

Analysis of Stress and Work Motivation on Employee Performance With Work Environment as a Mediation Variable at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan

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Abstract

This study aims to test and analyze the effect of work stress on employee performance. Testing and analyzing work motivation for employee performance. Testing and analyzing the influence of the work environment on employee performance. To test and analyze the influence of work stress and work motivation on employee performance mediated by the work environment. This research is a quantitative research with an explanatory approach. The population in this study amounted to 45 people who were directly used as saturated samples. The sample in this study is 45 samples which are saturated samples. The results of the study are that work stress has a positive and significant effect on the environment of PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan. Work motivation has a positive and significant effect on the performance of employees at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan. The work environment has a positive and significant effect on the performance of employees at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan. Work stress has a positive and significant effect on the performance of employees at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan. Work motivation has a positive and significant effect on the performance of employees at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan. The work environment has a positive and significant effect on the performance of employees at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan. Work stress and work motivation have a positive and significant effect on the Work Environment of employees at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan

Keywords: Work Stress, Work Motivation, Work Environment, Employee Performance, Generation Maintenance

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Introduction

Employee performance is a strategic component in ensuring operational effectiveness and organizational sustainability, especially in the energy sector such as PT PLN Nusantara Power. One of the important units in this company structure is the UPHK (Power Generation Maintenance Unit), which has the main responsibility for the repair, overhaul, and maintenance of the power plant unit as a whole. The success of UPHK depends heavily on the integration of work between various functional positions, such as electricians, mechanics, and control-instruments, as well as the coordinating roles of Project Manager (PM), Quality Control (QC), and Project Controller (PA). In a technical work environment like this, operational performance is not only determined by the sophistication of the equipment, but also by the reliability of human resources in completing work on time and with quality according to standards. Gracia et al. (2020) emphasized that in the high-risk energy sector, employee performance is greatly influenced by work pressure, leadership, and work environment conditions. Therefore, an in-depth understanding of the factors that affect human resource performance is a very urgent need.

The problem that arises in the field is the non-achievement of the performance targets of technicians and project teams, both in terms of the timeliness of work completion (on time) and the results of the Customer Satisfaction Survey (SKP) after the implementation of overhaul work or technical inspection. Based on the company's standards, the on-time realization target is set at 100%, while the minimum expected SKP value is 85%. However, realization data in 2024 shows that some units have not reached this target. For example, PLTU 2 Bukit Asam only recorded 78.87% of on-time realization and 76.95% of SKP scores. Sementara itu, PLTG GT 1.1 Belawan recorded 101.82% on time (exceeding the target), but the SKP value was only 75.34%, which shows a discrepancy between the speed of implementation and the level of customer satisfaction. The following is the performance data of the overhaul work of several generating units:

Table 1. UPHK Overhaul Performance Realization Data in 2024

No	Generating Units	Jenis Inspection	Realisasi on time	Realization of SKP
1	PLTU 2 BUKIT ASAM	SE	78.87%	76.95%
2	PLTG GT 1.1 BELAWAN	MI	101.82%	75.34%
3	PLTG GT 2.1 BELAWAN	MI	123.53%	82.79%
4	PLTMG 3 DURI	54K	100.84%	89.00%
5	PLTMG 2 DURI	48K	98.82%	91.00%
6	PLTG GT 2.2 BELAWAN	MI	101.24%	84.00%
7	PLTD PULO PISANG UNIT 4	SO	102.86%	91.50%
8	PLTU 1 NAGAN RAYA	SI	103.19%	88.44%
9	PLTMG 7 DURI	54K	113.33%	87.50%

Source : PLN Medan City

The data shows an imbalance between the timeliness of project completion and the quality of customer perception of the work results, which indicates the presence of non-technical variables that affect employee performance. This problem is very likely to be influenced by high levels of work stress, low work motivation, and a work environment that is not optimal, both from the physical, social, and managerial sides. Wahyadyatmika et al. (2023) suggest that work pressure that is not balanced with a supportive work environment

can reduce technician performance, even though technical work can be completed on time. Therefore, it is important to scientifically test the relationship between psychological, motivational, and work environment aspects to the work outcomes of technical employees at UPHK.

Poorly managed work stress can have an impact on decreased concentration, work effectiveness, and project team coordination. On the other hand, high work motivation can be the main driver to improve individual and team performance. However, the positive effects of motivation and the negative effects of stress are strongly influenced by the work environment including communication factors, work facilities, safety, and managerial support. Pranoto and Mesra (2024) show that work motivation has a significant impact on performance, especially if mediated by factors such as job satisfaction or a conducive work atmosphere. Abeje and Luo (2023) also emphasized that a positive organizational climate plays a major role in shaping employee engagement and performance, especially in jobs that involve safety and high-precision aspects such as plant maintenance.

