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Job Satisfaction As A Mediator Of Leadership, Culture, And Innovation In State-Owned Defense Firms

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Abstract
Background: *Innovative work behaviour (IWB) plays a critical role in sustaining organizational competitiveness, particularly in dynamic and strategic sectors such as defense. Yet, the psychological mechanisms that connect leadership and culture with innovation remain underexplored, especially in state-owned enterprises (SOEs) operating under bureaucratic and hierarchical structures.*
Purpose*: This study examines the mediating role of job satisfaction in the relationships between transformational leadership, organizational culture, and IWB in the context of Indonesian defense SOEs.*
Design/methodology/approach*: The quantitative survey was conducted among 288 permanent employees of PT Pindad, who represent the arms, ammunition, and special vehicles divisions. The data was analyzed using PLS-SEM using SmartPLS version 4, applying a second-order construct approach.*
Findings/Results: *The results showed that job satisfaction mediated the relationship between transformational leadership and IWB, while partially mediating the relationship between organizational culture and IWB. These findings highlight the importance of job satisfaction as a psychological mechanism by which relational and structural factors shape innovative behaviors.*
Conclusion*: Job satisfaction functions as a central mechanism that translates leadership and cultural influences into employee innovation. This emphasizes the importance of enhancing employee satisfaction to strengthen innovation capacity in bureaucratic organizations.*
Originality/value: *This research contributes by extending theoretical understanding of IWB within highly regulated defense SOEs and by offering a psychologically grounded model of innovation in strategic industries.*
Keywords: *Defense SOEs, innovative work, Job Satisfaction, Organizational culture, Transformational leadership*

INTRODUCTION

The defense industry holds a vital role in safeguarding national sovereignty and ensuring long-term security and stability. Facing global pressures such as rapid technological disruption, intensifying international competition, and the demand for continuous modernization of defense systems, organizations in this sector must embrace innovation, not only in product development but also in processes and human resource management. At the heart of this effort lies innovative work behavior (IWB), which refers to the ability of employees to create, communicate, and implement new ideas that improve organizational effectiveness (De Jong & Den Hartog, 2010; Janssen, 2000).

IWB does not occur in isolation but is shaped by organizational conditions and psychological factors. One significant antecedent is transformational leadership (TL), a leadership style centered on empowerment, motivation, and individual growth through four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass & Avolio, 1994). Empirical studies have consistently associated TL with creativity and innovation outcomes (Jaiswal & Dhar, 2015; Khan et al., 2020). More recent scholarship argues that the effect of TL on innovation often occurs indirectly, mediated by psychological mechanisms such as job satisfaction (Bednall et al., 2018; Hilton et al., 2023; Shalley & Gilson, 2004).

Alongside leadership, organizational culture (OC) is recognized as a central factor influencing innovation. D. Denison (1990) highlights four dimensions of an effective organizational culture: involvement, consistency, adaptability, and mission. An adaptive culture that values employee participation provides psychological safety, enabling experimentation and the expression of ideas without fear of failure (Scott & Bruce, 1994). In this way, OC serves as a set of values and norms that guide collective behavior that

supports innovation (Martins & Terblanche, 2003). Previous studies confirm this role, such as Nazir & Zamir (2015) in the service sector, who found a strong link between culture and IWB. Hilton et al. (2023) further observed that collaborative cultures act as a primary driver of innovation in strategic industries.

Job satisfaction (JS) also functions as a key psychological mechanism that channels the effects of leadership and culture into innovative behaviour. Employees who feel job satisfaction typically have higher motivation, openness to change, and a proactive attitude (Spector, 1997; Zhou & George, 2001). Prior research shows that supportive leadership and organizational cultures enhance satisfaction, which in turn drives innovation (Al-edenat, 2018; Eva et al., 2019; Lok & Crawford, 2004; Walumbwa & Lawler, 2003). More recent studies emphasize that psychological mechanisms are central to this process, as shown by Afsar & Umrani (2019; Choi et al., 2016), who demonstrated that motivation and empowerment facilitate innovative behaviours. In line with this view, Basir & Hamidah (2025), Srirahayu et al. (2023), and Simamora et al. (2025) further confirm that job satisfaction remains a critical factor in encouraging IWB, although its mediating role is still underexplored in strategic industries.

