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The Effects of Psychological Safety and Work Engagement on Employee Performance: The Mediating Role of Job Satisfaction Among Shift Workers

Nabilah Dyandra Ayu[1*], M. Ali Iqbal[2]
[1]Universitas Mercu Buana, Jakarta, Indonesia, 55124110085@student.mercubuana.ac.id
[2]Universitas Mercu Buana, Jakarta, Indonesia, ali.iqbal@mercubuana.ac.id

*Corresponding Author: 55124110085@student.mercubuana.ac.id[1]

Abstract: Shift-based Network Operation Center work requires continuous vigilance and rapid responses. Although attendance remained high and relatively stable, persistent lateness and fluctuations in several performance indicators showed that employee performance was not fully stable. Previous studies have reported inconsistent findings regarding the direct effects of psychological safety and work engagement on employee performance and the mediating role of job satisfaction. This study examines the direct and indirect relationships among psychological safety, work engagement, job satisfaction, and employee performance. A quantitative explanatory survey was conducted among all 116 shift employees of the Network Operation Center Division at PT Cipta Karya Technology using saturated sampling. Likert-scale questionnaire data were analyzed using partial least squares structural equation modeling with SmartPLS. Psychological safety, work engagement, and job satisfaction positively and significantly affected employee performance. Psychological safety and work engagement also positively and significantly affected job satisfaction. Furthermore, job satisfaction significantly mediated the effects of psychological safety and work engagement on employee performance. The novelty lies in integrating these direct and mediated relationships within the specific context of shift employees in a 24-hour Network Operation Center in the telecommunications sector. The findings highlight psychological safety, work engagement, and job satisfaction as complementary resources for improving employee performance.

Keywords: psychological safety, work engagement, job satisfaction, employee performance, PLS-SEM.

INTRODUCTION

Rapid digital development has positioned the telecommunications sector as an important pillar of economic activity. In Indonesia, private telecommunications companies face intense competition, rapid technological change, and increasing customer expectations while being required to maintain network service quality continuously. These operational conditions are particularly demanding for employees working in shifts in a Network Operation Center (NOC),

as they require high alertness, time flexibility, and responsibility for maintaining network stability without interruption. Consequently, this work environment has the potential to create prolonged psychological pressure and makes employee performance an important organizational concern.

At PT Cipta Karya Technology, attendance records for the NOC Division from October 2024 to October 2025 showed that employee attendance remained above 90% every month and was relatively high and stable. However, employee lateness occurred consistently throughout the observation period. The performance indicators of the CH and NOM & Infra teams also fluctuated. In July, the actual achievement of Escalation Time and Manual Ticket reached 29.99 minutes against the company's 15-minute target. The figures subsequently improved to 8.84 minutes in August and reached 14.65 minutes in September. These findings demonstrate a difference between high employee attendance and the stability of punctuality and performance. They also indicate that employee performance may be associated not only with technical job demands but also with employees' psychological conditions and work attitudes.

A preliminary survey involving 31 NOC employees further supported this indication. The results showed that 87% of employees felt that time passed slowly during some shifts, 77% stated that mistakes made the work atmosphere tense and caused employees to become more cautious, and 61% were dissatisfied with the recognition they received for their work. Based on these findings, psychological safety, work engagement, and job satisfaction were selected as the principal factors examined in relation to employee performance.

Psychological safety refers to a condition in which employees feel safe expressing ideas, concerns, questions, and mistakes without fear of negative interpersonal consequences (Edmondson, 1999). In a high-pressure operational environment such as an NOC, psychological safety allows employees to communicate, collaborate, and report problems without fear. However, previous studies have reported inconsistent findings. Edfi and Rinaldi (2024) and Wang et al. (2021) found that psychological safety positively affected employee performance, whereas Lee (2022) found no significant effect. These inconsistent findings indicate the need to re-examine the direct effect of psychological safety on employee performance and the mechanism through which this relationship may occur.