Although many studies have examined the relationship between work stress, motivation, and performance separately, it is still very rare to examine these three variables simultaneously with a work environment mediation approach, especially in the context of the electrical industry and plant maintenance projects. The research of Wahyadyatmika et al. (2023) only reviewed toll road construction projects, while Pranoto and Mesra (2024) researched the public service sector. Therefore, this research was conducted at PT PLN Nusantara Power–UPHK Medan, with the aim of filling the gap and providing kontribusi scientific and practical in managing technical human resources operating in a high-risk, tight time pressure, and high-quality standards that must be met by the team of technicians, PMs, QCs, and PAs.

Literature Review

2.1 Work Stress

Work stress is a condition of emotional and physiological tension that arises due to a mismatch between job demands and an individual's capacity to deal with them. In technical work environments such as power plant maintenance, work stress is often triggered by high workloads, punctuality demands, and the complexity of coordination between teams. Erawati, Sitiari, and Indiani (2019) stated that work stress has a negative impact on performance if it is not balanced with psychologically supportive working conditions. This is reinforced by the findings of Rasool et al. (2020), who emphasize that chronic work stress in the workplace can lower sustainable performance, especially in industries with high operational pressures.

In the context of the Power Generation Maintenance Unit (UPHK), work stress can arise in electricians, mechanics, and control-instruments, especially when managing overhaul work that is urgent and has a direct impact on national electricity availability. The study of Khairuddin, Saidun, and Hashim (2019) shows that work stress can also be influenced by motivational factors, such as dissatisfaction with rewards or lack of recognition, which ultimately affects overall work performance. Therefore, work stress not only has a direct impact on performance, but can also affect perceptions of the work environment and decrease the effectiveness of project coordination.

2.2 Work Motivation

Work motivation is an internal and external drive that encourages individuals to act optimally in achieving organizational goals. In a technical project environment such as UPHK Medan, motivation plays an important role in determining the level of involvement of technicians and project controllers (PAs). Pranoto and Mesra (2024) explained that high work motivation is positively correlated with improved performance, especially if supported by a communicative and fair work environment. Intrinsic motivations, such as satisfaction with

achievement and self-development, are essential for professional technicians, while extrinsic motivations such as compensation and job stability also have a significant influence.

Erawati et al. (2019) in their study on the hospitality sector in Bali showed that work motivation plays a mediator in the relationship between work stress and performance, indicating that motivation is able to weaken the negative impact of stress. Meanwhile, Fajrin and Mesra (2024) emphasized the importance of managerial programs that are oriented towards increasing motivation as a strategy to improve performance in various sectors, including technical work. Thus, motivation not only has a direct impact on the results of work, but also interacts closely with the psychological conditions and environment of the organization.

2.3 Work Environment

The work environment is the overall physical, social, and psychological condition that affects employees in carrying out their duties. In the context of UPHK Medan, the work environment includes aspects of technical facilities, work safety, communication climate, and support from project leaders (PM). A supportive work environment can be a decisive factor in maintaining the psychological stability of technicians and ensuring the success of maintenance projects. Jamhuri, Ferine, and Mesra (2024) show that a healthy work environment not only increases motivation, but is also able to mediate the relationship between discipline and employee performance.

In another study, López-Cabarcos et al. (2022) emphasized the importance of leadership behavior and work climate in shaping team performance, especially in high- pressure work environments. The Ikhsan and Mesra study (2024) also emphasized that optimizing the work environment, both in terms of facilities and relationships between employees, can increase the effectiveness of technical teams. Therefore, the work environment is not just a passive context, but an active element that can strengthen or weaken the influence of stress and motivation on work performance.

2.4 Employee Performance

Employee performance reflects the extent to which an individual or team achieves the work targets that have been set by the organization. At UPHK Medan, performance indicators not only include the timeliness of overhaul completion but also the quality of work reflected through the Customer Satisfaction Survey (SKP). According to Maulita and Mesra (2024), employee performance is greatly influenced by job satisfaction and organizational support, especially in jobs that have strict time and quality standards.

Batubara and Mesra (2023) in their research on BPJS Employment shows that a good work environment is able to improve team performance through an indirect influence on motivation. Meanwhile, López-Cabarcos et al. (2022) underline that the quality of employee performance is closely related to the perception of working conditions and leadership behavior. In the context of maintenance project technicians, the roles of QC (quality control), PA, and PM also help to form a conducive work environment for the achievement of optimal performance. So, employee performance is the final outcome that is directly or indirectly influenced by work stress, motivation, and the work environment that interact with each other in the organizational structure

