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High-performance work systems and psychosocial safety climate influence work engagement through job satisfaction pathways

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Abstract
Purpose: This study aims to analyze the mechanisms through which high performance work systems and psychosocial safety climate affect employee work engagement with the consideration of job satisfaction as mediator in TIC sectors.
Methodology: A sample of 334 employees working across several provinces in Indonesia was surveyed, and Partial Least Squares Structural Equation Modelling was applied to analyze the data using Smart-PLS.
Results: The results confirmed both HPWS and PSC did not have a positive direct effect on work engagement. However, they had a positive indirect effect, respectively, on work engagement by increasing job satisfaction.
Conclusions: Thus, confirming the role of full mediation of job satisfaction. This study provides the first evidence of the comprehensive integration of two independent variables of HPWSs and PSC with mediation job satisfaction in one model, which has never been done in any previous studies, to employee outcomes in the context of service sectors, and it contributes to the field with important theoretical contributions, as well as managerial recommendations.
Limitations: This study is limited in the use of cross sectional, self report.
Contribution: The contribution: there has never been a previous study that integrates these 4 variables in one whole theoretical model. Literacy contribution, for the TIC (testing inspection certification business services sector, especially in the HR department.

Keywords: *High-Performance Work Systems (HPWS), Job Satisfaction, Psychosocial Safety Climate (PSC), Work Engagement*

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1. Introduction

Work engagement is a crucial element of employee well-being and business performance. It is essential, since teams exhibiting high engagement levels have demonstrated the potential to enhance business outcomes and bolster organizational sustainability and competitive advantage in the face of global changing pressure. In a dynamic organizational context and a progressively competitive work environment, enterprises must cultivate an atmosphere that is both productive and conducive to employee well-being. The pervasive digital transformation across various industrial sectors, including Indonesia, compels organizations to foster a supportive work environment; thus, it is essential to focus on work engagement, which signifies the emotional and cognitive involvement of employees in their tasks, as a crucial element in attaining equilibrium (Cabrera-Aguilar et al., 2023). A global survey on employee engagement by Gallup (2024), encompassing over 3.3 million workers across more than 100.000 teams and 50 diverse industries worldwide, indicates that the global employee engagement rate

reached 23% in 2023. Nonetheless, a considerable disparity in employee engagement persists between exemplary firms and the worldwide average, as well as within the United States, where employee engagement rates stand at 33% for the US and 70% for best practice organizations in 2023.

The employee engagement survey conducted by Gallup (2024) indicates that in Indonesia, the percentage of disengaged employees is notably higher at 68.78%, while the engaged percentage is merely 25.28%, with 5.93% classified as actively disengaged, based on a survey of 791 employees from 2021 to 2023. The aforementioned data pertains to employee engagement, yet it can also reflect general engagement, as employee engagement encompasses the involvement and enthusiasm of individuals in both their tasks and work environment (Gallup, 2024). In contrast, work engagement is a more specific construct, meaningful experiencecharacterized by a positive and fulfilling connection to one's job. This experience is reflected through sustained energy (vigor), a strong sense of purpose and enthusiasm (dedication), and full immersion in one's work (absorption). Importantly, this mental state is enduring and generalized, not tied to a specific object, situation, person, or action, but rather represents a deeper emotional and cognitive connection to the nature of work itself (Schaufeli, Bakker, & Salanova, 2006).

Work engagement can be understood as a positive and meaningful psychological state that individuals experience in relation to their jobs, often expressed through high energy (vigor), strong involvement (dedication), and deep focus (absorption). This state of mind is generally long-lasting and broad in nature, not directed at any one event, task, or person (Schaufeli et al., 2006). Over the years, research has shown that work engagement plays a vital role in shaping positive organizational outcomes. A review by Kim, Kolb, and Kim (2013), found that engagement is strongly linked to improved organizational performance and serves as a key link between various driving factors such as personal strengths and job resources and actual performance outcomes. Support for these findings is evident in the study by Tims, Bakker, Derks, and Van Rhenen (2013) which explored the experiences of healthcare workers in the Netherlands. Their results revealed that engagement, both on an individual and group level, helped explain how greater access to job resources both structural and social as well as increased challenging job demands, led to better job performance.

