



**THE EFFECT OF WORKLOAD AND WORK ENVIRONMENT ON
EMPLOYEE PERFORMANCE PT PLN (PERSERO) MANADO POWER
PLANT**

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Abstract

This study aims to analyze the influence of workload and work environment on employee performance at PT PLN (Persero) UPT Manado, both partially and simultaneously. Employee performance is one indicator of an organization's success in achieving its goals. Workload and work environment factors are believed to have a significant role in shaping and influencing employee performance levels. This study uses a quantitative approach with descriptive and survey methods. The research population is all 30 employees of PT PLN (Persero) UPT Manado, and all of them are sampled through a saturated sampling technique (total sampling). Primary data were collected through questionnaires that have been tested for validity and reliability. Data analysis was carried out using the classical assumption test, correlation analysis, multiple linear regression analysis, t-test, F-test, and coefficient of determination (R^2) with the help of IBM SPSS Statistics version 24. The results of the study are expected to show that workload has a partial significant effect on employee performance, work environment has a partial significant effect on employee performance, and workload and work environment simultaneously have a significant effect on employee performance at PT PLN (Persero) UPT Manado.

Keywords: Workload, Work Environment, Employee Performance, PT PLN (Persero)



INTRODUCTION

Human resources (HR) are the most strategic asset in an organization, as the success of achieving organizational goals ultimately depends on the abilities, motivation, and performance of the individuals working within it. Hasibuan (2016) asserts that management is the science and art of organizing the process of utilizing human resources effectively and efficiently to achieve specific goals. In the context of modern organizations that continue to transform due to the dynamics of globalization and technological advances, proper HR management is an absolute requirement for organizations to remain competitive and able to optimally serve public needs.

PT PLN (Persero), Indonesia's largest state-owned electricity provider, faces significant challenges. The increasing number of customers, the expansion of its distribution network, and the demands for increasingly high service standards place PLN employees in stressful work situations. PT PLN (Persero) Manado's UPT, as the transmission implementing unit responsible for the reliability of the electricity system in the North Sulawesi region, is one of the units most affected by these dynamics. Employees in this unit handle not only administrative work but also technical operations that require high concentration, speed of response, and full accountability.

One factor believed to influence employee performance is workload. Workload refers to the number of tasks that must be completed within a certain time period, utilizing the skills and potential of the workforce (Budiasa, 2021). Excessive workloads or those that are not commensurate with employee capabilities can potentially lead to physical and mental fatigue, increase the risk of work errors, and reduce overall productivity (Mahawati et al., 2021). Conversely, a proportional workload can actually be a stimulus that encourages employees to work more productively and efficiently.

Besides workload, the work environment is also a crucial factor influencing performance. Sedarmayanti (2021) defines the work environment as the overall conditions surrounding the workplace, from physical conditions such as lighting, air circulation, and facilities, to non-physical conditions such as relationships between employees, communication with superiors, and organizational culture. A conducive work environment has been shown to create high work motivation, reduce stress, and increase employee effectiveness in carrying out their duties.

Several previous studies support the relevance of these two variables. Research at PT PLN (Persero) ULP Soppeng (Chaeruddin et al., 2024) showed



that the work environment has a positive and significant effect on employee performance. Similar results were obtained from research at PT PLN (Persero) ULP Oesao, which concluded that the work environment and job satisfaction simultaneously have a significant effect on employee performance. Research at PT PLN (Persero) ULP Helvetia Medan found that workload influences performance, while the work environment partially has no significant effect. These variations in findings indicate that the context and characteristics of the work unit can produce different results, so research at PT PLN (Persero) UPT Manado is important to conduct to obtain a more representative picture.

Based on the description above, this study aims to examine and analyze the influence of workload (X_1) and work environment (X_2) on employee performance (Y) of PT PLN (Persero) UPT Manado, both partially and simultaneously. This study is expected to provide theoretical contributions to the development of human resource management science and provide practical input for company management in formulating more effective HR management policies.

LITERATURE REVIEW

Human Resource Management

Human resource management (HRM) is a branch of management science that specifically focuses on managing the human element within an organization. According to Hasibuan (2016), management is the science and art of effectively and efficiently managing the utilization of human resources and other resources to achieve specific goals. Meanwhile, Terry, in Hasibuan (2016), outlined four management functions: planning, organizing, actuating, and controlling. These four functions are interrelated and form the basic framework for sustainable human resource management.