Despite these insights, most research has concentrated on private and commercial organizations, where structures are generally more flexible and less bureaucratic. In contrast, state-owned enterprises (SOEs) in the defense sector, such as PT Pindad in Indonesia, operate within rigid hierarchies and bureaucratic systems while carrying responsibility for strategic national projects. These unique characteristics may alter how leadership and culture shape employee innovation.

Therefore, this study examines the role of job satisfaction mediation in connecting transformational leadership and organizational culture with IWB within PT Pindad, a state-owned defense agency. Using a quantitative approach with PLS-SEM, this study aims to contribute to a theoretical understanding of innovation in formal and hierarchical settings, while offering practical recommendations for human resource strategies to drive innovation in strategic organizations.

METHODS

The study used a quantitative approach with an explanatory cross-sectional design to examine the causal relationship between TL, OC, JS, and IWB. Primary data collection was carried out through a structured questionnaire filled out by respondents. The research focused on permanent employees of PT Pindad (Persero), particularly from the arms, ammunition, and special vehicles divisions, as these units represent the company's core production activities.

Data were collected using a survey method with a structured questionnaire consisting of closed-ended items on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Respondents were selected through purposive sampling with the following criteria: (1) permanent employee status, (2) a minimum tenure of two years, and (3) direct involvement in technical or managerial tasks. A total of 288 valid responses were obtained; this number exceeded the minimum sample limit required for SEM-PLS analysis (Hair et al., 2019).

To ensure content validity, this research instrument was developed by adapting the scale used in previous studies. Each construct is measured using several indicators presented in the form of closed-ended statements. The dimensions, number of items, and sources are summarized in Table 1.

Table 1. Summary of Construct, Dimension, and Item

Variabel	Dimension	Number of Items	Source
Transformational Leadership	Idealized Influence (TL-II), Inspirational Motivation (TL-IM), Intellectual Stimulation (TL-IS), Individualized Consideration (TL-IC)	22	Bass & Avolio (1994)
Organizational Culture	Involvement (OC-I), Consistency (OC-C), Adaptability (OC-A), Mission (OC-M)	24	D. Denison (1990)
Job Satisfaction	Work Itself (JS-WI), Pay & Benefits (JS-PB), Supervision (JS-S), Coworkers (JS-C), Promotion & Career Development (JS-PCD)	25	Spector (1997)
Innovative Work Behavior	Idea Exploration (IWB-IE), Idea Generation (IWB-IG), Idea Championing (IWB-IC), Idea Implementation (IWB-II)	16	De Jong & Den Hartog (2010; Janssen, 2000)

Data were analyzed using SEM-PLS with SmartPLS version 4. Because all constructs were multi-dimensional, this study applies a repeated indicator approach, i.e., first-order indicators were used to form second-order constructs (Becker et al., 2012; Hair et al., 2019).

The analysis process was carried out in two stages. First, the measurement model was evaluated to assess the validity and reliability of the construct using outer loadings, AVE, HTMT ratios, CR, and CA. Second, the structural models were tested to examine the relationship among latent variables and mediating effects, with bootstrapping using 5,000 resamples to generate t-statistics and p-values (Hair et al., 2017). Additional evaluations include tests of multicollinearity (VIF), R^2, f^2, and Q^2 using the blindfolding procedure, as well as SRMR to assess model fit.

Based on theory and previous empirical findings, the following hypotheses were formulated:

H1: Transformational leadership has a positive effect on innovative work behavior.

H2: Organizational culture has a positive effect on innovative work behavior.

