The Effect of Coworker Support and Teamwork on Proactive Work Behavior Through Work Engagement

Reno Juniarfan, Hadlinovan Rosel, Prio Prayetno, Kiki Farida Ferine, Sri Rahayu

Abstract

This study examines how coworker support and teamwork relate to proactive work behavior, with work engagement considered as a mediator, among employees of Renun Hydroelectric Power Plant and UP3 Rantau Prapat. A quantitative, cross-sectional survey was conducted with 60 employees using a census sampling approach. Data were analyzed through partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4, with 5,000 bootstrap subsamples. Coworker support was positively associated with work engagement ($\beta = 0.509$; $p < 0.001$) and proactive work behavior ($\beta = 0.276$; $p = 0.024$). Teamwork was positively associated with proactive work behavior ($\beta = 0.335$; $p = 0.002$), while its association with work engagement was positive ($\beta = 0.273$; $p = 0.057$). Work engagement was positively associated with proactive work behavior ($\beta = 0.351$; $p = 0.001$). The indirect association between coworker support and proactive work behavior through work engagement was significant ($\beta = 0.179$; $p = 0.021$). These findings suggest that coworker support and teamwork follow different pathways in their relationships with employees' proactive behavior.

Keywords: coworker support; teamwork; work engagement; proactive work behavior; PLS-SEM.

Reno Juniarfan[1]
[1]Magister Manajemen Universitas Pembangunan Panca Budi, Medan, Indonesia
e-mail: rheynoe16@gmail.com[1]

Hadlinovan Rosel[2], Prio Prayetno[3], Kiki Farida Ferine[4], Sri Rahayu[5]
[2,3,4,5]Magister Manajemen Universitas Pembangunan Panca Budi, Medan, Indonesia
e-mail:hadlinovanrosel@gmail.com[2], prioprayetnomp@gmail.com[3],
kikifarida@dosen.pancabudi.ac.id[4], srirahayu@dosen.pancabudi.ac.id[5]
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INTRODUCTION

Proactive work behavior refers to employees' initiative in anticipating problems and identifying ways to improve how work is carried out. Such behavior is particularly relevant to organizations responsible for services and infrastructure, where operational activities require cross-functional coordination and responses to changing work conditions. Previous studies have examined proactive behavior from social exchange, conservation of resources, and social cognitive perspectives [1].

Social resources at work may help create conditions that encourage such initiative. Coworker support includes practical assistance, information, emotional support, and feedback from colleagues. The exchange of support among coworkers has been linked to work engagement [2], while social support is recognized as a relational resource in the workplace [3].

Teamwork refers to the collective process of coordinating activities, sharing responsibilities, and aligning individual contributions toward common goals. Whereas coworker support emphasizes the assistance received by an individual, teamwork concerns how employees collaborate. Both therefore represent related aspects of the social work environment, although they emphasize different processes.

Work engagement is a motivational state characterized by energy, dedication, and involvement in work. From a Job Demands–Resources perspective, job resources can help employees manage work demands and sustain their engagement. These conditions may, in turn, be associated with work outcomes and proactive behavior [2], [4], [8], [9].

This study focuses on Renun Hydroelectric Power Plant (PLTA Renun) and UP3 Rantau Prapat. At PLTA Renun, shift schedules limit opportunities for some employees to interact face to face, whereas UP3 Rantau Prapat oversees customer service units (ULPs) located across several sites. Work-related communication takes place through WhatsApp and cross-departmental activities. These arrangements provide an opportunity to examine how employees experience coworker support and teamwork under different patterns of workplace coordination.

Against this background, the study investigates the relationships of coworker support and teamwork with proactive work behavior through work engagement among employees of PLTA Renun and UP3 Rantau Prapat. By examining both forms of social resources within one model, the study offers insight into proactive behavior in the operational setting of the electricity sector.

LITERATURE REVIEW

2.1 Coworker Support and Work Engagement

Coworker support provides assistance, information, feedback, and care when employees face work demands. From social exchange and Job Demands–Resources perspectives, this support constitutes a social resource that may be associated with work engagement [2], [3].

H1: Coworker support has a positive effect on work engagement.

2.2 Teamwork and Work Engagement

Teamwork involves aligning team members' contributions through communication, coordination, mutual support, and cohesion [5]. In this study, teamwork is assessed in terms of cooperation toward shared goals, understanding of responsibilities, coordination, and adjustments to work activities. Previous research has also addressed the relationship between teamwork, working conditions, and work engagement [6].