In Indonesia, a study by Niswaty, Wirawan, Akib, Saggaf, and Daraba (2021) found that authentic leadership and psychological capital are important predictors of work engagement in public sector employees. Interestingly, they also found that leaders who are authentic not only directly enhance engagement but also foster the psychological strength that underpins it. Similarly, research by Sudibjo and Riantini (2023) involving teachers in Jakarta and Bogor revealed that while meaningful work plays a role in shaping engagement, its impact is relatively smaller compared to the more direct influences of supportive organizational environments and servant leadership. These collective insights highlight a crucial point: employees who are truly engaged are not just contributors they are strategic assets that drive the long-term health and effectiveness of any organization. Despite the growing attention this topic has received, most studies continue to focus on specific sectors and tend to overlook the service industry in Indonesia. This indicates a clear opportunity for future research to explore additional variables that may influence work engagement especially in relation to high-performance work systems, psychological safety in the workplace, and overall job satisfaction.

High-Performance Work Systems (HPWS) represent a thoughtfully integrated set of human resource practices designed to help employees grow, stay committed, and perform at their best. When applied together, these practices work in harmony to build employees' skills, encourage motivation, and deepen their sense of engagement within the organization Dorta-Afonso, Romero-Domínguez, and Benítez-Núñez (2023), and have emerged as a central focus in contemporary human resource management strategies due to their impact on overall organizational performance. Dorta-Afonso, González-de-la-Rosa, Garcia-Rodriguez, and Romero-Domínguez (2021) discovered in their resarch on hotel employees in the Canary Islands that HPWS positively influenced quality of life, satisfaction, motivation, and organizational commitment. A study by Stirpe and Zárraga-Oberty (2017) included 537 workplaces with over 200 employees in the UK indicated that HPWS reduced retention outcomes in highly feminine workplaces compared to those that were less feminized.

The efficacy of HPWS is demonstrated through 7 (seven) interrelated main dimensions. Dorta-Afonso et al. (2023) shown that HPWS, characterized by seven essential features, exert a favorable and significant impact on job satisfaction, both directly and indirectly through the mediating effect of burnout, among hotel employees in the Canary Islands. Research by Zhang, Zhu, Dowling, and Bartram (2013) on medical practitioners and administrative personnel in China indicated that HPWS can lead to either work engagement or emotiobnal exhaustion, contingent upon employees' perceptions of the employee-employer relationship. Specifically, a perception of economic exchange heightens the probability of HPWS inducing emotional exhaustion, whereas a perception of social exchange diminishes the likelihood of HPWS fostering employee wotk engagement. However, this study has not been performed in Indonesia, particularly within the service sector, which connects HPWS to work engagement via the mediating effect of job satisfaction.

The concept of Psychosocial Safety Climate (PSC) has surfaced as an essential element in fostering a workplace atmosphere conducive to the psychological well-being of employees. PSC is characterized as an organizaational environment conducive to the psychological safety and well-being of employees, encompassing collective perceptions related to the policies, practices, and procedures designed to safeguard their psychological health and safety (Dong & Li, 2024). The investigation carried out by Geisler, Berthelsen, and Muhonen (2019) concerning social service workers in Sweden demonstrated a positive correlation between PSC and work engagement, satisfaction, and organizational commitment. In this study, PSC is expressed through 4 (four) main dimensions that are interrelated and mutually reinforcing. The thorough execution of these 4 (four) dimensions establishes a robust basis for cultivating a workplace that fosters employee psychosocial well-being. Furthermore, a study by Yu and Li (2020) focusing on male mine workers in China indicated that PSC has the potential to mitigate unsafe behaviors by influencing work stress and job burnout as mediating factors. Moreover, Y.-H. Huang et al. (2016) on truck drivers in the United States demonstrated that favorable employee evaluations of the safety climate at both the organizational (OSC) and group (GSC) levels correlated with increased Workplace contentment and workforce involvement. Furthermore, a study by Gan and Kee (2022) on young academics at a research university in Malaysia revealed that the relevance of psychological safety climate in promoting the significance of employee engagement and job fulfillment lies in their function as protective factors against the adverse consequences of work demands. Nevertheless, similar research has not been undertaken in Indonesia, particularly within the service sector, which connects PSC to work engagement via the mediating influence of job satisfaction.