H3: Transformational leadership has a positive effect on job satisfaction.

H4: Organizational culture has a positive effect on job satisfaction.

H5: Job satisfaction positively influences innovative work behavior.

H6: Job satisfaction mediates the relationship between transformational leadership and innovative work behavior.

H7: Job satisfaction mediates the effect of organizational culture on innovative work behaviour.

The proposed conceptual framework illustrates both direct and indirect relationships among the variables, with job satisfaction serving as a mediating factor (see Figure 1).

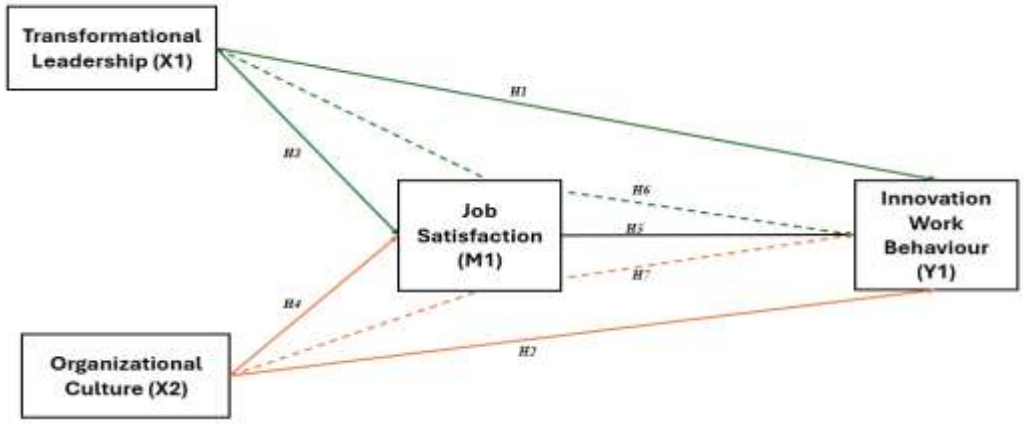

Figure 1. Conceptual Framework of the Study

RESULTS

Respondent Characteristics

Table 2 summarizes the respondents' demographic profile. The majority were employed in technical divisions of PT Pindad, with male employees comprising 88.5% of the sample. Most participants were between 35 and 44 years of age (41.7%) and had a high school or equivalent education background (47.9%). Regarding tenure, 37.5% had worked for 11–20 years, reflecting substantial organizational experience. The largest occupational group was staff (56.2%), followed by senior staff (33.3%) and managers (10.5%). Overall, these characteristics suggest that the sample represents a diverse cross-section of PT Pindad employees in terms of age, education, and tenure, while still being representative of the organizational structure.

Table 2. Respondent Demographic

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	255	88.5%
	Female	33	11.5%
Age	25–34 years	96	33.3%
	35–44 years	120	41.7%
	45–54 years	60	20.8%
	≥ 55 years	12	4.2%
Education	High School/Equivalent	138	47.9%

	Diploma	84	29.2%
	Bachelor (S1)	60	20.8%
	Postgraduate (S2)	6	2.1%
Year of Service	1–10 years	72	25.0%
	11–20 years	108	37.5%
	21–30 years	84	29.2%
	> 30 years	24	8.3%
Position	Staff	162	56.2%
	Senior Staff	96	33.3%
	Manager	30	10.5%

Evaluation of Measurement Models

The outer model was tested to ensure the validity and reliability of constructs, focusing on convergent validity, discriminant validity, and internal consistency.