In the electricity sector, study [7] reported a positive relationship between teamwork, job satisfaction, and employee performance at PLN UP3 North Medan. Although that study examined different outcome variables, its findings provide a relevant point of comparison for understanding collaboration in the PLN work environment.

H2: Teamwork has a positive effect on work engagement.

2.3 Work Engagement and Proactive Work Behavior

Work engagement is a motivational state involving vigor, dedication, and absorption in work. Employees who are more engaged may be better prepared to recognize opportunities for

improvement, propose ideas, and take anticipatory action. Models of proactive motivation identify motivational states as factors associated with change-oriented behavior [8], [9].

H3: Work engagement has a positive effect on proactive work behavior.

2.4 Coworker Support, Teamwork, and Proactive Work Behavior

Coworker support can improve access to assistance and information, whereas teamwork facilitates coordination when improvement ideas are put into practice. These social resources are therefore expected to be directly associated with proactive work behavior, albeit through different characteristics.

H4: Coworker support has a positive effect on proactive work behavior.

H5: Teamwork has a positive effect on proactive work behavior.

2.5 The Mediating Role of Work Engagement

Work engagement is positioned as a mediator because social resources at work may be associated with employees' psychological experiences before being reflected in their behavior. Accordingly, this study examines the indirect relationships of coworker support and teamwork with proactive work behavior separately.

H6: Work engagement mediates the effect of coworker support on proactive work behavior.

H7: Work engagement mediates the effect of teamwork on proactive work behavior.

RESEARCH METHODS

3.1 Research Design, Population, and Sample

This study adopted a quantitative approach using a cross-sectional survey design. The study population also served as the sample and comprised 60 employees: 30 from PLTA Renun and 30 from UP3 Rantau Prapat. All members of the population were included through total sampling, or a census.

3.2 Measurement of Variables

Data were collected using a structured questionnaire with a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The instrument contained 17 statements: four items for coworker support, four for teamwork, four for work engagement, and five for proactive work behavior. The researchers developed and adapted these items from conceptual definitions and relevant literature rather than reproducing any single established scale in full. Coworker support covered assistance, information, support in stressful situations, and advice from colleagues [2], [3], [11]. Teamwork encompassed cooperation toward common goals, an understanding of responsibilities, coordination, and adjustment of work activities, drawing on selected aspects of teamwork quality [5]. Work engagement was based on vigor, dedication, and absorption [10], while proactive work behavior included improvement initiatives, problem prevention, idea sharing, and the identification of opportunities for improvement [8], [9].

3.3 Data Analysis Procedure

Data were analyzed using PLS-SEM in SmartPLS 4.1.2.1. The measurement model was evaluated using outer loadings, Cronbach's alpha, rho_A, composite reliability, average variance extracted (AVE), and the heterotrait–monotrait ratio (HTMT). Structural model assessment covered inner variance inflation factors (VIF), path coefficients, R^2, indirect effects, and PLSpredict (10 folds and 10 repetitions). Statistical significance was assessed with 5,000 bootstrap subsamples using two-tailed tests at a 5% significance level. The analytical procedures followed [12], and predictive assessment followed [13].

4. RESULTS AND DISCUSSION

4.1 Respondent Characteristics

Table 1. Respondent Characteristics

Characteristic	Category	Number	Percentage
Organization	PLTA Renun	30	50.0%
Organization	UP3 Rantau Prapat	30	50.0%
Length of service	Less than 5 years	23	38.3%

Characteristic	Category	Number	Percentage
Length of service	5–10 tahun	17	28.3%
Length of service	More than 10 years	20	33.3%

All 60 members of the study population were included in the analysis, comprising 30 employees from PLTA Renun and 30 from UP3 Rantau Prapat. In terms of tenure, 23 respondents (38.3%) had worked for less than five years, 17 (28.3%) for 5–10 years, and 20 (33.3%) for more than ten years. Participants represented a range of job functions.

4.2 Descriptive Statistics

Table 2. Descriptive Statistics

Construct	Mean score
Coworker Support	4.18
Teamwork	4.13
Work Engagement	4.25
Proactive Work Behavior	4.19

Mean scores for all four constructs exceeded 4 on the five-point scale. Work engagement had the highest mean (4.25), followed by proactive work behavior (4.19), coworker support (4.18), and teamwork (4.13). Overall, these descriptive results suggest that respondents rated each construct relatively positively. These ratings, however, are distinct from the findings of the subsequent tests of relationships between variables.