Work engagement is a positive work-related psychological state characterized by vigor, dedication, and absorption (Schaufeli et al., 2002). Employees with strong work engagement tend to demonstrate energy, persistence, responsibility, and concentration in performing their duties. Burlian (2024) and Rabuana and Yanuar (2023) found that work engagement positively affected employee performance. In contrast, Kamulyanisa Hadi et al. (2022) reported that work engagement did not significantly affect employee performance. These differences suggest that work engagement may not always be translated directly into performance, particularly in highly structured and repetitive work environments.

The mediating role of job satisfaction has also produced inconsistent findings. Tri Amelia Risa et al. (2024) found that job satisfaction played a mediating role in the relationship between psychological work conditions and employee performance, whereas Julindrastuti and Karyadi (2025) reported no mediating effect. Similarly, Lesmana and Handayani (2025) found that job satisfaction mediated the relationship between work engagement and employee performance, while Yuwana Irwandi and Sanjaya (2022) reported a different result. These inconsistencies support the examination of job satisfaction as a mechanism linking psychological safety and work engagement to employee performance.

The Job Demands-Resources theory provides the theoretical foundation for explaining these relationships. Shift schedules, continuous network monitoring, rapid incident responses, and time pressure represent job demands that require sustained physical, cognitive, and psychological effort. Psychological safety serves as a job resource that helps employees manage these demands, while work engagement reflects the motivational process that emerges

when employees have adequate resources to perform their work (Bakker & Demerouti, 2014; Clarke et al., 2016). Job satisfaction represents a positive work outcome that may subsequently encourage employees to perform their responsibilities more effectively.

Accordingly, this study examines seven relationships: the effects of psychological safety and work engagement on employee performance; the effects of psychological safety and work engagement on job satisfaction; the effect of job satisfaction on employee performance; and the indirect effects of psychological safety and work engagement on employee performance through job satisfaction. The study contributes to the literature by simultaneously examining these direct and indirect relationships among shift employees in a 24-hour Network Operation Center in the telecommunications sector.

METHODS

This study employed a quantitative explanatory design with a causal-associative approach to examine the causal relationships among the research variables. Psychological safety and work engagement were treated as independent variables, employee performance as the dependent variable, and job satisfaction as the mediating variable. The research was conducted among employees working in shifts in the Network Operation Center Division of PT Cipta Karya Technology.

The study population consisted of 116 employees in the Network Operation Center Division. Saturated sampling was applied because all members of the population were included as the research sample. Accordingly, the study involved 116 respondents. Primary data were collected through an online questionnaire distributed using Google Forms. Each item was measured on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Psychological safety was measured using indicators derived from Edmondson (1999) and Li et al. (2022). Work engagement was measured using indicators based on the Utrecht Work Engagement Scale developed by Schaufeli and Bakker, as adopted by Wirawan et al. (2020b). Employee performance was measured using Koopmans' indicators, as adopted by Latifah et al. (2024), while job satisfaction was measured using indicators originally developed by Smith et al. (1969), as adopted by Latifah et al. (2024).

The data were initially analyzed descriptively to summarize respondent characteristics and responses to each research variable. The research model was subsequently analyzed using partial least squares structural equation modeling with SmartPLS. Evaluation of the measurement model included outer loadings and average variance extracted to assess convergent validity; cross-loadings, the heterotrait-monotrait ratio, and the Fornell–Larcker criterion to assess discriminant validity; and Cronbach's alpha and composite reliability to assess internal consistency reliability.

The structural model was evaluated using the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and variance inflation factor (VIF). The direct and indirect hypotheses were tested through the bootstrapping procedure. A one-tailed test was applied because all hypotheses specified positive directional relationships. Following the criteria established in the thesis, a relationship was considered significant when its t-statistic was at least 1.64 and its p-value was less than or equal to 0.05.

