The Effect of Workload on Burnout with Work-Life Balance as A Mediation Variable at PT PLN (Persero) ULP Liang, Central Maluku

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Abstract

This study analyzes the effect of workload on burnout with work-life balance as a mediating variable in Engineering Team Leader employees of PT PLN (Persero) ULP Liang, Central Maluku. The study used a quantitative approach with a saturated sampling technique on 42 respondents. Data were collected through a Likert scale questionnaire and analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM). The test results showed that workload did not have a significant direct effect on burnout (β = 0.006; t = 0.031; p = 0.976). Conversely, workload had a negative and significant effect on work-life balance (β = −0.336; t = 3.003; p = 0.003), while work-life balance had a negative and significant effect on burnout (β = −0.484; t = 3.369; p = 0.001). The indirect effect of workload on burnout through work-life balance was also significant (indirect β = 0.177; t = 2.020; p = 0.044). This finding confirms that work-life balance is an important mechanism explaining how job demands relate to burnout. Workload management needs to be accompanied by rest time arrangements, rotation, and organizational support.

Keywords: Workload; Burnout; Work-life Balance

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1. Introduction

Human resources are a crucial element in maintaining the sustainability of an organization's operations. In electricity providers, workforce readiness and resilience are crucial because services must be maintained continuously, and supply disruptions can directly impact the community. Therefore, achieving operational targets must be balanced with managing employee capacity, safety, and well-being.

The context of PT PLN (Persero) ULP Liang presents unique operational challenges. Based on the description in the thesis, engineering employees face on-call work, network disruptions, extreme weather, difficult field conditions, and repair needs that can arise outside of normal working hours. The paper also describes the limitations of the power plant infrastructure and the extensive service coverage that increase the intensity of engineering staff mobilization. This situation has the potential to reduce recovery time and employees' opportunities to pursue personal lives.

Workload essentially describes the demands of tasks that must be completed within a specific timeframe, utilizing both physical and mental capacity. Workload can become problematic when the amount, complexity, or deadline of work is disproportionate to the available resources (Mahawati et al., 2021; Koesomowidjojo, 2017; Tarwaka, 2015). In electrical engineering, quantitative demands such as frequency of outages and area size combine with qualitative demands such as safety risks, uncertain field conditions, and the need for rapid decision-making.

Persistent work pressure can be linked to burnout, a state of exhaustion that develops as a result of chronic work stress. Maslach and Leiter (2016) explain burnout through the dimensions of exhaustion, cynicism or alienation from work, and a decreased sense of personal effectiveness. However, workload does not always directly lead to burnout. Experience, professional adaptation, environmental support, and the ability to restore energy can influence how work demands are experienced.

One relevant mechanism is work-life balance, the ability to maintain a balance of time, engagement, and satisfaction between work and life outside of work (Greenhaus et al., 2003; Fisher et al., 2009). When work demands interfere with rest, family life, and personal activities, this balance can be disrupted. Conversely, a better balance allows for recovery, thus reducing the risk of prolonged burnout.

Previous research in this manuscript has yielded inconsistent results. Arrahman and Setyawan (2020) found a significant positive relationship between workload and burnout, while Pratama and Lestari (2019) reported a positive but insignificant effect. These discrepancies in findings create an empirical opportunity to examine the role of work-life balance as a mediating variable in the context of engineering personnel in the archipelago.

Although previous studies have examined the relationship between workload and burnout, the findings reported in this manuscript remain inconsistent. Arrahman and Setyawan (2020) reported a significant relationship between workload and burnout, whereas Pratama and Lestari (2019) found a positive but insignificant effect. These differences suggest that the relationship between workload and burnout may depend on the working context and the conditions experienced by employees. However, the role of work-life balance as an explanatory mechanism in the relationship between workload and burnout among engineering personnel in electricity service organizations requires further examination.

The contribution of this study lies in examining workload, burnout, and work-life balance within the specific operational context of engineering personnel at PT PLN (Persero) ULP Liang, Central Maluku. Rather than examining only the direct relationship between workload and burnout, this study also investigates whether work-life balance provides an indirect pathway through which workload is associated with burnout. This approach may provide a more comprehensive understanding of employee well-being in technical service environments characterized by operational demands and work responsibilities beyond regular working hours.