Regarded as a key psychological outcome stemming from how individuals perceive and evaluate their job roles, job satisfaction is essential to employees' overall well-being and workplace functioning (Ninaus, Diehl, & Terlutter, 2021) and has been demonstrated to significantly influence various organizational results. Research by Hoboubi, Choobineh, Ghanavati, Keshavarzi, and Hosseini (2017) on employees in Iran's petrochemical industry indicated that productivity rises with an increase in average job satisfaction scores. A study by Yuen, Loh, Zhou, and Wong (2018) on seafaring officers demonstrated that job satisfaction positively influences work performance. Then, a study by Salleh, Lohana, Kumar, and Nooriza (2024) on employees of oil and gas companies in Malaysia demonstrated that job satisfaction positively and significantly influences talent retention. Research by Y.-H. Huang et al. (2016) on truck drivers in the United States indicates that job satisfaction significantly mediates the relationship between safety climate to 2 (two) talent management results: employee connectedness and resignation levels. Nevertheless, such research has not been undertaken in Indonesia, particulartly within the service sector, which highlights the relevance of job satisfaction in its intermediary role between HPWS and PSC regarding work engagement.

Gallup's global poll findings indicate that employee engagement remains a considerable challenge worldwide. This underscores the imperative to enhance engagement across industries. Moreover, the aforementioned data indicates that best-practice firms exhibit significantly greater engagement levels than the worldwide everage. This highlights the significance of an appropriate strategy, such as the implementation of HPWS, to enhance work engagement. Furthermore, the aforementioned data indicates that employee engagement levels in Indonesia remain inferior to those of best-practice firms. Previous studyies reveal a substantial gap in comprehending the mechanisms that connect HPWS and

PSC to work engagement, particulartly with the mediating influence of job satisfaction. While other studies have examined the partial correlations among these factors, a thorough investigation that consolidates these 4 (four) constructs into a cohesive theoretical model, particularly within the Indonesian industry environent, remains absent. This research sets out to address this gap by assessing the influence of HPWS and PSC on employee work engagement, mediated by job satisfaction, at PT InspecCo, a State-Owned Enterprise (BUMN) involved in consulting services, certification, inspection and audit, testing and analysis, and training in Indonesia. The global and national phenomena previously discussed are pertinent to the circumstances at PT InspecCo, where analogous obstacles in enhancing work engagement are experieneced.

According to the data from PT InspecCo, during the past 5 (five) years, the patterns of the Employee Satisfaction Index (ESI) and Employee Engagement Index (EEI) have exhibited swings, demonstrating a drop until 2022, followed by a resurgence in 2023 and 2024. Despite the favorable trend observed in 2024, the increase does not yet signify optimal stability, particularly for work engagement (EEI), which exhibits a lower average value relative to the EEI of the past 5 (five) years. Work engagement is a crucial element that signifies employee perceptions of job satisfaction, work experience, work environment, and psychological well-being. PT InspecCo, operating in a high-pressure work environment, encounters risks that may affect job satisfaction and work engagement. Fluctuations in the EEI suggest internal factors warranting further investigation, particularly with the possibility for job satisfaction within the PT InspecCo work environment, which may influence the sustainability of employee engagement and productivity.

PT InspecCo, as a strategic state-owned enterprise (BUMN) that engaged in the technical services business, significantly contributes to the support of various industrial sectors through aforementioned services. This position is becoming more significant in the context of digital transformation and globalization, which drive companies to enhance their competitiveness and the quality of their services. The success of PT InspecCo is significantly reliant on the effective performance of its employees under these conditions. Nonetheless, obstacles in the field are frequently inevitable, including significant work pressure from stringent targets, the intricacies of tasks, and the necessity to consistently adjust to emerging technologies. This pressure may diminish job satisfaction among employees. If not addressed effectively, it could adversely affect work engagement and, in turn, organizational productivity.

Additionally, establishing a supportive work system, like high-performance work systems (HPWS), along with fostering a positive safety climate (PSC), are crucial elements that can assist organizations in navigating these challenges. However, so far, there has been no research that has thoroughly explored the combination of both factors simultaneously, which could enhance staff involvement in their roles facilitated by the intermediary role of job satisfaction, particularly in Indonesia as applied in PT InspecCo**.** This study aims to offer pertinent management strategy recommendations to enhance the significance of HPWS and PSC on employee job dedication by elevating job satisfaction. This study is crucial for gaining a comprehensive understanding of the relationship, serving as a foundation for PT InspecCo and analogous sectors to formulate more effective human resource management strategies. This study offers both academic contributions and enhances managerial practices in Indonesia's strategic service industry, particularly for PT InspecCo.