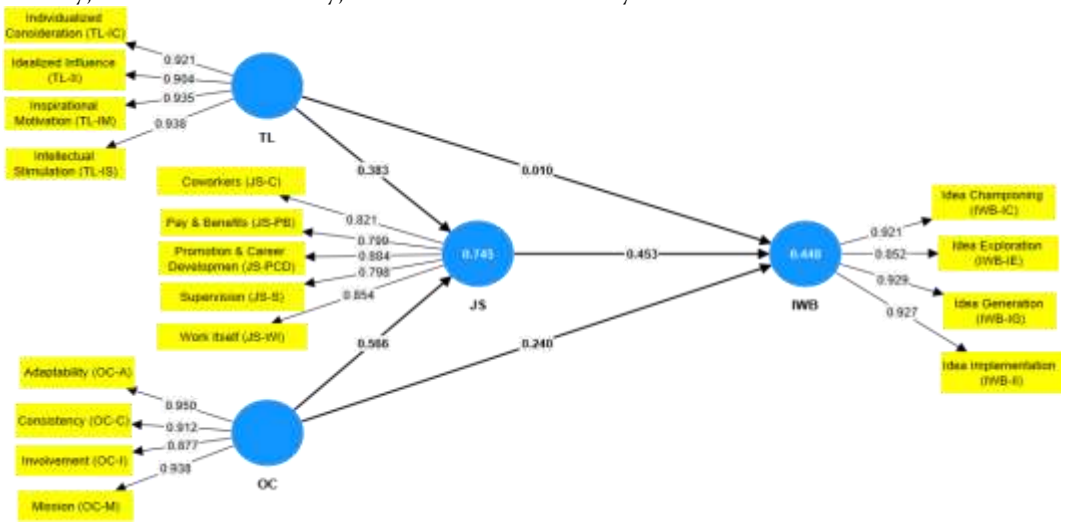

Figure 2. PLS- SEM Model Estimation Results

Convergent Validity

The results demonstrated adequate convergent validity, with all indicator loadings exceeding 0.70. Even the lowest values for job satisfaction (supervision = 0.798; pay & benefits = 0.799) met an acceptable standard. In addition, all Average Variance Extracted (AVE) scores also exceed 0.50 (IWB = 0.824; JS = 0.692; OC = 0.846; TL = 0.855), thereby affirming satisfactory convergent validity (Hair et al., 2021).

Table 3. Convergent Validity Results

Construct	Indicator	Outer loadings (>0,7)	AVE (>0,5)	Convergent validity
Transformational Leadership	Idealized Influence (TL-II)	0.904	0.855	Valid
	Individualized Consideration (TL-IC)	0.921		Valid
	Inspirational Motivation (TL-IM)	0.935		Valid
	Intellectual Stimulation (TL-IS)	0.938		Valid
Organizational Culture	Adaptability (OC-A)	0.950	0.846	Valid
	Consistency (OC-C)	0.912		Valid
	Involvement (OC-I)	0.877		Valid
Job Satisfaction	Supervision (JS-S)	0.798	0.692	Valid
	Work Itself (JS-WI)	0.854		Valid
	Mission (OC-M)	0.938		Valid
	Coworkers (JS-C)	0.821		Valid
	Pay & Benefits (JS-PB)	0.799		Valid

	Promotion & Career Development (JS-PCD)	0.884		Valid
Innovation Work Behavior	Idea Championing (IWB-IC)	0.921	0.824	Valid
	Idea Exploration (IWB-IE)	0.852		Valid
	Idea Generation (IWB-IG)	0.929		Valid
	Idea Implementation (IWB-II)	0.927		Valid

Discriminant Validity

Discriminant validity was assessed using the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT). The square root of AVE for each construct exceeded inter-construct correlations, fulfilling the Fornell–Larcker criterion (Fornell & Larcker, 1981). In addition, all HTMT values were below the 0.90 cutoff, with the highest value being 0.882 for OC ↔ JS, still within the acceptable range (Dijkstra & Henseler, 2015). These results confirmed discriminant validity.

Table 4. Fornell-Larcker Test Results

Construct	IWB	JS	OC	TL
IWB	0.908			
JS	0.655	0.832		
OC	0.613	0.812	0.920	
TL	0.501	0.746	0.640	0.925

Note: Diagonal values are √AVE. All √AVE > inter-construct correlations. HTMT values < 0.90 (maximum = 0.882).