Based on this background, this study aims to examine: (1) the effect of workload on work-life balance; (2) the effect of work-life balance on burnout; (3) the direct effect of workload on burnout; and (4) the mediating role of work-life balance in the relationship between workload and burnout. Its practical contribution is directed at strengthening more humane work arrangement policies in service units with geographical and operational challenges.

2. Literature Review

Workload

Workload is the interaction between job demands and an individual's capacity to meet them. These demands can be quantitative, related to the number of tasks and completion time, or qualitative, related to the level of difficulty, concentration, and responsibility of the work (Dhania, 2010; Mahawati et al., 2021). In this study, workload was measured through work conditions, work time management, engagement balance, and work standards. In the context of the Liang ULP, these indicators are relevant for understanding additional tasks, time demands, and standards for resolving disruptions.

Burnout

Burnout is a psychological response to chronic, unmanaged work stress. Maslach and Leiter (2016) emphasize emotional exhaustion, cynicism or depersonalization, and decreased personal accomplishment. The research paper operationalizes burnout through physical exhaustion, emotional exhaustion, mental exhaustion, and low self-efficacy. Thus, burnout is not simply understood as a momentary feeling of exhaustion, but as an accumulation of fatigue that can impair well-being and work effectiveness.

The relationship between workload and burnout may not always be straightforward. Employees may experience high work demands without developing the same level of burnout because their responses can be influenced by recovery opportunities, support from the organization, and the ability to manage work and personal responsibilities. Consequently, workload alone may not fully explain burnout. Examining work-life balance as a mediating variable can help explain how work demands are associated with employees' psychological well-being.

Work-Life Balance

Work-life balance reflects an individual's ability to meet both work demands and personal responsibilities. The dimensions used in the study include satisfaction balance, time balance, and involvement balance. This balance is important because recovery time, family relationships, and personal activities are resources that help individuals cope with work demands (Greenhaus et al., 2003; Fisher et al., 2009).

Work-life balance may function as an important resource in managing work-related demands. When employees are able to maintain sufficient time and involvement in activities outside work, they may have better opportunities to recover from work-related fatigue. In contrast, excessive work demands that interfere with personal responsibilities may reduce this balance and contribute to exhaustion. Based on this reasoning, work-life balance is expected to be negatively associated with burnout and may mediate the relationship between workload and burnout.

Conceptual Framework and Hypothesis

The research model places workload (X) as the independent variable, work-life balance (Z) as the mediator, and burnout (Y) as the dependent variable. Conceptually, workload is expected to decrease work-life balance; better work-life balance is expected to decrease burnout; and the effect of workload on burnout may occur through changes in work-life balance.

Hypothesis

H1. Workload has a negative effect on work-life balance.
H2. Work life balance has a negative effect on burnout.
H3. Workload influences burnout
H4. Work-life balance mediates the effect of workload on burnout.

3. Method

This study used a quantitative approach with an explanatory design to examine the relationship between variables. The research location was PT PLN (Persero) ULP Liang, Central Maluku. The study population was all 42 Engineering Team Leaders. Due to the relatively limited population size, all members of the population were sampled using a saturated sampling technique (total sampling).

The respondents were selected based on their membership in the Engineering Team Leader group at PT PLN (Persero) ULP Liang, Central Maluku. The use of saturated sampling was considered appropriate because the study involved a relatively small and identifiable population, allowing all 42 members of the population to participate in the research. This sampling approach was intended to obtain information from the entire target population within the selected research unit.

The questionnaire was designed to measure workload, work-life balance, and burnout based on the operational dimensions presented in Table 1. Each item was assessed using a five-point Likert scale, ranging from strongly disagree to strongly agree. Before interpreting the statistical results, the measurement indicators were evaluated to determine whether they adequately represented the constructs examined in this study.

Primary data was obtained through a five-point Likert-scale questionnaire, ranging from strongly disagree to strongly agree, and direct observation. Secondary data was used as supporting information.

Table 1. Measurement of variables refers to operational definitions as summarized in

Variables	Operational dimensions/indicators
Workload (X)	Working conditions; working time management; balance of involvement; work standards.
Work-Life Balance (Z)	Balance of satisfaction; balance of time; balance of involvement.
Burnout (Y)	Physical exhaustion; emotional exhaustion; mental exhaustion; low self-esteem.