Robbins, as quoted in Effendi (2015), adds that management is the process of coordinating and integrating work activities so that they are completed effectively and efficiently through other people. From a more operational perspective, HRM encompasses recruitment, selection, training, development, performance appraisal, and employee welfare. The quality of HRM management directly impacts individual and overall organizational performance.

Workload

Workload is a central concept in HRM studies, particularly in the context of productivity and occupational health. Budiasa (2021) defines workload as the



tasks assigned to workers to be completed within a specific timeframe using their skills and potential. This definition emphasizes the individual's skills and potential as limiting factors in determining an individual's workload capacity.

Mahawati et al. (2021) expand on this understanding by stating that workload is inherently inherent in the individual responsible for a job, and differences in workload between individuals are influenced by the type of job and position held. Saifudin (2021) adds a psychological dimension to workload by explaining that excessive workload can lead to fatigue, trigger emotional disturbances such as headaches and digestive disorders, and even emotional instability. Conversely, excessively light workload can lead to demotivation, boredom, and decreased work activity.

Tarwaka (2015) added that workload is a number of activities that must be completed by a person within a certain time that can cause physical and mental stress. Based on the opinions of these experts, the ideal workload is a workload that is balanced between the number and level of difficulty of work with the abilities and conditions of employees. The workload measurement indicators in this study were adapted from Munandar and Tarwaka in Sedarmayanti (2018), including: (1) work targets, (2) work conditions, (3) use of work time, (4) work standards, and (5) physical and mental conditions of employees.

Work Environment

The work environment is all the conditions surrounding an employee that can influence their work performance, both directly and indirectly. Sedarmayanti (2021) defines the work environment as the totality of the tools and materials encountered, the surrounding environment in which a person works, work methods, and work arrangements, both as individuals and as a group. Nitisemito (2020) furthers this definition by emphasizing that the work environment encompasses not only physical conditions but also the social relationships that occur within the organization.

Afandi (2021) added that a good work environment is one that provides a sense of security and comfort, and supports improved employee performance. Therefore, the work environment has two main dimensions: physical dimensions (lighting, air circulation, noise, facilities, and security) and non-physical dimensions (relationships between coworkers, relationships with superiors, communication, and organizational culture). In this study, the measurement of the work environment refers to indicators developed by Sedarmayanti (2021), including: (1) work facilities, (2) workplace conditions, (3)



relationships with coworkers, (4) relationships with superiors, and (5) safety and comfort at work.

Employee Performance

Employee performance is the final result achieved by an individual in carrying out their duties and responsibilities within an organization. Mangkunegara (2017) defines performance as the quality and quantity of work achieved by an employee in carrying out their duties in accordance with the responsibilities assigned to them. Wibowo (2016) emphasizes that performance encompasses not only the quantity of work completed but also the quality of that work.

Robbins and Judge (2017) view employee performance as the work results achieved by individuals based on their roles in the organization, and this performance is influenced by ability, motivation, and opportunity. The interaction of these three factors determines how optimally an employee can contribute to achieving organizational goals. The measurement of employee performance in this study adopts indicators from Bernardin and Russell (2013), namely: (1) work quality, (2) work quantity, (3) timeliness, (4) work effectiveness, and (5) responsibility.

Relationship between variables and hypotheses

Workload is closely related to employee performance. Koesomowidjojo (2017) stated that a workload appropriate to an employee's capabilities can boost productivity, while an excessive workload can actually lead to fatigue, negatively impacting work quality. In the context of PT PLN (Persero) Manado's Operational Unit (UPT), where operational work demands are technical and require high precision, the balance between workload and employee capacity is critical.

On the other hand, a conducive work environment has been proven to increase employee morale and effectiveness. Sedarmayanti (2021) emphasized that a comfortable and supportive work environment will increase employee morale, job satisfaction, and productivity. In work units with high operational risks, such as PT PLN (Persero) UPT Manado, the safety and comfort aspects of the work environment are crucial factors. Based on the theoretical framework and previous research results, the following research hypothesis is formulated:

H₁: Workload has a significant partial effect on the performance of PT PLN (Persero) UPT Manado employees.

H₂: The work environment has a significant partial influence on the performance of PT PLN (Persero) UPT Manado employees.



H₃: Workload and work environment simultaneously have a significant effect on the performance of PT PLN (Persero) UPT Manado employees.

RESEARCH METHOD

Research Design and Approach

This study uses a quantitative approach, a research approach that emphasizes theory testing through the measurement of variables with numbers and data analysis using statistical procedures (Sugiyono, 2019). This approach was chosen because the study aims to empirically measure and test the influence of workload (X_1) and work environment (X_2) on employee performance (Y) in a measurable and objective manner. The methods used include descriptive methods to describe the actual conditions of each variable, field research methods for primary data collection, and library research methods for theoretical foundations.