Internal Reliability

The construct reliability test was carried out using Cronbach's alpha and composite reliability. The entire value exceeds 0.70, so the construct is declared to have a strong internal consistency (Hair Jr. et al., 2017).

Table 5. Construct Reliability Results

Construk	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)
IWB	0.928	0.931	0.949
JS	0.888	0.891	0.918
OC	0.939	0.942	0.956
TL	0.944	0.947	0.959

Taken together, these assessments confirmed that the measurement model achieved convergent validity, discriminant validity, and reliability, allowing subsequent testing of the structural model.

Evaluation of Structural Models

The structural model was evaluated through multicollinearity, magnitude of variance explained (R^2), effect size (f^2), predictive relevance (Q^2), and path significance.

Multicollinearity

The VIF values for all constructs were under 5, confirming that multicollinearity was not a concern (Hair Jr. et al., 2017).

Table 6. Inner Model VIF Values

Construct	IWB	JS	OC	TL
IWB				
JS	3,926			
OC	2,955	1,695		
TL	2,271	1,695		

Coefficient of Determination (R^2)

The R^2 for Job Satisfaction was 0.745, classified as substantial, while Innovative Work Behaviour had an R^2 of 0.448, indicating moderate explanatory power (Hair et al., 2017).

Table 7. R^2 Values

Endogenous constructs		R^2	R^2 Adjusted	Interpretation
IWB		0.448	0.442	Moderate
JS		0.745	0.743	Substantial

Effect Size (f^2)

Analysis of effect size revealed that OC → JS (f^2 = 0.743) had a large effect, TL → JS (f^2 = 0.340) had a moderate-large effect, JS → IWB (f^2 = 0.095) showed a small effect, and OC → IWB (f^2 = 0.035) was negligible. No effects were detected for TL → IWB. These results follow guidelines by Hair Jr. et al. (2017).

Table 8. Effect Size (f^2)

Path	f^2	Interpretation
JS → IWB	0.095	Small
OC → IWB	0.035	Negligible
OC → JS	0.743	Large
TL → IWB	0.000	No effect
TL → JS	0.340	Medium to large

Predictive Relevance (Q^2)

The Q^2 values were 0.506 for Job Satisfaction (high predictive relevance) and 0.361 for IWB (moderate predictive relevance), confirming the model's predictive capability (Hair Jr. et al., 2017).

Table 9. Q-Square (Q^2)

Endogenous constructs		Q^2	Interpretation
IWB		0.361	Moderate predictive power
JS		0.506	High predictive power

Path Coefficients and Significance

The bootstrapping results indicated significant paths for JS → IWB (β = 0.453, p < 0.001), OC → IWB (β = 0.240, p = 0.036), OC → JS (β = 0.566, p < 0.001), and TL → JS (β = 0.383, p < 0.001). However, TL → IWB was not significant (β = 0.010, p = 0.916).

Table 10. Path Coefficient Results

Path	β (Coefficient)	t-Statistik	p-Value	Decision
JS → IWB	0.453	3.902	0.000	Significant
OC → IWB	0.240	2.094	0.036	Significant
OC → JS	0.566	10.120	0.000	Significant
TL → IWB	0.010	0.106	0.916	Not significant
TL → JS	0.383	8.536	0.000	Significant

Mediation Analysis

The mediation analysis indicated that Job Satisfaction mediated both TL → IWB (β = 0.173, p = 0.001) and OC → IWB (β = 0.256, p < 0.001). Since TL → IWB was insignificant as a direct path, JS served as a full mediator in this relationship. Meanwhile, the OC → IWB path remained significant alongside the indirect effect, indicating partial mediation. These findings align with both the bootstrapping approach (Hair Jr. et al., 2017) and the mediation logic of Baron & Kenny (1986).