Data analysis was performed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) using SmartPLS. Evaluation of the measurement model (outer model) was carried out through outer loading, Average Variance Extracted (AVE), discriminant validity, Cronbach's Alpha, and Composite Reliability. Evaluation of the structural model (inner model) was carried out through R-square, f-square, path coefficients, and significance testing using bootstrapping. The effect is declared significant if the p-value <0.05 or t-statistic >1.96.

PLS-SEM was used because the research model examined both the direct relationships among the variables and the indirect relationship involving work-life balance as a mediating variable. The analysis consisted of evaluating the measurement model and the structural model. The measurement model was assessed using indicator loadings, convergent validity, discriminant validity, and reliability. The structural model was evaluated using the coefficient of determination, path coefficients, and bootstrapping results. The mediation analysis was conducted by examining the specific indirect effect of workload on burnout through work-life balance.

Mediation testing was conducted by examining specific indirect effects. An indirect effect was declared significant if it met the statistical criteria. Determining the type of mediation took into account the significance of both indirect and direct effects. All interpretations in this article are limited to Technical Team Leader respondents in the studied unit; the results are not necessarily generalizable to all PLN units.

4. Results and Discussion

Characteristics And Quality of Instruments

The research sample consisted of 42 Engineering Team Leaders of PT PLN (Persero) ULP Liang. The entire population was selected as respondents through saturation sampling. In the outer loading test, most indicators showed high values. The workload indicators BK1–BK8 had a loading of 0.829–0.965; the burnout indicators B1–B8 were in the range of 0.929–0.963; while the work-life balance indicators WLB1–WLB8 were in the range of 0.590–0.936.

The outer loading results indicate that most measurement indicators demonstrated satisfactory relationships with their respective constructs. However, the work-life balance indicator WLB8 obtained a loading value of 0.590, which was lower than the other indicators. This result requires careful consideration when evaluating the measurement model. The decision to retain or remove the indicator should be based not only on its loading value but also on its theoretical relevance and its contribution to the validity and reliability of the construct.

Table 2. Characteristics And Quality of Instruments

Construct	Outer loading range	Notes
Workload	0.829–0.965	All reported indicators ≥ 0.70.
Burnout	0.929–0.963	All reported indicators ≥ 0.70.
Work-Life Balance	0.590–0.936	WLB8 = 0.590; needs to be considered together with AVE and construct validity.

The reported Cronbach's Alpha values were 0.970 for workload, 0.984 for burnout, and 0.943 for work-life balance. All values exceeded the typical threshold of 0.70, indicating high internal consistency. However, the lower loading value of the WLB8 compared to other indicators should still be evaluated substantively, not solely based on overall reliability.

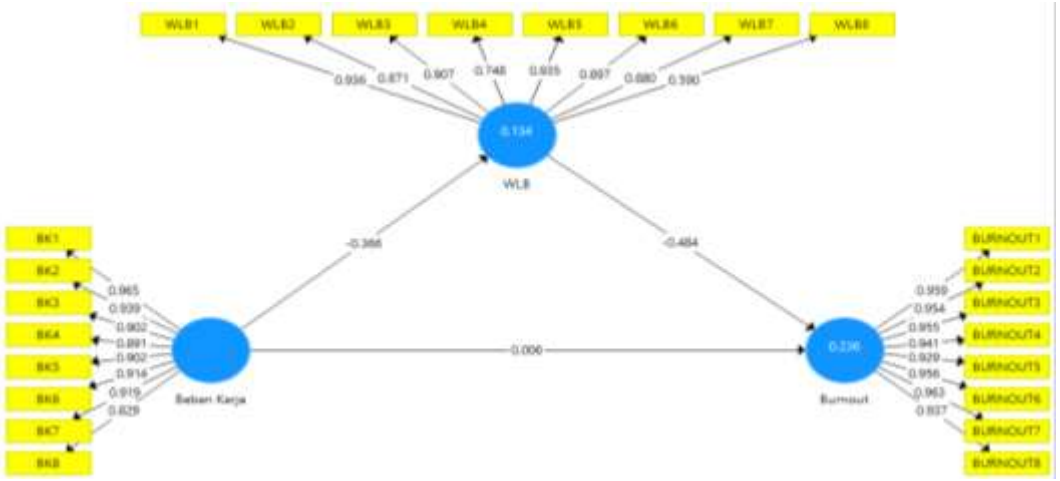

Figure 1. Inner Model Results (Path Analysis)

Structural Model

The R-square value for burnout was 0.236 (adjusted 0.197), indicating that the model explains 23.6% of the variation in burnout. The R-square value for work-life balance was 0.134 (adjusted 0.112), meaning workload explains 13.4% of the variation in work-life balance. The remainder is influenced by other factors not included in the model.