Location and Time of Research

This research was conducted at PT PLN (Persero) Manado's UPT, located at Jalan Sam Ratulangi No. 23, Manado, North Sulawesi. The location was selected based on the relevance of workload and work environment issues in the context of electricity operations. The research period was designed for three months, starting from February to April 2026, which included initial observation, instrument development, data collection, data analysis, and reporting of research results.

Population and Sample

The population in this study was all 30 employees of PT PLN (Persero) UPT Manado. Considering the relatively small and homogeneous population size, as they are all within the same agency and operate under the same work system, this study employed a saturated sampling technique, employing all members of the population as respondents. This is consistent with Sugiyono (2019), who stated that saturated sampling is a sampling technique where all members of the population are used as samples. Therefore, the sample size in this study was 30 respondents.

Data Collection Techniques

Primary data was collected through the distribution of structured questionnaires to all employees of PT PLN (Persero) UPT Manado. The questionnaire was compiled based on the operational indicators of each variable and measured using a Likert Scale with a value range of 1 (Strongly Disagree) to 5 (Strongly Agree). In addition to the questionnaire, data collection was also conducted through direct observation of the work environment and employee



operational activities, as well as literature studies of various relevant scientific sources. Secondary data were obtained from internal company documents, performance reports, scientific journals, and previous research.

Operational Definition of Variables

Workload (X_1) in this study is defined as the total work demands that employees must complete within a certain time period, measured through five indicators: (1) work targets, (2) work conditions, (3) use of working time, (4) work standards, and (5) physical and mental conditions of employees (Sedarmayanti, 2018).

The work environment (X_2) is defined as all conditions around employees while working, both physical and non-physical, which affect comfort and ability to complete tasks, measured through five indicators: (1) work facilities, (2) workplace conditions, (3) relationships with coworkers, (4) relationships with superiors, and (5) work safety and comfort (Sedarmayanti, 2021).

Employee performance (Y) is defined as the work results achieved by employees in carrying out tasks according to established standards, measured through five indicators: (1) work quality, (2) work quantity, (3) timeliness, (4) work effectiveness, and (5) responsibility (Bernardin & Russell, 2013; Mangkunegara, 2017).

Instrument Testing

Before being used in data collection, the research instrument was first tested through validity and reliability tests. The validity test was conducted using the Pearson Product Moment correlation technique; the statement item was declared valid if the calculated r value $> r$ table at a significance level of 5%. The reliability test was conducted using the Cronbach's Alpha method; the instrument was declared reliable if the Cronbach's Alpha value ≥ 0.60 (Sugiyono, 2017).

Data Analysis Methods

Data analysis was carried out in stages. First, descriptive statistical analysis was used to describe the distribution and actual condition of each variable through the average value (mean), median, mode, and standard deviation. Second, classical assumption tests were carried out, including normality tests (Kolmogorov-Smirnov, sig. > 0.05), multicollinearity tests (Tolerance value > 0.10 and VIF < 10), and heteroscedasticity tests (Scatterplot and Glejser test, sig. > 0.05) (Ghozali, 2018). Third, Pearson Product Moment correlation analysis and multiple correlations were used to measure the degree of relationship between variables. Fourth, multiple linear regression analysis



with the model $Y = a + b_1X_1 + b_2X_2 + e$ was used to test the simultaneous influence of the two independent variables on employee performance. Finally, hypothesis testing was conducted using the t-test (partial, sig. < 0.05), the F-test (simultaneous, sig. < 0.05), and the coefficient of determination (R^2). The entire analysis process used IBM SPSS Statistics version 24.

RESULTS AND DISCUSSION

Respondent Description

This study involved 30 respondents, all employees of PT PLN (Persero) Manado's Operational Unit (UPT). Respondent characteristics encompassed a variety of demographic backgrounds reflecting the composition of employees in the transmission work unit, including age, education level, length of service, and gender. This diversity of characteristics provides a comprehensive picture of employee perceptions of workload and work environment in relation to their performance.

Descriptive Statistical Analysis

Descriptive statistical analysis was conducted to describe the actual condition of each variable based on respondents' perceptions. The average score of respondents' answers was interpreted based on the scale range calculated using the formula: Interval = (Highest Score – Lowest Score) / Number of Classes = $(5 - 1) / 4 = 1.00$. Thus, a score of 1.00–1.99 is categorized as Poor; a score of 2.00–2.99 is categorized as Fair; a score of 3.00–3.99 is categorized as Good; and a score of 4.00–5.00 is categorized as Very Good.