2.5 Research Conceptual Framework

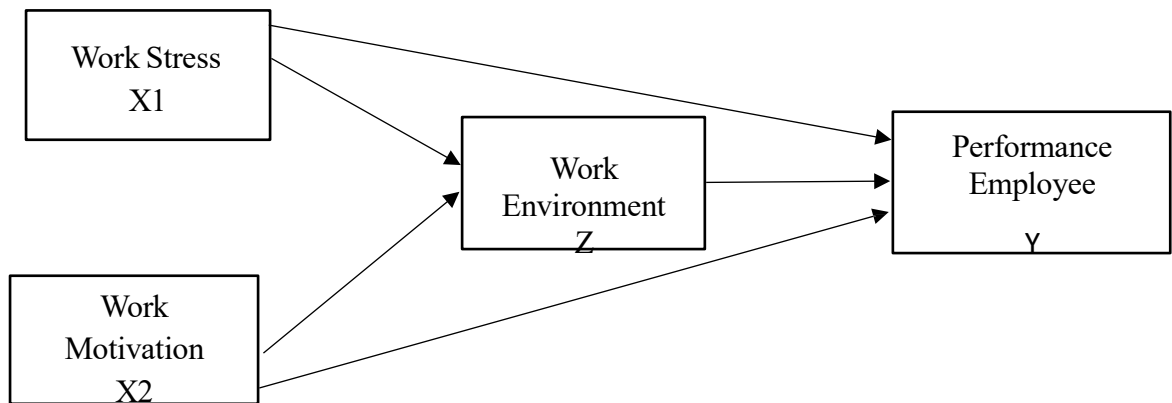


Figure 1. Research Conceptual Framework

2.6 Research Hypothesis

Based on the description of the conceptual framework of the research, the hypotheses proposed in this study are as follows:

- H1 : Work stress has a positive and significant effect on the Work Environment at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan
- H2 : Work motivation has a positive and significant effect on the Work Environment at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan
- H3 : The Work Environment has a positive and significant effect on Employee Performance at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan
- H4 : Work stress has a positive and significant effect on Employee Performance at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan
- H5 : Work motivation has a positive and significant effect on Employee Performance at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan
- H6 : Work stress has a positive and significant effect on Employee Performance at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan through Employee Performance
- H7 : Work motivation has a positive and significant effect on the Work Environment at PT PLN Nusantara Power Generation Maintenance Unit (UPHK) Medan through Employee Performance

Methods

This research is a quantitative research with an explanatory approach. This approach was used because the main purpose of the study was to explain the causal relationship between variables, namely the influence of work stress (X1) and work motivation (X2) on employee performance (Y), with the work environment (Z) as the mediating variable.

3.1 Location and Research Object

This research was carried out at PT PLN Nusantara Power – Power Generation Maintenance Implementation Unit (UPHK) Medan, especially in the Maintenance, Repair, and

Overhaul (MRO) work area which is an integral part of the UPHK structure. This unit has the main responsibility for the implementation of periodic maintenance, repair, and overhaul projects of power generation units in the Medan working area and its surroundings.

The object of this study is all employees who are directly involved in technical and operational activities on the plant maintenance project, including:

1. Technicians (electrical, mechanical, and control-instrument fields),
2. Project Controller (PA),
3. Quality Control (QC),
4. Field supervisors, as well as
5. Project Manager (PM).

All research subjects are part of the overhaul project implementer which has a strategic role in the variables studied, namely work stress, work motivation, work environment, and employee performance in the context of technical operations and projects in the plant environment.

3.2 Population and Sample

The population in this study is all employees who work within PT PLN Nusantara Power – Medan Generation Maintenance Implementation Unit (UPHK), especially in the Maintenance, Repair, and Overhaul Unit (UMRO) work area which is part of the UPHK structure. The total population is 45 people.

3.3 Data Collection Techniques

The data collection technique in this study was carried out using a closed questionnaire in the form of a questionnaire which was compiled based on indicators from each research variable, namely work stress, work motivation, work environment, and employee performance. Each statement in the questionnaire is designed based on theoretical indicators that have been adapted from previous relevant scientific journals, and adjusted to the context of the maintenance and overhaul project of power plant units within PT PLN Nusantara Power – UPHK Medan.

The questionnaire was distributed online using the Google Form platform, to improve time efficiency, filling flexibility, and speed up the data recapitulation process. The online model was chosen because all respondents were in a work unit that could be reached internally and had access to electronic devices.

Result and Discussion

Result

4.1 Outer Model

In the *Partial Least Squares–Structural Equation Modeling* (PLS-SEM) approach, testing the measurement model or outer model is an important initial stage to evaluate the accuracy of the theoretical construct in reflecting the latent variables used in the model. The main purpose of this test is to ensure that each indicator used is truly representative of the construct in question and has adequate measurement quality before analyzing the relationship between constructs in the structural model (inner model). Here is an output image of the Outer Model.