Table 11. Specific Indirect Effect

Mediation Path	Indirect Effect (β)	t-Statistik	p-Value	Dicision
OC → JS → IWB	0.256	3.599	0.000	Significant
TL → JS → IWB	0.173	3.394	0.001	Significant

Hypothesis Testing

Of the seven hypotheses, six were supported while one was rejected. Specifically, H1 (TL → IWB) was not supported, while H2–H7 were accepted. These results underscore the role of Job Satisfaction as a critical mechanism linking leadership and culture to innovative behaviours.

Table 12. Hypothesis Testing Results

Hypothesis	Path	β (Coefficient)	t-Statistik	p-Value	Decision
H1	TL → IWB	0.010	0.106	0.916	Rejected
H2	OC → IWB	0.240	2.094	0.036	Accepted
H3	TL → JS	0.383	8.536	0.000	Accepted
H4	OC → JS	0.566	10.120	0.000	Accepted
H5	JS → IWB	0.453	3.902	0.000	Accepted
H6	TL → JS → IWB (Full mediation)	0.173	3.394	0.001	Accepted
H7	OC → JS → IWB (Partial mediation)	0.256	3.599	0.000	Accepted

Of the seven hypotheses put forward, six were accepted and one was rejected. TL has no direct significant effect on (H1 is rejected), but its effect is fully mediated by JS (H6 is accepted). OC significantly affected IWB both directly and indirectly via (H2 and H7 accepted). These findings confirm that job satisfaction is a key psychological mechanism that bridges relational (TL) and structural (OC) influences on innovative work behavior, particularly in strategic organizations such as defense SOEs.

Model fit

Although PLS-SEM does not rely heavily on global fit indices, the SRMR value was 0.080, which meets the conservative cutoff (≤ 0.08) proposed by Dijkstra & Henseler (2015). The NFI value of 0.792 was slightly below the recommended 0.90 threshold but still within an acceptable range (Hair Jr. et al., 2017). Thus, the model demonstrated adequate fit.

The Influence of Transformational Leadership on Innovative Work Behaviors

The analysis revealed that the direct effect of TL on IWB was insignificant (β = 0.010; p = 0.916). This indicates that transformational leadership does not directly stimulate employee innovation, but rather operates through indirect mechanisms. These results differ from prior studies such as Jaiswal & Dhar (2015), Khan et al. (2020), and Dewi et al. (2025), which documented positive and direct associations between TL and innovation. The divergence in results may be attributed to the organizational context. PT Pindad, as a strategic state-owned enterprise, is characterized by hierarchical and bureaucratic structures that constrain the freedom to express innovative ideas, even when leadership styles are inspirational. These results are consistent with the work of Bednall et al. (2018), Shalley & Gilson (2004), and Hilton et al. (2023), who emphasize that the impact of TL on innovation is primarily mediated through psychological mechanisms, such as job satisfaction, rather than direct pathways.

The Influence of Organizational Culture on Innovative Work Behavior

The relationship between OC and IWB was significant (β = 0.240; p = 0.036). This suggests that adaptive, participatory, and consistent workplace environments enhance employees' willingness to propose and implement new ideas. These findings align with D. R. Denison & Mishra (1995), Scott & Bruce (1994), and Martins & Terblanche (2003), who emphasize the centrality of supportive and inclusive cultures in fostering innovation. More recent evidence, such as Nazir & Zamir (2015) in the service sector, also reinforces this association. Hilton et al. (2023) further highlight that collaborative cultures are critical drivers of innovation in strategic industries. Therefore, these findings confirm that organizational cultures that promote engagement, collaboration, and continuous learning are essential in enhancing IWB.