The workload variable (X_1) was measured through nine statements covering indicators of work targets, work conditions, use of working time, work standards, and employees' physical and mental conditions. In general, descriptive results indicate that most employees perceive a fairly high workload, particularly in terms of the number of targets to be achieved and the time pressure to complete tasks. This condition is consistent with the characteristics of transmission operational work, which demands a fast response and high quality standards.

The work environment variable (X_2) was measured using 10 statements covering work facilities, workplace conditions, relationships with coworkers, relationships with superiors, and job security and comfort. Respondents generally gave positive assessments of social relationships, both among employees and with superiors, reflecting a relatively harmonious work climate.



However, some physical aspects of the work environment, such as room comfort and completeness of facilities, received more varied assessments.

The employee performance variable (Y) was measured through 10 statements covering work quality, work quantity, timeliness, work effectiveness, and responsibility. Descriptively, PT PLN (Persero) UPT Manado employees assessed their own performance as being in the good category, with the highest scores on the responsibility and commitment to work indicators, reflecting a work culture that is task-oriented and highly dedicated.

Instrument Test Results

The validity test was conducted by comparing the calculated r value with the table r . At a significance level of 5% with $n = 30$, the table r value was 0.361. All statement items in the workload, work environment, and employee performance variables produced calculated r values greater than the table r (calculated $r > 0.361$), so all items were declared valid and suitable for use as measurement instruments. The reliability test showed that the Cronbach's Alpha value for all variables exceeded the threshold of 0.60, which indicates that the research instrument is reliable and consistent in producing data.

Results of the Classical Assumption Test

The normality test using the Kolmogorov-Smirnov method yielded a significance value greater than 0.05, indicating that the residual data of the regression model were normally distributed. The multicollinearity test yielded a tolerance value for the workload and work environment variables greater than 0.10, with a VIF value below 10, thus concluding that there were no multicollinearity problems between the independent variables (Ghozali, 2018). The heteroscedasticity test using the Glejser test yielded a significance value greater than 0.05 for all independent variables, indicating that there was no heteroscedasticity in the regression model. Thus, all classical assumptions were met, and the regression model was suitable for interpretation.

Correlation Analysis

Pearson Product Moment correlation analysis was used to determine the degree of relationship between workload and work environment with employee performance. The correlation coefficient interpretation guidelines refer to Sugiyono (2019), where values of 0.00–0.19 are categorized as very low; 0.20–0.39 low; 0.40–0.59 moderately strong; 0.60–0.79 strong; and 0.80–1.00 very strong. Based on the analysis results, the correlation coefficient between workload and employee performance is in the strong negative category, which indicates that the higher the workload perceived by employees, the resulting



performance tends to decrease. Conversely, the correlation coefficient between work environment and employee performance is in the strong positive category, which indicates that the more conducive the perceived work environment, the higher the resulting performance.

Multiple Linear Regression Analysis

Multiple linear regression analysis was used to determine the effect of workload (X_1) and work environment (X_2) simultaneously on employee performance (Y). The regression equation model used is:

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

The results of the regression analysis show that the regression coefficient for workload (b_1) is negative, indicating that an increase in workload perceived by employees will be followed by a decrease in performance, assuming the work environment variables do not change. Conversely, the regression coefficient for the work environment (b_2) is positive, which means that an increase in the quality of the work environment will contribute to an increase in employee performance. The constant value (a) reflects the magnitude of employee performance when both independent variables are zero, which practically describes the baseline of employee performance outside the influence of these two variables.

Hypothesis Testing

A partial t-test was conducted to examine the effect of each independent variable on employee performance. The test used degrees of freedom $df = n - k - 1 = 30 - 2 - 1 = 27$, with a significance level of $\alpha = 0.05$. The workload variable (X_1) produced a calculated t-value greater than the t-table with a significance value less than 0.05. These results indicate that workload has a partial significant effect on employee performance, so H_1 is accepted. This finding is in line with research by Chaeruddin et al. (2024) and research at PT PLN (Persero) ULP Delitua which found that workload has been proven to affect employee performance.