2. Literature review

2.1. Work Engagement

Berger and Berger (2017) in their book defined work engagement as a psychological condition in the workplace characterized by employee focus, dedication, and a sense of energy and passion for their tasks. Work engagement, in conjuction with organizational commitment, has been demonstrated to exert the most significant influence on critical personnel outcomes, including employee performance, retention, and organizational performance. This aligns with Armstrong (2020), who asserts in his book that work engagement refers to the phenomenon where individuals exhibit interest and positivity, often demonstrating passion for their work. They engage in discretionary behaviors, opting to exceed expectations "going the extra mile", and are driven to attain elevated performance levels.

2.2. High-Performance Work Systems (HPWS)

This study focuses on two main independent variables HPWS and Psychosocial Safety Climate (PSC) both of which are found to play an important role in shaping employee work engagement. As noted by discussed further by Sun, Aryee, and Law (2007), research in strategic human resource management has often taken one of two perspectives when evaluating high-performance HR practices: the resource-based approach or the control-based approach. The resource-based approach emphasizes the development of internal talent through practices such as employee training and clear, expansive career development pathways (Sun et al., 2007).

In contrast, the control-based approach focuses more on managing and supervising employee performance through established rules and procedures (Sun et al., 2007). Within the framework of high-performance human resource practices, three main subsystems work together to support employee engagement and organizational success. The first focuses on how people enter, move within, and grow inside the organization. This includes not only hiring and promotions but also opportunities for training and skill development that help employees advance in their careers. The second area involves how organizations assess and reward performance covering both the evaluation of individual achievements and the compensation and benefits offered in return. The third area emphasizes the relationship between employees and the organization, particularly how jobs are structured and the extent of employee involvement in organizational decision-making that impacts their roles and daily functions. Together, these systems aim to create a workplace that supports both individual growth and collective performance.

2.3. Psychosocial Safety Climate (PSC)

Denison (1996) through his literature review, clarified the distinction between organizational climate and organizational culture. Organizational climate is understood as the collective perception of organizational members regarding the work environment, including its structures, practices, and interpersonal dynamics and respond to their immediate work environment how it shapes their thoughts, emotions, and behaviors. It is typically seen as short-term, subjective, and relatively easier to influence, especially by those in leadership positions. On the other hand, organizational culture goes deeper; it reflects the shared values, beliefs, and historical experiences that have evolved over time within the organization. Unlike climate, culture is more deeply rooted and complex, making it far less susceptible to direct change. A more specific element within the broader category of organizational climate is what is known as the safety climate. This refers to how employees interpret and assess their organization's commitment to safety particularly how management communicates, enforces, and demonstrates its dedication to organizational measures and standards concerning employee safety (Dollard et al., 2024).

2.4. Job Satisfaction

Shields et al. (2015) conceptualize job satisfaction as the cumulative positive or negative emotional response individuals develop concerning their occupational roles and the broader organizational setting. This encompasses attitudes and affective states concerning specific job aspects, including satisfaction or dissatisfaction with performance management procedures and outcomes, rewards determination processes, and career development opportunities. Satisfaction at work represents a state of emotional well-being that develops as a consequence of how employees perceive and make sense of their roles and experiences within the organizational setting (Zumaroh & Kusumawati, 2024). It is a critical factor in an employee's life (Ninaus et al., 2021) and significantly influences work motivation, work quality, career decisions, personal health, and relationships with coworkers (Alakhras, Al-Mousa, & Lewis, 2022). Job satisfaction significantly influence performance, commitment, and effectiveness (Dorta-Afonso et al., 2023).

3. Methodology

This study employed the Krejcie and Morgan (1970) formula for finite populations, determining a required sample size of 332 permanent employees. Participants were selected based on functional employment level, a minimum of 6 (six) years of work experince, and birth years ranging from 1980 to 1996, categorizing them as millennials. An online questionnaire was administered using LimeSurvey. The questionnaire included 1 (one) identity field and 4 (four) fields pertaining to variables, along with

short answer items that respondents were required to complete, with an average completion time of approximately 5 (five) to ten minutes. The questionnaire includes details regarding the security of the respondent's identity and responses, along with inquiries about the willingness to complete the questionnaire, addressing ethical considerations in participation in this study. The researcher utilized a 7-point Likert scale in the distributed questionnaire, as it offers a greater range of response options that more accurately reflect respondents' attitudes and opinions. This approach enhances respondents' reasoning by enabling them to articulate their true feelings more effectively (Joshi, Kale, Chandel, & Pal, 2015).