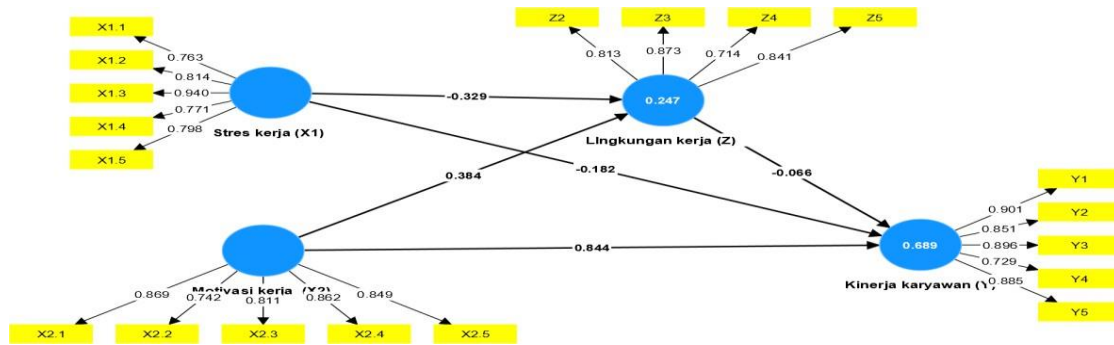


Figure 2. Output Outer Model

Outer loading testing is carried out to assess the contribution of each indicator to the construct it represents. Based on the results of the second phase of testing, the Z1 indicator on the Work Environment (Z) variable has been discarded because it has a loading value of 0.684, below the minimum threshold of 0.7 as recommended by Ghazali (2016). This deletion is done to improve the validity of the model.

Table 2. Outer Loading Test Results

	Employee performance (Y)	Work environment (Z)	Work motivation (X2)	Work stress (X1)
X1.1				0,763
X1.2				0,814
X1.3				0,940
X1.4				0,771
X1.5				0,798
X2.1			0,869	
X2.2			0,742	
X2.3			0,811	
X2.4			0,862	
X2.5			0,849	
Y1	0,901			
Y2	0,851			
Y3	0,896			
Y4	0,729			
Y5	0,885			
Z2		0,813		
Z3		0,873		
Z4		0,714		
Z5		0,841		

Source: SEM PLS 4. (2025)

The results of the outer loading of the previous table show that all indicators used in the second stage have qualified for a strong contribution to their respective constructs, with values above 0.7. In the Work Stress variable (X1), the X1.1 to X1.5 indicator showed good consistency (0.763–0.940), while the Work Motivation indicator (X2) was in the range of 0.742–0.869. Employee performance (Y) is strongly reflected through indicators Y1 to Y5 (0.729–0.901). As for the Work Environment (Z) variable, the Z1 indicator was excluded

because it had a loading value below 0.7 (0.684), according to the recommendation of Hair et al., (2021) and the Z2 to Z5 indicator showed valid results after retesting (0.714–0.873). Overall, the measurement model has met the eligibility criteria and can proceed to the evaluation stage of convergent validity, discriminatory, and construct reliability.

1. Construct Test of Validity and Reality

The test has three parts: (1) Average Variance Extracted (AVE), (2) cross loading and Fornell-Larcker Criterion and (3) Composite Reliability (CR) and Cronbach's Alpha. Barikit described the results of this test.

2. Average Variance Extracted (AVE)

Convergent validity testing is performed to ensure that all indicators in a construct have a high correlation with each other. This validity is evaluated through the Average Variance Extracted (AVE) value, where the recommended AVE value is ≥ 0.50 . The value shows that the construct can explain more than 50% of the variance of each of the indicators attributed to it.

Table 3. AVE Test

	Average variance extracted (AVE)
Employee performance (Y)	0,731
Work environment (Z)	0,660
Work motivation (X2)	0,685
Work stress (X1)	0,672

Source: SEM PLS 4. (2025)

Based on the results of Table 3, all constructs in the model have qualified for convergent validity, with an AVE value above 0.50. The highest AVE value was found in the construct of Employee Performance (Y) of 0.731, followed by Work Motivation (X2) of 0.685, Work Stress (X1) of 0.672, and Work Environment (Z) of 0.660. This shows that each construct is able to explain more than 50% of the variance of its indicators, so it can be declared to have good convergent validity and is feasible to proceed to the next analysis

3. Cross Loading & Fornell-Larcker Criterion

In addition, discriminant validity is necessary to ensure that different constructs actually measure different concepts. Two commonly used approaches are cross loading analysis and the Fornell-Larcker Criterion. In cross loading analysis, the indicator of a construct must have a higher loading value terhadap konstruksya dibandingkan dengan other constructs. Meanwhile, the Fornell-Larcker Criterion approach requires that the square root value of each construct is greater than the correlation between constructs, as evidence that the construct does indeed stand uniquely in the model. Here are the results.