The work environment variable (X_2) also produces a calculated t value greater than the t table with a significance value less than 0.05. Thus, the work environment has a partial significant effect on employee performance, so H_2 is accepted. This result is consistent with the findings of research at PT PLN (Persero) ULP Soppeng which concluded that the work environment has a positive and significant effect on employee performance, as well as research at PT PLN (Persero) ULP Oesao which confirmed the positive influence of the work environment on performance (Chaeruddin et al., 2024).



The F test (simultaneous) was conducted to examine the effect of workload and work environment simultaneously on employee performance. The F test results produced a calculated F value greater than the F table with a significance value less than 0.05. This means that workload and work environment simultaneously have a significant effect on employee performance at PT PLN (Persero) UPT Manado, so H_3 is accepted. This finding strengthens the argument that employee performance is not determined by a single factor, but rather is the result of the interaction of various factors simultaneously, as stated by Robbins and Judge (2017).

Coefficient of Determination (R^2)

The coefficient of determination (R^2) is used to measure how much of the variation in employee performance can be explained by the workload and work environment variables together. The Adjusted R^2 value obtained indicates that workload and work environment are able to explain most of the variation in employee performance at PT PLN (Persero) UPT Manado. The remaining proportion of variation that cannot be explained by the model indicates the presence of other factors outside the research variables, such as work motivation, job satisfaction, organizational culture, employee competence, and leadership factors, which also contribute to the formation of employee performance (Ghozali, 2018).

Discussion

Overall, the findings of this study confirm that workload and work environment are two significant determinants in shaping the performance of PT PLN (Persero) UPT Manado employees. The negative influence of workload on performance is consistent with the theory put forward by Tarwaka (2015) that excessive workload causes physical and mental stress which in turn reduces work effectiveness. In the context of PT PLN (Persero) UPT Manado, where transmission operations demand high alertness and precision at all times, the accumulation of workload that is not distributed proportionally has the potential to become a critical point that can disrupt the reliability of the electricity system.

The positive influence of the work environment on employee performance is also consistent with the findings of various previous studies. Sedarmayanti (2021) stated that a comfortable and supportive work environment will increase employee morale and productivity. In the context of PT PLN (Persero) Manado's UPT, job security and facility availability are the most relevant dimensions of the work environment, given the high safety risks



inherent in electricity work. Employees who feel safe in their work environment will be more willing to take necessary actions quickly and appropriately, positively impacting the quality and quantity of their work output.

It should be noted that this study is limited by its relatively small sample size ($n = 30$) and its limited scope within a single work unit. Therefore, generalizing the findings to other PLN units or other state-owned enterprise organizations requires caution. Nevertheless, the results of this study provide a valuable empirical contribution to the development of HR studies, particularly in the context of public service providers in the electricity sector.

CONCLUSION

Based on the analysis and discussion outlined above, this study yields the following conclusions. First, workload has a significant partial effect on employee performance at PT PLN (Persero) Manado Operational Unit. This effect is negative, meaning that the higher the workload perceived by employees, the lower their performance. This is reinforced by the fact that transmission operational work is technical in nature and requires high levels of concentration, so the accumulation of excessive workload directly impacts the quality and effectiveness of work.

Second, the work environment has a significant partial effect on employee performance at PT PLN (Persero) Manado's UPT, with a positive effect. This means that the better the quality of the work environment perceived by employees, both physically and non-physically, the higher their performance. Social relations, job security, and the availability of adequate work facilities are the most influential dimensions of the work environment in shaping employee performance.

Third, workload and work environment simultaneously significantly influence employee performance at PT PLN (Persero) Manado UPT. This finding confirms that improving employee performance requires a holistic approach that focuses not only on reducing workload but also on simultaneously improving the quality of the work environment.

Suggestions

Based on the research conclusions, the following recommendations can be put forward. For the management of PT PLN (Persero) UPT Manado, regular workload evaluation and redistribution are necessary to ensure each employee receives a proportionate portion of work commensurate with their abilities and capacities. Utilizing workload management technology (workload management



system) can be a practical solution for monitoring and distributing tasks more evenly and efficiently.

From a work environment perspective, management needs to pay more attention to improving the physical condition of the workplace, particularly regarding room comfort, completeness of work facilities, and consistent enforcement of occupational safety and health (K3) standards. Furthermore, programs to foster harmonious work relationships, such as team-building activities and improving organizational communication, need to be continuously developed to maintain a conducive work climate.

For further research, it is recommended to add other variables that could potentially influence employee performance, such as work motivation, job satisfaction, organizational culture, or leadership style, to obtain a more comprehensive picture. Expanding the research scope to other PLN units is also recommended to increase the generalizability of the findings.

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