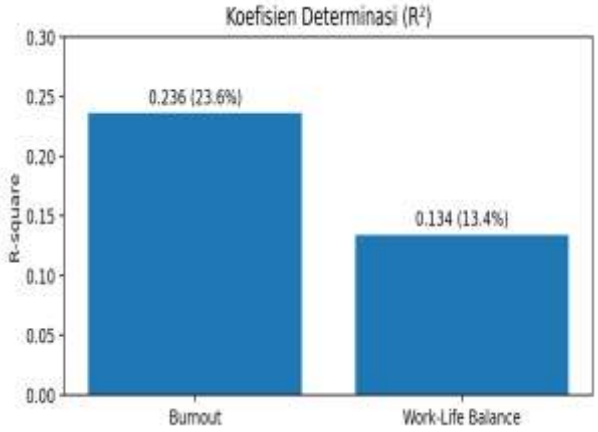

Figure 2. Model determination coefficient (R^2).
Source: SmartPLS 2026 data processing

Path Coefficient Test Results

The bootstrapping results in the hypothesis testing table show three main relationships. Workload on burnout has a coefficient of 0.006 with a t-statistic of 0.031 and a p-value of 0.976, so the direct effect is not significant. Workload on work-life balance has a coefficient of -0.336 (t = 3.003; p = 0.003), while work-life balance on burnout has a coefficient of -0.484 (t = 3.369; p = 0.001). The last two relationships are significant and negative.

Table 3. Path Coefficient Test Results

Connection	B	t-statistic	p-value	Decision
Workload → Burnout	0.006	0.031	0.976	Not significant
Workload → WLB	–0.336	3,003	0.003	Significant negative
WLB → Burnout	–0.484	3,369	0.001	Significant negative

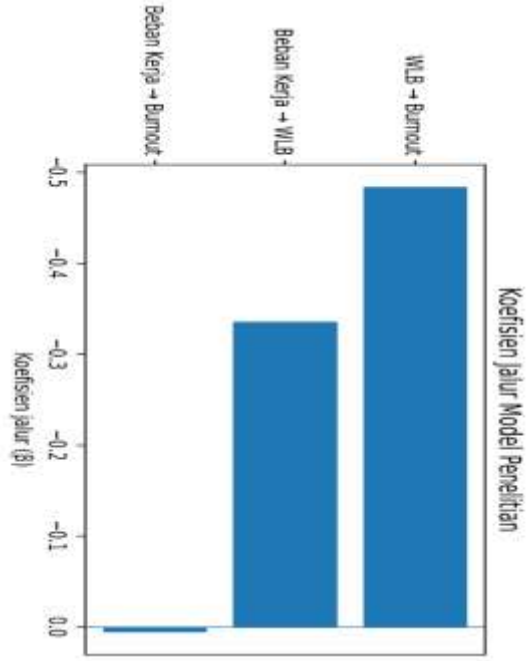

Figure 3. Path coefficients based on the hypothesis testing table.
Source: SmartPLS 2026 data processing.

The first finding shows that workload does not directly explain burnout in this model. Professional adaptation exists: engineers perceive preparedness, mobility, and field risks as part of their job responsibilities. However, this finding does not imply that workload is unimportant or without risks. Rather, it suggests that the relationship needs to be understood through other mechanisms.

The second finding shows that the higher the workload, the lower the work-life balance. The demands of handling disruptions and being prepared outside of work hours can consume time and energy that should be used for rest and personal life. Thus, workload is associated with limited opportunities to maintain work-life balance.