Table 4. Cross Loading Test

	Employee performance (Y)	Work environment (Z)	Work motivation (X2)	Work stress (X1)
X1.1	-0,141	-0,230	-0,085	0,763
X1.2	-0,081	-0,303	0,025	0,814
X1.3	-0,199	-0,278	-0,012	0,940
X1.4	0,092	-0,329	0,226	0,771

	Employee performance (Y)	Work environment (Z)	Work motivation (X2)	Work stress (X1)
X1.5	-0,246	-0,073	-0,006	0,798
X2.1	0,855	0,327	0,869	0,040
X2.2	0,643	0,109	0,742	0,029
X2.3	0,569	0,601	0,811	-0,034
X2.4	0,608	0,288	0,862	0,026
X2.5	0,643	0,155	0,849	0,100
Y1	0,901	0,294	0,693	-0,227
Y2	0,851	0,290	0,616	-0,168
Y3	0,896	0,275	0,800	-0,066
Y4	0,729	0,277	0,557	-0,159
Y5	0,885	0,184	0,771	0,033
Z2	0,201	0,813	0,374	-0,147
Z3	0,301	0,873	0,301	-0,350
Z4	0,030	0,714	-0,016	-0,236
Z5	0,307	0,841	0,352	-0,273

Source: SEM PLS 4. (2025)

The results of the *cross loading* test in the previous table showed that each indicator had the highest loading value in the construct it represented, qualifying for discriminant validity. The X1.1–X1.5 indicator is most strongly correlated with the Work Stress variable (X1), the X2.1–X2.5 indicator shows the highest correlation in Work Motivation (X2), Y1–Y5 is predominantly correlated with Employee Performance (Y), and Z2–Z5 has the highest load in the Work Environment (Z). There is no indicator that has a higher load on other constructs, so it can be concluded that the discriminant validity has been adequately met based on the *results of cross loading*.

Table 5. Uji Fornell-Larcker Criterion

	Employee performance (Y)	Work environment (Z)	Motivasi kerja (X2)	Stres kerja (X1)
Employee performance (Y)	0,855			
Work environment (Z)	0,305	0,812		
Work motivation (X2)	0,812	0,372	0,828	
Work stress (X1)	-0,130	-0,315	0,037	0,820

Source: SEM PLS 4. (2025)

The Fornell-Larcker Criterion test in Table 5 shows that each construct in the model has a higher square root value of AVE than the correlation with other constructs, so the validity of the discriminant has been met. Diagonal values such as 0.855 (Employee Performance), 0.812 (Work Environment), 0.828 (Work Motivation), and 0.820 (Work Stress) are greater than the correlation between constructs, indicating that each construct has uniqueness in measuring different variables. Thus, the model is feasible to use for advanced analysis

4. Uji Composite Reliability (CR) dan Cronbach's Alpha

Construct reliability testing is also necessary to see the internal consistency between indicators in a construct. The two main measures used are Composite Reliability (CR) and Cronbach's Alpha, with the recommended threshold being ≥ 0.70 . This value shows that the

indicators in the construct have a high level of reliability in measuring the concept in question consistently.

Table 6. Uji Composite Reliability (CR) dan Cronbach's Alpha

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)
Employee performance (Y)	0,907	0,918	0,931
Work environment (Z)	0,838	0,871	0,885
Work motivation (X2)	0,885	0,900	0,916
Work stress (X1)	0,877	0,898	0,911

Source: SEM PLS 4. (2025)

The results of the construct reliability test showed that all variables had an excellent level of reliability. Cronbach's Alpha and Composite Reliability values (rho_a and rho_c) for Employee Performance (Y), Work Environment (Z), Work Motivation (X2), and Work Stress (X1) are all above the 0.70 threshold. This indicates that the indicators in each construct are consistent and reliable in measuring variables stably and accurately. The model is worth proceeding to the stage of structural analysis.

4.2 Inner Model

Model inner testing is used to evaluate the causal relationships between constructs or hypotheses in the model. The value of R^2 (R-square), to measure how much an independent variable explains the dependent variable. In structural model analysis (inner model), the path significance test is carried out to measure the strength and significance of the relationship between constructs. This test uses the path coefficient, t-statistic, and p-value values of the bootstrapping results. The hypothesis is declared significant and accepted if the t-statistical value is > 1.96 and the p-value < 0.05 at a significance level of 5%.

1. Nilai R^2 (R-square)

The results of the R-square adjusted test showed that the Working Environment (Z) explained a 21.1% variation in the model after adjusting for the number of abletors. Meanwhile, Employee Performance (Y) has a higher value, which is 66.6%, indicating that the constructs in the model are quite strong in explaining performance changes. Value that telah disesuaikan This strengthens the model's reliability in forecasting dependent variables more accurately. The results can be seen in the next table:

Table 7. R-square adjusted results

	R-square	R-square adjusted
Employee performance (Y)	0,689	0,666
Work environment (Z)	0,247	0,211

Source: SEM PLS 4. (2025)

2. Direct Impact Test

The direct influence test was carried out by looking at the relationship between independent variables and dependent variables without paying attention to the mediator variables. If *the path coefficient value* is significant ($t > 1.96$ and $p < 0.05$), then it can be concluded that there is a strong direct influence between variables.