The Influence of Transformational Leadership and Organizational Culture on Job Satisfaction

Transformational leadership positively influenced job satisfaction (β = 0.383; p < 0.001), as did organizational culture (β = 0.566; p < 0.001). These findings suggest that leadership practices that provide emotional support and cultures that promote collaboration can strengthen employees' positive perceptions of their work. This outcome is consistent with motivation theory Spector (1997) and with studies by Walumbwa & Lawler (2003) and Lok & Crawford (2004), which demonstrated that supportive leadership and constructive cultures improve satisfaction and loyalty. More recent research by Eva et al. (2019) also supports these results, showing that leadership enhances psychological well-being, which in turn reinforces innovative behaviour.

The Effect of Job Satisfaction on Innovative Behavior

JS significantly predicted IWB ($\beta = 0.453$; $p < 0.001$). Employees who are satisfied with their jobs, relationships, and career opportunities are more likely to actively contribute new ideas and participate in innovation activities. This supports the affective theory of Spector (1997) and Zhou & George (2001), as well as contemporary findings from Kesting & Parm Ulhøi (2010) and Srirahayu et al. (2023), which emphasize that satisfaction motivates proactive behaviours. Recent studies further confirm this view: Bin Saeed et al. (2019) and Basir & Hamidah (2025) highlighted that satisfaction enhances intrinsic motivation, making it a strong predictor of innovative outcomes, while Simamora et al. (2025) provided evidence from Indonesian organizations, showing that job satisfaction significantly enhances employee performance and acts as a psychological mechanism linking organizational factors with innovation-related outcomes.

Mediation Analysis

Indirect effect results showed that job satisfaction served as a full mediator for TL → IWB ($\beta = 0.173$; $p = 0.001$) and a partial mediator for OC → IWB ($\beta = 0.256$; $p < 0.001$). Thus, job satisfaction emerges as a crucial psychological mechanism that transforms leadership and cultural influences into innovative actions. These findings echo Al-edenat (2018) and Eva et al. (2019), which highlight the mediating role of satisfaction in the relationship between leadership and innovation. In relation to the organisational culture, the results are also in line with Lok & Crawford (2004), while a systematic literature review by Basir & Hamidah (2025) further confirms that job satisfaction consistently functions as a strategic psychological channel, linking organizational contexts with innovation across diverse industries.

Managerial Implications

The results provide several practical insights for human resource management in strategic SOEs: First, transformational leadership should be complemented with initiatives that enhance job satisfaction, such as recognition, mentoring, and fair evaluation systems, to effectively foster innovation. Second, organizational culture must emphasize adaptability, inclusiveness, and collaboration to increase employee involvement in idea generation and implementation. Finally, management should implement policies that improve job satisfaction, including fair compensation, clear career development paths, and supportive working conditions. By focusing on these areas, organizations embedded within bureaucratic systems can still create an environment conducive to innovation.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

This study confirms that job satisfaction is a pivotal factor linking transformational leadership and organizational culture to IWB. Transformational leadership does not directly affect innovation but influences it indirectly through job satisfaction (full mediation). In contrast, organizational culture affects innovation both directly and indirectly, with job satisfaction serving as a partial mediator. These findings underscore the importance of psychological factors in optimizing leadership and culture within bureaucratic and hierarchical contexts, such as defense SOEs.

Recommendations

For PT Pindad and similar organizations, several recommendations can be drawn from the findings of this study. First, leadership development programs should emphasize inspirational motivation, intellectual stimulation, and individualized consideration to strengthen the role of transformational leadership. Second, organizational culture must be enhanced to become more adaptive and collaborative, thereby fostering experimentation and active employee engagement. Third, management should prioritize efforts to improve job satisfaction through strengthened incentive systems, transparent career progression, and supportive work environments.

In addition, this research also offers several directions for further research. Longitudinal design is recommended to observe the dynamics of relationships between variables over time. Comparative studies involving multiple organizations would further improve the generalizability of the results. Finally, the inclusion of moderating variables, such as innovation climate or organizational commitment, may enrich the conceptual model and provide deeper insights into the mechanisms driving innovative work behaviour.

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