4.3 Measurement Model Assessment

Table 3. Construct Reliability and Convergent Validity

Construct	Cronbach's α	rho_A	CR (rho_C)	AVE
Coworker Support	0.775	0.790	0.855	0.597
Teamwork	0.778	0.782	0.857	0.600
Work Engagement	0.727	0.740	0.830	0.551
Proactive Work Behavior	0.845	0.854	0.889	0.615

Cronbach’s alpha, rho_A, and composite reliability exceeded 0.70 for all constructs, while AVE values were above 0.50. Outer loadings ranged from 0.650 to 0.822. Two indicators, CS1 (0.692) and WE1 (0.650), had loadings below 0.708. Both were retained in light of the construct-level reliability and AVE results, as well as their representation of the conceptual dimensions being measured.

Table 4. Discriminant Validity (HTMT)

Construct pair	HTMT
Coworker Support – Proactive Work Behavior	0.827
Coworker Support – Teamwork	0.731
Teamwork – Proactive Work Behavior	0.835
Coworker Support – Work Engagement	0.883
Proactive Work Behavior – Work Engagement	0.889
Teamwork – Work Engagement	0.733

HTMT values ranged from 0.731 to 0.889. All point estimates fell below the 0.90 threshold, although the values for coworker support–work engagement (0.883) and work engagement–proactive work behavior (0.889) were relatively high. For coworker support–work engagement, the upper bound of the 95% bias-corrected confidence interval was 1.072.

4.4 Structural Model Assessment

Table 5. Inner VIF

Predictor → Endogenous construct	VIF
Coworker Support → Proactive Work Behavior	1.984
Coworker Support → Work Engagement	1.476
Teamwork → Proactive Work Behavior	1.622
Teamwork → Work Engagement	1.476
Work Engagement → Proactive Work Behavior	1.963

Table 6. Coefficients of Determination

Endogenous construct	R^2	Adjusted R^2
Work Engagement	0.491	0.473
Proactive Work Behavior	0.677	0.659

All inner VIF values were below 3, indicating no strong evidence of collinearity among predictors in the structural model. VIF values for the measurement model ranged from 1.312 to 2.030.

Note: PLSpredict reported 600 prediction observations because the 60 respondents were included across 10 repetitions. The number of unique respondents nevertheless remained 60.

PLSpredict produced positive Q^2_predict values for all endogenous indicators, ranging from 0.164 to 0.473. PLS-SEM yielded lower root mean squared error (RMSE) than the linear model for eight of the nine indicators, while mean absolute error (MAE) was lower for all indicators. Based on the RMSE comparison, the model showed moderate predictive performance. The prediction output contained 600 observations because 60 respondents were assessed across 10 repetitions; the number of unique respondents remained 60.

The model explained 49.1% of the variance in work engagement ($R^2 = 0.491$; adjusted $R^2 = 0.473$) and 67.7% of the variance in proactive work behavior ($R^2 = 0.677$; adjusted $R^2 = 0.659$). Regarding model fit, SRMR was 0.111 for the mixed model and 0.092 for the composite model, while the corresponding NFI values were 0.558 and 0.679. The mixed-model d_ULS value (1.876) was slightly above the 99% quantile (1.871), and the composite-model d_ULS value (1.297) was slightly above the 95% quantile (1.289). By contrast, d_G values for both models were below the 95% quantile.

4.5 Hypothesis Testing

Table 7. Direct-Effect Hypothesis Tests

Hypothesis	Path	β (O)	t	p
H1	Coworker Support → Work Engagement	0.509	3.766	<0.001
H2	Teamwork → Work Engagement	0.273	1.905	0.057
H3	Work Engagement → Proactive	0.351	3.275	0.001

Hypothesis	Path	β (O)	t	p
	Work Behavior			
H4	Coworker Support → Proactive Work Behavior	0.276	2.260	0.024
H5	Teamwork → Proactive Work Behavior	0.335	3.058	0.002

The hypothesis tests showed positive relationships between coworker support and both work engagement (β = 0.509; t = 3.766; p < 0.001) and proactive work behavior (β = 0.276; t = 2.260; p = 0.024). Work engagement was also positively related to proactive work behavior (β = 0.351; t = 3.275; p = 0.001), as was teamwork (β = 0.335; t = 3.058; p = 0.002). The relationship between teamwork and work engagement was positive in direction (β = 0.273), but its p-value of 0.057 exceeded the 5% significance threshold. Thus, four of the five tested direct relationships were statistically significant at the 5% level.