Table 8. Direct Influence Test

	O	M	STDEV	T-Statistic	P-Value
Work Stress (X1) → Performance (Y)	-0,295	-0,280	0,110	2,682	0,007
Work Motivation (X2) → Performance (Y)	0,782	0,765	0,065	12,031	0,000
Work Stress (X1) → Enviromental (Z)	-0,355	-0,348	0,125	2,840	0,005
Work Motivation (X2) Enviromental → (Z)	0,401	0,395	0,109	3,678	0,000
Work Environment (Z) → Performance (Y)	0,218	0,204	0,089	2,449	0,015

Source: SEM PLS 4. (2025)

3. Indirect Influence Test (Mediation)

Indirect influence tests are carried out to determine the extent to which independent variables affect dependent variables through mediator variables. This influence is calculated based on the path between independent → mediator → dependent. If both paths are significant, then mediation is considered to have occurred. The type of mediation (full or partial) can be determined based on the significance of the immediate impact after the mediator is inserted

Table 9. Indirect Influence Test

	O	M	STDEV	T-Statistic	P-Value
X1 → Z → Y (Stres → Environment → Performen	-0,129	-0,126	0,048	2,688	0,008
X2 → Z → Y (Motivation → Environment → Performen	0,141	0,138	0,052	2,712	0,007

Source: SEM PLS 4. (2025)

2.3 Hipotesis

The following are the results of a comprehensive hypothesis that summarize the results of the direct and indirect path significance test based on hypotheses H1 to H7:

Table 10. Hypothesis Test Results

Hipotesis	Statement	O	M	STDEV	T-Statistic	P-Value	Information
H1	Work Stress has a negative and significant effect on Employee Performance at PT PLN Nusantara Power – UPHK Medan.	-0,295	-0,280	0,110	2,682	0,007	Significant, negative influence
H2	Work Motivation has a positive and significant effect on Employee Performance at PT PLN Nusantara Power – UPHK Medan	0,782	0,765	0,065	12,031	0,000	Significant, the positive influence is very strong
H3	Work Stress Has a Negative and Significant Effect on the Work Environment at PT PLN Nusantara Power – UPHK Medan	-0,355	-0,348	0,125	2,840	0,005	Significant, negative influence

Hipotesis	Statement	O	M	STDEV	T- Statistik	P- Value	Information
H4	Work Motivation has a positive and significant effect on the Work Environment at PT PLN Nusantara Power – UPHK Medan	0,401	0,395	0,109	3,678	0,000	Significant, moderate positive influence
H5	The Work Environment has a positive and significant effect on Employee Performance at PT PLN Nusantara Power – UPHK Medan.	0,218	0,204	0,089	2,449	0,015	Significant, positive influence
H6	Work Environment Mediates the Influence of Work Stress on Employee Performance at PT PLN Nusantara Power – UPHK Medan	-0,129	-0,126	0,048	2,688	0,008	Significant, negative mediation
H7	Work Environment mediates the influence of Work Motivation on Employee Performance at PT PLN Nusantara Power – UPHK Medan.	0,141	0,138	0,052	2,712	0,007	Significant, positive mediation

Source: Data Processed (2025)

All hypotheses H1 to H7 are proven to be statistically significant and in accordance with the direction of the hypothetical relationship, both in direct influence and through media mechanisms.

Discussion

1. The Effect of Work Stress on Employee Performance

The test results showed that work stress had a negative and significant effect on employee performance ($O = -0.295$; $p = 0.007$). These findings support the theory of work stress according to Erawati et al. (2019), which states that work pressure without psychological support can reduce performance. Rasool et al. (2020) also mentioned that chronic work stress has an impact on sustained performance declines, especially in high-pressure sectors such as power plants. At UPHK Medan, technicians who face high time demands and operational risks are prone to performance decline due to emotional and physical stress that is not managed properly.

2. The Influence of Work Motivation on Employee Performance

Work motivation was shown to have a positive and very significant effect on performance ($O = 0.782$; $p = 0.000$). These findings are in line with the theory of Pranoto and Mesra (2024), which emphasizes that internal motivation and support of the work environment are able to drive technician performance. Erawati et al. (2019) also showed that motivation can be a protective factor against the effects of stress. In the UPHK Medan environment, technicians who are intrinsically and extrinsically motivated tend to show better work involvement and quality of results in overhaul projects.