RESULTS AND DISCUSSION

The respondents were predominantly male (79%), aged 26–35 years (69%), and bachelor's degree holders (76%). Employees with more than five years of service constituted the largest tenure category (38%), while NOS Data & Infrastructure represented the largest departmental category (21%). These findings indicate that the respondents were predominantly employees of productive age with a university education. However, the largest tenure category

should not be interpreted as a majority because it accounted for less than half of the respondents.

Table 1. Respondent Characteristics

Characteristic	Dominant Category	n	%
Gender	Male	92	79
Age	26–35 years	80	69
Education	Bachelor's degree	88	76
Tenure	More than five years	44	38
Department	NOS Data & Infrastructure	24	21

Source: Research data collection (2026)

Measurement and Structural Model Assessment

Following the measurement-model refinement reported in the thesis, all retained indicators and constructs met the required validity and reliability criteria. Based on the Fornell–Larcker criterion, the square roots of average variance extracted were 0.798 for psychological safety, 0.823 for job satisfaction, 0.812 for work engagement, and 0.849 for employee performance. Each value exceeded the correlations between the respective construct and the other constructs. Cronbach's alpha and composite reliability values were also above 0.70 for all constructs, indicating satisfactory internal consistency reliability.

Table 2. Construct Reliability

Construct	Cronbach's Alpha	Composite Reliability (rho_c)
Psychological Safety	0.904	0.924
Job Satisfaction	0.932	0.944
Work Engagement	0.942	0.951
Employee Performance	0.952	0.959

Source: SmartPLS data processing (2026)

The structural-model results showed that psychological safety and work engagement explained 54.0% of the variance in job satisfaction. Psychological safety, work engagement, and job satisfaction collectively explained 66.0% of the variance in employee performance. The positive predictive relevance values for both endogenous constructs indicated that the model was predictive. Furthermore, the variance inflation factor values ranged from 1.375 to 2.173, all below the threshold of 5, indicating no multicollinearity among the predictor constructs.

Table 3. Structural Model Summary

Endogenous Construct	R^2	Adjusted R^2	Q^2
Job Satisfaction	0.540	0.532	0.500
Employee Performance	0.660	0.651	0.571

Source: SmartPLS data processing (2026)

Note: Use the term Q^2 rather than Q^2predict if the table in the thesis is labeled as predictive relevance or Q-square. Do not rename analysis indicators without a basis in the thesis.

Hypothesis Testing

Table 4. Bootstrapping Results

Relationship	Coefficient	T-statistic	P -value	Decision
Psychological Safety → Employee Performance	0.196	2.219	0.029	Accepted
Work Engagement → Employee Performance	0.400	3.464	<0.001	Accepted
Psychological Safety → Job Satisfaction	0.473	4.932	<0.001	Accepted
Work Engagement → Job Satisfaction	0.368	3.693	<0.001	Accepted
Job Satisfaction → Employee Performance	0.346	2.776	0.005	Accepted
Psychological Safety → Job Satisfaction → Employee Performance	0.163	2.191	0.029	Accepted
Work Engagement → Job Satisfaction → Employee Performance	0.127	2.522	0.012	Accepted

Source: SmartPLS data processing (2026)

A value of 0.000 in the SmartPLS output should be reported as $p < 0.001$, because the p-value is not actually zero.

Psychological Safety and Employee Performance

Psychological safety had a positive and significant effect on employee performance ($\beta = 0.196$, $t = 2.219$, $p = 0.029$). This result indicates that higher psychological safety is associated with better employee performance. Employees who feel safe expressing opinions, discussing work-related problems, requesting assistance, and acknowledging mistakes are better able to communicate and coordinate in performing their responsibilities. In the NOC environment, such conditions can support employees in responding to operational problems that require cooperation and information exchange.

