explaining the relationship between the independent and dependent variables.

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Determination Test Results

Table 9. Determination Test Results

Model Summary				
Model	R	R Square	**Adjusted R Square**	Std. Error of the Estimate
1	.820[a]	.672	.650	6.39094

a. Predictors: (Constant), Discipline, training and preventive maintenance

Source: SPSS version 25 (2026)

Referring to Table 9, The Adjusted R-squared value of 0.650 indicates that, after adjusting for the number of independent variables and the sample size, the model's ability to explain the variation in employee productivity is 65.0%, while 35.0% is explained by factors other than the variables under study.

Discussion

The Effect of Discipline on Employee Productivity

Based on the multiple linear regression analysis, the discipline variable yielded a regression coefficient of 0.164, indicating a positive direction of influence. The partial test (t-test) results revealed that discipline does not have a significant effect on employee productivity. This is evidenced by the calculated t-value being less than the t-table value (0.926 < 2.013) and a significance value greater than 0.05 (0.359 > 0.05). Consequently, the null hypothesis (H0) is accepted, and the alternative hypothesis (H1) is rejected. The t-table value was determined based on a sample size of 50 respondents and the number of variables involved. These results indicate that the hypothesis stating discipline has a positive and significant effect on employee productivity lacks statistical support; thus, in this study, discipline does not exert a significant partial effect on the productivity of PT. Bintang Terang Lestari Abadi employees. The findings also demonstrate that the regression model satisfies the necessary analytical requirements. The residual data are normally distributed, as the normality test yielded a significance value of 0.074 (> 0.05). Furthermore, the discipline variable showed a tolerance value of 0.235 (> 0.10) and a VIF of 4.253 (< 10), indicating the absence of multicollinearity issues. The Glejser test yielded a significance value of 0.289 (> 0.05) for discipline, indicating no heteroscedasticity issues. Therefore, the lack of a significant effect of discipline is not attributable to violations of classical assumptions within the research model.

The findings of this study are supported by previous research conducted by Tanjung and Mardhiyah (2023)—titled "The Influence of Compensation, Work Discipline, and Motivation on Employee Productivity at Bank Syariah Indonesia, Kabanjahe Regency"—which found that work discipline, when analyzed individually (partially), did not have a significant effect on employee productivity, whereas the other variables did. That study explained that employees with high levels of discipline tend to be more organized and punctual, and are capable of completing tasks in accordance with company targets. Conversely, these results differ from the study by Listiana and Aslamiyah (2024)—titled "The Influence of Work Motivation, Work Discipline, and Work Environment on Employee Productivity at PT. Petrokopindo Cipta Selaras"—which concluded that work discipline significantly affects employee productivity. Furthermore, a study by Halim (2024)—titled "Analysis of the Influence of Training, Discipline, and Motivation on Employee Productivity at PT. Asia Adhitama Shipyard"—found that training and work discipline had a positive and significant effect on employee productivity, both individually and simultaneously. On the other hand, the results of this study align with the findings of Widani et al. (2024), who stated that work discipline did not have a significant effect when analyzed individually, although it did have an effect when tested simultaneously with other variables. Thus, this study contributes to addressing a research gap by demonstrating that the influence of discipline on productivity is not always significant. Discrepancies between these results and previous studies may stem from differences in company characteristics, job types, operational conditions, respondent composition, and other variables included in the research models.

The Effect of Training on Employee Productivity

Based on the regression analysis results, the training variable yielded a regression coefficient of 0.164. This positive coefficient indicates that training exerts a positive influence on employee productivity. The partial test (t-test) results reveal that training has a positive and significant effect on employee productivity; this is evidenced by a calculated t-value (t-count) of 2.091 exceeding the critical t-value (t-table) of 2.012, alongside a significance value of 0.042 (which is less than 0.05). Consequently, the null hypothesis (H0) is rejected and the alternative hypothesis (H2) is accepted, signifying that training (X2) significantly affects employee productivity. The t-table value was

determined based on a sample size of 50 respondents and three independent variables. These findings support the hypothesis that training has a positive and significant impact on employee productivity at PT. Bintang Terang Lestari Abadi. This conclusion demonstrates that training has a significant partial effect on productivity; the relationship observed is not merely a result of chance within the sample but is backed by sufficient statistical evidence to confirm an effect within the study population. Thus, the findings validate the research hypothesis that superior training provided by the company leads to higher employee productivity. These results align with a previous study by Suroto et al. (2023) titled "The Influence of Training and Work Discipline on Employee Productivity in the Liquid Management Division at PT. Paragon Technology, Tangerang Regency," which concluded that both training and work discipline have a positive and significant impact on employee productivity, whether analyzed individually (partially) or collectively (simultaneously).

The results of this study align with the research conducted by Halim (2024)—titled "The Influence of Training, Discipline, and Motivation on Employee Productivity at PT. Asia Adhitama Shipyard"—which found that training has a positive and significant impact on employee productivity. However, this study differs from previous research; specifically, it contrasts with the findings of Wildani et al. (2024), who reported that training did not have a significant effect on employee productivity. Thus, the significant impact observed in this study offers a different finding, reinforcing the existence of divergent results regarding the relationship between training and productivity. Discrepancies between these findings and those indicating no significant impact may stem from differences in organizational characteristics, job types, competency requirements, training content and methods, and the practical application of training outcomes in the workplace. Nevertheless, the company in this study still faces challenges regarding the equitable distribution of training; certain training programs are restricted to specific employee groups or job roles, meaning not all employees have equal opportunities to enhance their competencies. Variations in results may also be attributed to the transfer of training. Training only impacts productivity when the acquired knowledge and skills are genuinely applied to the job. Therefore, the success of training should not be measured solely by the number of participants, but also by changes in employee behavior and capabilities upon their return to the workplace.