The results show that workload was not significantly associated with burnout through a direct relationship in the tested model. This finding indicates that the direct relationship between workload and burnout was not statistically supported among the respondents. However, workload was significantly associated with work-life balance, while work-life balance was significantly associated with burnout. These results suggest that the relationship between workload and burnout may be better understood by considering employees' work-life balance rather than focusing only on the direct relationship between the two variables.

The Mediation Role of Work-Life Balance

The specific indirect effects test yielded an indirect effect coefficient of 0.177, a t-statistic of 2.020, and a p-value of 0.044. Because the t-statistic was greater than 1.96 and the p-value was less than 0.05, the indirect effect was declared significant. Meanwhile, the direct effect of workload on burnout was not significant (p = 0.976). Based on these results, it was found that work-life balance acted as a full mediator.

Table 4. Mediation Role of Work-Life Balance

Connection	Original Sample (0)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Workload → Work Life Balance → Burnout	0.177	0.190	0.088	2,020	0.044

These findings confirm that job demands are linked to burnout primarily through disruptions to work-life balance. Increased workloads can reduce recovery time and engagement in personal life. When this balance is compromised, the risk of physical, emotional, and mental exhaustion increases. Conversely, a maintained work-life balance is associated with lower levels of burnout.

Discussion and Implications

The study's findings align with the argument that burnout is determined not only by the magnitude of work demands but also by the resources available to manage those demands. Work-life balance is a crucial mechanism linking work demands to employees' psychological well-being. These findings also explain the discrepancy between previous research: in the context of ULP Liang's engineering workforce, workload was not shown to have a direct effect, but its indirect effect through work-life balance was significant.

The managerial implication is that workload control needs to be implemented alongside recovery policies. Work units can evaluate the allocation of standby schedules, ensure equitable personnel rotation and replacement, schedule rest periods after handling nighttime outages, and strengthen superior support.

Personnel planning and equipment readiness are also crucial to prevent ongoing infrastructure disruptions from becoming an additional burden on technical personnel.

Summary of Findings and Practical Implications

Table 5. Summary of Findings and Practical Implications

Aspect	Empirical findings	Meaning for HR management
Workload → burnout	β = 0.006; p = 0.976; not significant	Workload was not shown to directly trigger burnout in this model and sample.
Workload → WLB	β = −0.336; p = 0.003; significant	Increasing work demands are associated with a weakening work-life balance.
WLB → burnout	β = −0.484; p = 0.001; significant	Better work-life balance is associated with lower burnout.
WLB Mediation	Indirect β = 0.177; p = 0.044	WLB is a significant intermediary pathway in the relationship between workload and burnout.

Implications For Pt PLN (Persero) ULP Liang

First, standby work arrangements need to be accompanied by clear recovery mechanisms. Employees who have to deal with disruptions outside of work hours need adequate rest time and alternative arrangements to prevent readiness from becoming a continuous demand.

Second, the division of territory and task rotation should be evaluated based on the frequency of disruptions, the difficulty of the terrain, safety risks, and personnel availability. This approach helps avoid placing a heavy burden on any particular individual or group.

Third, organizations can strengthen psychosocial support through superior-subordinate communication, fatigue monitoring, and access to counseling or support when employees experience work stress. Fourth, improving equipment reliability and infrastructure readiness should be viewed as part of a workload management strategy, not merely a technical matter.

Research Limitations

The study used 42 respondents from one work unit and one job group, so generalizations should be made with caution. Data were collected through questionnaires, potentially influenced by respondents' subjective perceptions. The model also partially explains the variation in burnout and work-life balance; other factors such as organizational support, job control, family circumstances, tenure, and coping strategies can be tested in future research.

5. Conclusion

Research on 42 Engineering Team Leaders at PT PLN (Persero) ULP Liang showed that workload did not have a significant direct effect on burnout (β = 0.006; p = 0.976). However, workload had a negative and significant effect on work-life balance (β = −0.336; p = 0.003). Furthermore, work-life balance had a negative and significant effect on burnout (β = −0.484; p = 0.001). The indirect effect of workload on burnout through work-life balance was also significant (β = 0.177; t = 2.020; p = 0.044). Thus, work-life balance proved to be a full mediation mechanism, as concluded in the thesis. The main finding of the study is that managing burnout in engineering personnel is not sufficient to focus solely on job demands; organizations need to maintain recovery space and balance in employees' personal lives.

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