This finding supports the Job Demands–Resources perspective, which positions psychological safety as a work-related resource that helps employees manage interpersonal risks and workplace demands. The result is consistent with Edfi and Rinaldi (2024), who found that psychological safety positively affected employee performance, and Jin and Peng (2024), who emphasized the importance of a psychologically safe team climate in facilitating performance-related communication. The effect size was classified as small ($f^2 = 0.061$), indicating that psychological safety contributed to employee performance, although performance was also influenced by other variables in the model and factors outside the study.

Work Engagement and Employee Performance

Work engagement had a positive and significant effect on employee performance ($\beta = 0.400$, $t = 3.464$, $p < 0.001$). Among the direct predictors of employee performance included in the model, work engagement had the largest path coefficient. This result indicates that employees who demonstrate vigor, dedication, and absorption are more likely to maintain energy, concentration, and responsibility in performing their duties.

The finding is relevant to the shift-based NOC environment, which requires employees to remain focused during continuous monitoring and operational activities. It supports Burlian (2024) and Rabuana and Yanuar (2023), who reported that work engagement positively affected employee performance. Its medium effect size ($f^2 = 0.283$) further demonstrates that work engagement made a meaningful contribution to employee performance in the research model.

Psychological Safety and Job Satisfaction

Psychological safety had a positive and significant effect on job satisfaction ($\beta = 0.473$, $t = 4.932$, $p < 0.001$). This relationship had a large effect size ($f^2 = 0.353$). The result indicates that employees who feel safe expressing their opinions, asking for assistance, and discussing mistakes are more likely to evaluate their work experience positively.

A psychologically safe work environment can create greater comfort in workplace interactions and reduce employees' concerns about negative interpersonal consequences. This finding is consistent with Gan and Kee (2024), Li et al. (2022), Etti et al. (2025), and Mitterer and Mitterer (2023), who linked psychological safety with higher job satisfaction. In the shift-based NOC context, open communication is relevant because operational coordination and the exchange of work-related information require employees to communicate without excessive interpersonal fear.

Work Engagement and Job Satisfaction

Work engagement had a positive and significant effect on job satisfaction ($\beta = 0.368$, $t = 3.693$, $p < 0.001$), with a medium effect size ($f^2 = 0.214$). This finding indicates that employees who experience vigor, dedication, and absorption tend to have a more positive evaluation of their work.

Employees who are energetic, involved, and focused on their responsibilities are more likely to experience meaning and satisfaction in performing their work. The result is consistent with Mascarenhas et al. (2022), Sypniewska et al. (2023), and Lesmana and Handayani (2025). In the NOC environment, work engagement therefore contributes not only to how employees perform their duties but also to how positively they perceive their work experience.

Job Satisfaction and Employee Performance

Job satisfaction had a positive and significant effect on employee performance ($\beta = 0.346$, $t = 2.776$, $p = 0.005$), with a medium effect size ($f^2 = 0.162$). This result indicates that employees with higher job satisfaction tend to demonstrate better performance.

Satisfaction with work, supervision, compensation, development opportunities, and coworker relationships can encourage employees to carry out their responsibilities more positively and consistently. This finding supports Gazi et al. (2022), Pio (2022), Indrayani et al. (2024), and Tafese Keltu (2024), who found that job satisfaction positively affected employee performance and work outcomes.

The Mediating Role of Job Satisfaction in the Psychological Safety–Performance Relationship

The indirect effect of psychological safety on employee performance through job satisfaction was positive and significant ($\beta = 0.163$, $t = 2.191$, $p = 0.029$). Therefore, job satisfaction significantly mediated the effect of psychological safety on employee performance.

The finding indicates that psychological safety contributes to a more positive work experience, which increases job satisfaction and subsequently contributes to employee performance. This indirect relationship is supported by previous findings connecting psychological safety with job satisfaction (Gan & Kee, 2024; Li et al., 2022; Mitterer & Mitterer, 2023) and job satisfaction with employee performance (Lesmana & Handayani, 2025; Pio, 2022; Riwayati et al., 2025).