3. The Effect of Work Stress on the Work Environment

Work stress has a negative and significant effect on perception of the work environment ($O = -0.355$; $p = 0.005$). This supports the study of Khairuddin et al. (2019), which emphasized

that work pressure can interfere with work relationships and team coordination. In the context of UPHK Medan, high work stress can cause tension between employees, decrease collaboration, and affect technicians' perception of the work climate and managerial support.

4. The Effect of Work Motivation on the Work Environment

Work motivation has a positive and significant effect on the work environment ($O = 0.401$; $p = 0.000$). These findings are in line with the findings of Jamhuri, Ferine, and Mesra (2024), which show that a healthy work environment is influenced by employee motivation. Motivated employees are more active in building positive working relationships, maintaining communication, and creating a productive work atmosphere. At UPHK Medan, this can be seen in the enthusiasm of technicians in supporting the success of plant maintenance.

5. The Influence of Work Environment on Employee Performance

The work environment was shown to have a positive and significant effect on performance ($O = 0.218$; $p = 0.015$). López-Cabarcos et al. (2022) state that the quality of the work environment affects the effectiveness of teams, especially in high-pressure jobs. This is also supported by the study Batubara dan Mesra (2023), which found that supportive working conditions indirectly improve performance through motivation. At UPHK Medan, proper work facilities and a positive leadership climate are the keys to maintaining technician performance.

6. Work Environment Mediation between Work Stress and Employee Performance

The work environment mediated the negative influence of work stress on employee performance ($O = -0.129$; $p = 0.008$). This shows that a positive work environment can reduce the impact of stress on performance. The studies of Erawati et al. (2019) and López-Cabarcos et al. (2022) support this mediating role, emphasizing that organizational support and a healthy work atmosphere can neutralize excessive work pressure.

7. Mediation of the Work Environment between Work Motivation and Employee Performance

The work environment also mediated the positive influence of work motivation on performance ($O = 0.141$; $p = 0.007$), indicating that high motivation is more effective in improving performance when supported by conducive working conditions. These findings reinforce the view of Ikhsan and Mesra (2024) that good working relationships strengthen the involvement and quality of work of technicians in projects.

Conclusion and Suggestions

Conclusion

The conclusions in this study are:

1. Work stress has a negative and significant effect on employee performance at PT PLN Nusantara Power – UPHK Medan.
2. Work motivation has a positive and significant effect on employee performance at PT PLN Nusantara Power – UPHK Medan.
3. Work stress has a negative and significant effect on the work environment at PT PLN Nusantara Power – UPHK Medan.
4. Work motivation has a positive and significant effect on the work environment at PT PLN Nusantara Power – UPHK Medan.
5. The work environment has a positive and significant effect on employee performance at PT PLN Nusantara Power – UPHK Medan.
6. The work environment mediates the influence of work stress on employee performance at PT PLN Nusantara Power – UPHK Medan.
7. The work environment mediates the influence of work motivation on employee performance at PT PLN Nusantara Power – UPHK Medan.

Suggestions

It is recommended that management systematically map the sources of stress, both from technical and psychosocial aspects. Intervention programs such as *stress management training*, provision of work break time, and the involvement of technicians in project planning can minimize the impact of stress on performance and the work environment.

1. The need for a personalized approach in motivation, by combining performance-based rewards and informal recognition from leaders. Career development and self-development-based training can also increase the intrinsic motivation of technicians and PA/PM.
2. It is recommended to improve the aspects of work safety, completeness of facilities, and the team communication climate. Management needs to create an open and fair work culture so that the perception of the work environment remains positive, as well as being a psychological buffer against work pressure.
3. Strengthening the monitoring system based on objective indicators such as SKP, overhaul completion duration, and QC accuracy needs to be developed digitally. Regular feedback and the involvement of technicians in project evaluations will strengthen the commitment to performance standards.

Suggestions for Advanced Research

It is necessary to take a qualitative approach, such as in-depth interviews or participatory observations, to explore the emotional and motivational experiences of employees that are not reached through quantitative survey. It is also suggested the addition of other variables, such as leadership style, organizational culture, workload, and job satisfaction level to enrich the structural analysis. Advanced research can also expand the population to other generating units or compare between technical functions (engineering, operational, administrative).