The Effect of Preventive Maintenance on Employee Productivity

Based on the regression analysis results, preventive maintenance yielded a regression coefficient of 0.470, indicating a positive influence. This result was confirmed by a partial test showing that the calculated t-value exceeded the critical t-value (2.240 > 2.012) and the significance value was below 0.05 (0.030 < 0.05). Consequently, the null hypothesis (H0) was rejected, and the third hypothesis (H3) was accepted. Thus, preventive maintenance was proven to have a positive and significant partial effect on employee productivity. These results indicate that improved implementation of preventive maintenance leads to higher employee productivity. The findings provide empirical evidence that machine condition and readiness are crucial factors in enabling employees to meet production targets. This study aligns with previous research by Jibril et al. (2023), which demonstrated a positive and significant impact of preventive maintenance on workforce productivity. This consistency reinforces the evidence that preventive machine maintenance supports productivity by reducing operational disruptions and enhancing machine reliability. However, these findings differ from those of Kurniawan et al. (2021), who found no significant effect due to spare part limitations. Such discrepancies may stem from differences in company characteristics, machine conditions, spare part availability, technician resources, maintenance procedures, the frequency of machine breakdowns, and maintenance recording and monitoring systems. Although preventive maintenance was not yet implemented optimally in this study, the impact of machine breakdowns on productivity was clearly evident; when machines failed, production halted, forcing employees to work overtime to meet targets. This situation likely explains why preventive maintenance exerted a significant influence in this study.

The Simultaneous Effect of Discipline, Training and Preventive Maintenance on Employee Productivity

The research results indicate that discipline, training, and preventive maintenance simultaneously exert a positive and significant influence on employee productivity at PT. Bintang Terang Lestari Abadi. This is evidenced by the F-test results, which yielded an F-calculated value of 31.369 with a significance level of 0.000 ($p < 0.05$). Consequently, the hypothesis stating that discipline, training, and preventive maintenance collectively influence employee productivity is accepted. These findings demonstrate that employee productivity results from a combination of factors involving work behavior, employee capabilities, and the condition of production facilities. The results also align with several previous studies. Regarding the discipline variable, the findings support Wildani et al. (2024), showing that work discipline does not have a significant partial effect but can be influential when tested simultaneously with other variables. For the training variable, the results support Widigda et al. (2025), indicating

that training enhances competence and significantly impacts productivity. Meanwhile, regarding the preventive maintenance variable, the results are consistent with Jibril et al. (2023), who found that preventive maintenance has a positive and significant effect on labor productivity. Discrepancies between these results and previous studies may stem from differences in company characteristics, human resource conditions, training systems, levels of discipline implementation, machinery condition, spare part availability, and production process characteristics.

CONCLUSION

Based on the research findings, the author draws the following conclusions:

1. Based on the F-test results, the independent variables—comprising Discipline (X1), Training (X2), and Preventive Maintenance (X3)—simultaneously exert a positive and significant influence on the dependent variable, employee productivity (Y) (Case Study: Employees of PT. Bintang Terang Lestari Abadi).
2. Based on the t-test results, the Discipline variable (X1) does not have a significant partial effect on the dependent variable (Y), employee productivity (Case Study: Employees of PT. Bintang Terang Lestari Abadi).
3. Based on the t-test results, the Training variable (X2) has a positive and significant partial effect on the dependent variable (Y), employee productivity (Case Study: Employees of PT. Bintang Terang Lestari Abadi).
4. Based on the t-test results, the Preventive Maintenance variable (X3) has a positive and significant partial effect on the dependent variable (Y), employee productivity (Case Study: Employees of PT. Bintang Terang Lestari Abadi).

This study offers several recommendations for PT. Bintang Terang Lestari Abadi to consider, particularly regarding the enhancement of employee productivity.

1. Discipline (X1), It is recommended that PT. Bintang Terang Lestari Abadi strengthen supervision regarding punctuality, attendance, adherence to regulations, utilization of working hours, use of Personal Protective Equipment (PPE), and consistency in following Standard Operating Procedures (SOPs). Such supervision should be conducted consistently and accompanied by periodic evaluations.
2. Training (X2), Based on the findings of this study, it is recommended that PT. Bintang Terang Lestari Abadi map out training needs based on the specific positions, duties, and capabilities of each employee. The company is also advised to increase opportunities for employees to obtain competency certifications—particularly for roles requiring technical skills and workplace safety knowledge—to facilitate career advancement.
3. Preventive Maintenance (X3), The company is advised to enhance scheduled activities related to machine inspection, repair, component replacement, cleaning, lubrication, and adjustment. Maintenance activities should prioritize preventive measures rather than being performed only after a machine breakdown occurs. Based on the distribution of respondent answers regarding preventive maintenance, the company is expected to address machine repairs—even for minor issues—to prevent them from escalating into major breakdowns. The company should also perform machine adjustments whenever changes in performance are detected, ensuring the machinery remains ready for optimal operation. These measures aim to boost employee productivity at PT. Bintang Terang Lestari Abadi, as implementing preventive maintenance aligned with key indicators ensures that production activities run effectively and efficiently.
4. Employee Productivity (Y), It is recommended that the company avoid attempting to increase productivity solely by demanding that employees work faster or increase their working hours. Instead, productivity should be enhanced through comprehensive improvements to the work system. The company needs to integrate improvements in discipline, training, and preventive maintenance. Employees must demonstrate good work behavior, possess the appropriate competencies, and have access to machinery that is ready for use.

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