The term "complementary partial mediation" was deliberately not used because the thesis merely concludes that job satisfaction mediates the relationship.

The Mediating Role of Job Satisfaction in the Work Engagement–Performance Relationship

The indirect effect of work engagement on employee performance through job satisfaction was positive and significant ($\beta = 0.127$, $t = 2.522$, $p = 0.012$). Therefore, job satisfaction significantly mediated the effect of work engagement on employee performance.

This result indicates that work engagement increases employees' positive evaluation of their work, which subsequently contributes to improved performance. Employees who

demonstrate greater energy, dedication, and involvement tend to experience higher job satisfaction, and this satisfaction supports their performance. The result is consistent with Jufrizen et al. (2023), Lesmana and Handayani (2025), and Kartika Pertiwi and Korika Swastika (2026), who identified job satisfaction as a mechanism connecting work engagement with employee performance.

Research Contribution and Novelty

The study contributes to the literature by simultaneously examining five direct relationships and two indirect relationships in the specific context of shift employees working in a 24-hour Network Operation Center. Psychological safety had the strongest effect on job satisfaction, while work engagement was the strongest direct predictor of employee performance among the variables examined. Job satisfaction also significantly mediated the effects of psychological safety and work engagement on employee performance.

These findings show that employee performance in continuous network operations is associated not only with operational demands but also with psychological safety, employees' engagement with their work, and their job satisfaction. The study's novelty therefore lies in integrating these relationships into a single research model within the specific setting of shift-based NOC operations in the telecommunications sector.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Psychological safety and work engagement had positive and significant effects on employee performance among shift employees in the Network Operation Center Division of PT Cipta Karya Technology. Both variables also had positive and significant effects on job satisfaction, while job satisfaction positively and significantly affected employee performance. Furthermore, job satisfaction significantly mediated the effects of psychological safety and work engagement on employee performance.

Psychological safety and work engagement explained 54.0% of the variance in job satisfaction, whereas psychological safety, work engagement, and job satisfaction collectively explained 66.0% of the variance in employee performance. These findings support the Job Demands–Resources perspective by demonstrating that psychological safety functions as a job resource that helps employees manage work demands, while work engagement reflects a positive motivational state that supports performance. Job satisfaction also serves as a positive work outcome that contributes to improved employee performance.

Limitations

This study was limited to 116 shift employees in the Network Operation Center Division of PT Cipta Karya Technology. Therefore, the findings may not be generalized to employees in other divisions or organizations with different work characteristics. The research model examined only psychological safety and work engagement as predictors of employee performance, with job satisfaction as a mediating variable. The remaining unexplained variance in job satisfaction and employee performance indicates that other potentially relevant factors were not included in the research model.

Recommendations

Management should strengthen a work culture that supports psychological safety by promoting open communication between supervisors and employees, encouraging mutual support among team members, and focusing on problem resolution rather than assigning blame when operational errors occur. Work engagement should be maintained and improved through

recognition of employee achievements, supervisor support, and the provision of adequate work resources.

Management should also strengthen supervisors' leadership capabilities in providing clear direction, coordinating work effectively, and delivering constructive feedback, particularly to support coordination across shifts. Technical training, updated standard operating procedures, and periodic performance evaluations are also recommended to improve employees' ability to resolve operational problems accurately, effectively, and promptly without compromising work quality.

Future research should extend the study to other divisions, organizations, and occupational settings. Further studies may examine employees' confidence in taking work-related risks without fear of criticism or punishment, their persistence when facing difficulties, supervisors' leadership and communication practices, and employees' problem-solving capabilities. Future models may also integrate factors such as employee competence, organizational support, and human resource development to provide a broader explanation of job satisfaction and employee performance.

Author Contributions

Nabilah Dyandra Ayu contributed to the conceptualization of the study, development of the theoretical framework, data collection, data analysis, interpretation of the findings, preparation and revision of the manuscript, and approval of the final manuscript.

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