References

- Abeje, M., & Luo, F. (2023). The influence of safety culture and climate on safety performance: Mediating role of employee engagement in manufacturing enterprises in Ethiopia. *Sustainability*, 15(14), 11274. <https://doi.org/10.3390/su151411274>
- Batubara, R. H., & Mesra, B. (2023). The influence of teamwork on employee performance with the work environment as an intervening variable at the BPJS Employment Office, South Sumatra. *International Journal of Economics, Management and Accounting (IJEMA)*, 1(5), 379–390.
- Erawati, K. N., Sitiari, N. W., & Indiani, N. L. P. (2019). The effect of stress and working environment on employee performance through motivation mediation: A case study on international restaurant in Badung Bali. *Jurnal Ekonomi dan Bisnis Jagaditha*, 6(1), 22–30. <https://doi.org/10.22225/jj.6.1.2019.22-30>
- Fajrin, H., & Mesra, B. (2024, June). Improving employee performance through work motivation. In *Proceedings of the International Conference on Multidisciplinary Science (INTISARI)* (Vol. 1, No. 1, pp. 331–341).
- Ghozali, I., & Latan, H. (2015). *Partial least squares: Konsep, teknik dan aplikasi menggunakan SmartPLS 3.0*. Badan Penerbit Universitas Diponegoro.
- Gracia, F. J., Tomas, I., Martinez-Corcoles, M., & Peiro, J. M. (2020). Empowering leadership, mindful organizing and safety performance in a nuclear power plant: A multilevel structural equation model. *Safety Science*, 123, 104542. <https://doi.org/10.1016/j.ssci.2019.104542>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage Publications.

- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, 20, 277–319. [https://doi.org/10.1108/S1474-7979\(2009\)0000020014](https://doi.org/10.1108/S1474-7979(2009)0000020014)
- Heryati, A. N., Nurahaju, R., Nurcholis, G., & Nurcahyo, F. A. (2019). Effect of safety climate on safety behavior in employees: The mediation of safety motivation. *Psikohumaniora: Jurnal Penelitian Psikologi*, 4(2), 191–200. <https://doi.org/10.21580/pjpp.v4i2.4174>
- Ikhsan, A. S., & Mesra, B. (2024, October). Maximizing the work environment. In *Proceedings of the International Conference on Multidisciplinary Science (INTISARI)* (Vol. 1, No. 2, pp. 593–605).
- Jamhuri, A. M., Ferine, K. F., & Mesra, B. (2024). The influence of work environment and work discipline on employee performance with motivation as an intervening variable of PT Hutama Binjai-Brandan Infrastructure Works Zone IV. *World Journal of Advanced Research and Reviews*, 21(3), 2040–2049. <https://doi.org/10.30574/wjarr.2024.21.3.0423>
- Khairuddin, S. M. H. S., Saidun, Z., & Hashim, M. S. (2019). Measuring the effects of work motivation on stress and performance linkages in SME. *Asian Academy of Management Journal*, 24, 1–15. <https://doi.org/10.21315/aamj2019.24.1.1>
- López-Cabarcos, M. Á., Vázquez-Rodríguez, P., & Quiñoá-Piñeiro, L. M. (2022). An approach to employees' job performance through work environmental variables and leadership behaviours. *Journal of Business Research*, 140, 361–369. <https://doi.org/10.1016/j.jbusres.2021.11.008>
- Maulita, C., & Mesra, B. (2024, January). Analysis of compensation, work environment on employee performance with satisfaction employment as an intervening variable. In *Proceedings of the International Conference on Artificial Intelligence, Navigation, Engineering, and Aviation Technology (ICANEAT)* (Vol. 1, No. 1, pp. 175–178).
- Morrow, S. L., Koves, G. K., & Barnes, V. E. (2014). Exploring the relationship between safety culture and safety performance in US nuclear power operations. *Safety Science*, 69, 37–47. <https://doi.org/10.1016/j.ssci.2014.02.022>
- Nkosi, M., Gupta, K., & Mashinini, P. M. (2023). Assessing the capacity for change prior to the adoption of human factors engineering in power plant maintenance. *Systems*, 11(10), 520. <https://doi.org/10.3390/systems11100520>
- Peach, R., Ellis, H., & Visser, J. K. (2016). A maintenance performance measurement framework that includes maintenance human factors: A case study from the electricity transmission industry. *South African Journal of Industrial Engineering*, 27(2), 177–189. <https://doi.org/10.7166/27-2-1408>
- Pranoto, W., & Mesra, B. (2024). The influence of work motivation and leadership style on employee performance through job satisfaction as a mediating variable at the Employment BPJS Sumbagut Regional Office. *Lead Journal of Economy and Administration*, 3(1), 31–49.
- Rasool, S. F., Wang, M., Zhang, Y., & Samma, M. (2020). Sustainable work performance: The roles of workplace violence and occupational stress. *International Journal of Environmental Research and Public Health*, 17(3), 912. <https://doi.org/10.3390/ijerph17030912>
- Skeepers, N. C., & Mbohwa, C. (2015). A study on the leadership behaviour, safety leadership and safety performance in the construction industry in South Africa. *Procedia Manufacturing*, 4, 10–16. <https://doi.org/10.1016/j.promfg.2015.11.004>
- Wahyadyatmika, S. W., Ferine, K. F., & Indrawan, M. I. (2023). Analysis of work motivation and work stress on employee performance with work environment as a variable intervening at PT HKI Road Construction Pekanbaru–Padang Toll Road, Section Siring Field. *International Journal of Management, Economics and Accounting*, 1(2).