4.6 Indirect-Effect Testing

Table 8. Indirect-Effect Tests

Indirect path	β	t	p
Coworker Support → Work Engagement → Proactive Work Behavior	0.179	2.308	0.021
Teamwork → Work Engagement → Proactive Work Behavior	0.096	1.691	0.091

The indirect-effect tests indicated that work engagement mediated the relationship between coworker support and proactive work behavior (β = 0.179; t = 2.308; p = 0.021). The direct relationship between coworker support and proactive work behavior also remained positive and significant (β = 0.276; p = 0.024), a pattern consistent with complementary partial mediation. The indirect effect of teamwork through work engagement was positive (β = 0.096; p = 0.091) but not significant at the 5% level, although the direct relationship between teamwork and proactive work behavior was positive and significant. These results suggest that mediation through work engagement was supported for coworker support, but not for teamwork.

4.7 Coworker Support as a Social Resource for Work Engagement

Coworker support was positively related to work engagement (β = 0.509; p < 0.001). This finding suggests that assistance, information, and feedback from colleagues are associated with employees' energy and involvement in their work. It is consistent with research on the exchange of support among coworkers [2] and broader reviews of social support in the workplace [3].

In the study setting, shift schedules at PLTA Renun and the geographical distribution of ULPs at UP3 Rantau Prapat create different patterns of workplace interaction. Coworker support may therefore take the form of practical assistance, information sharing, and guidance

that help work proceed smoothly, whether provided face to face or through available communication channels.

4.8 Teamwork and Work Engagement

Teamwork had a positive coefficient in its relationship with work engagement ($\beta = 0.273$; $p = 0.057$). Although this relationship was not statistically significant at the 5% level, the coefficient indicates a positive tendency. This finding suggests that coordination and team collaboration do not necessarily correspond to similar changes in employees' individual motivational experiences, such as energy and dedication at work.

Study [7], which examined teamwork, job satisfaction, and employee performance at PLN UP3 North Medan, offers a comparative perspective on the relevance of collaboration in the electricity sector, although its outcome variables differ from the work engagement examined here.

4.9 Work Engagement and Proactive Behavior

Work engagement was positively related to proactive work behavior ($\beta = 0.351$; $p = 0.001$). Respondents who reported greater energy, enthusiasm, sense of meaning, and focus also tended to report more improvement initiatives and anticipatory actions. This finding is consistent with models of proactive motivation [8], [9].

4.1.0 Direct Relationships of Coworker Support and Teamwork with Proactive Work Behavior

Both coworker support ($\beta = 0.276$; $p = 0.024$) and teamwork ($\beta = 0.335$; $p = 0.002$) were positively related to proactive work behavior. Coworker support is associated with easier access to assistance and information, whereas teamwork is associated with coordinated action and the implementation of ideas for improvement.

4.1.1 Differences in Mediation Pathways

Work engagement mediated the relationship between coworker support and proactive work behavior ($\beta = 0.179$; $t = 2.308$; $p = 0.021$). Because the direct association between coworker support and proactive work behavior was also positive and significant ($\beta = 0.276$; $p = 0.024$), this pattern is consistent with complementary partial mediation.

CONCLUSION

This study of 60 employees at PLTA Renun and UP3 Rantau Prapat found that coworker support was positively related to work engagement and proactive work behavior. Teamwork was also positively associated with proactive work behavior, whereas its association with work engagement was positive in direction but not statistically significant at the 5% level. Work engagement mediated the relationship between coworker support and proactive work behavior; the corresponding mediation pathway for teamwork was not statistically supported.

Overall, the findings point to different patterns of association for the two social resources. Coworker support was related to proactive behavior both directly and indirectly through work engagement, while teamwork's relationship with proactive behavior was more evident through the direct pathway in this model.

5.1 Practical Implications

The findings highlight the importance of coworker support and collaboration in everyday work. At PLTA Renun, shift handovers and cross-functional discussions of operational problems can help maintain continuity in information and work experience. At UP3 Rantau Prapat, follow-up to online coordination among employees and ULPs can strengthen information exchange. In both organizations, communication channels that enable employees to request assistance, share ideas, and receive actionable responses may help foster a more collaborative work environment.

5.2 Limitations and Future Research

This study relied on a cross-sectional design and questionnaire data from 60 employees across two organizations. Future research could collect observations over multiple periods, combine questionnaires with operational records or assessments from other sources, and

include a broader range of organizational units. More systematic content validation and pilot testing of the instrument could also strengthen the accuracy of construct measurement.

5.3 Ethical Considerations

Participation was voluntary and involved an online questionnaire. Its introductory statement explained that responses would be used for academic purposes, would be kept confidential, and would not require names or other personal identifiers.

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