Work engagement was measured using the Indonesian version of UWES-9 (Kristiana & Purwono, 2019). HPWS was assessed using a scale adapted from Kloutsiniotis and Mihail (2020), based on (Sun et al., 2007). PSC was measured using PSC-12, while job satisfaction used a shortened MSQ (Chao, Jou, Liao, & Kuo, 2015). All items applied a 7-point Likert scale. To address common method variance, validated items were clearly worded, scale formats were varied, and anonymity was emphasized. Harman's single-factor test was conducted (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Data were analyzed using PLS-SEM via SmartPLS 4 and SPSS 25, chosen for its suitability in handling complex, formative models and non-normal data (Dorta-Afonso et al., 2023; Emur & Satrya, 2025).

4. Results and discussion

4.1. Result

4.1.1. Assessment of The Outer Model

To evaluate indicator reliability, defined as the proportion of variance explained by the construct (minimum threshold of 50%), it is essential to examine indicator loadings (Hair Jr et al., 2021). Indicator loadings should be at least 0.708, as this threshold signifies that the construct accounts for 50% of the indicator variance (Hair Jr, Risher, Sarstedt, & Ringle, 2019). The result indicates that the Composite Reliability (CR) exceeded 0.7 across all constructs. The rho A exceeded 0.7 in all instances (Dijkstra & Henseler, 2015). The proposed first-order model demonstrated a satisfactory level of internal consistency reliability. Following the analysis of reliability, an examination of validity was conducted.

To assess discriminant validity defined as the extent to which a construct is empirically distinguishable from other constructs in the model two key approaches were applied: the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio (Hair Jr et al., 2021). The results show that both assessments confirmed acceptable discriminant validity. Based on Fornell and Larcker's method, the square roots of the AVE values (shown in bold along the diagonal) were consistently greater than the inter-construct correlations (presented below the diagonal) (Fornell & Larcker, 1981). For the HTMT analysis, most of the values (italicized above the diagonal) remained below the conservative threshold of 0.85, in accordance with the guidelines proposed by (Henseler, Ringle, & Sarstedt, 2015). While three specific HTMT values MSC-MP: 0.878, MP-OC: 0.879, and VI-DE: 0.865 slightly exceeded this benchmark, they were still under the more liberal cut-off of 0.90, which is considered acceptable when constructs are conceptually related within a unified theoretical model (Hair Jr, Hult, Ringle, & Sarstedt, 2017). Moreover Franke and Sarstedt (2019), noted that slight deviations beyond the HTMT threshold do not necessarily pose a validity threat, especially when the constructs are conceptually distinct and the Fornell-Larcker condition is satisfied. As such, the model's discriminant validity is considered to be established.

Following the confirmation of the first-order measurement structure, a sequential procedure was implemented to construct the higher-order (second-order) model. The indicators corresponding to each underlying dimension of the higher-order construct were carefully organized and grouped. These dimensions were conceptualized as latent indicators, with their respective scores functioning as formative components of the overarching construct (Wright, Campbell, Thatcher, & Roberts, 2012). The resulting second-order model featuring HPWS as the higher-order construct underwent a separate validation process, reflecting its formative measurement characteristics (Hair Jr et al., 2017). To assess multicollinearity among the formative indicators, Variance Inflation Factor (VIF) values were computed for each dimension.

Table 1. Validation of the second-order model

Constructs	Dimensions	Weights	Sig. of Weights	VIF	Loadings
HPWS	REC1	0.243	0.000	2.209	0.757
	REC2				0.727
	REC3				0.536
	REC4				0.728
	TRA1	0.202	0.000	2.315	0.701
	TRA2				0.737
	TRA3				0.748
	SEC1	0.160	0.000	1.885	0.642
	SEC2				0.527
	SEC3				0.643
	PER1	0.236	0.000	2.341	0.81
	PER2				0.8
	PER3				0.791
	INC1	0.131	0.000	1.72	0.617
	INC2				0.66
	DEC1	0.109	0.000	1.604	0.602
	DEC2				0.6
	DES1	0.212	0.000	1.773	0.694
	DES2				0.697
	DES3				0.727

The results presented in Table 1 indicate that there was no significant collinearity issues identified. The significance level of the weights is observed because it may undermine the model's quality is discussed (Hair Jr et al., 2017). Significant observations were made. The individual loadings were assessed to determine the necessity of removing these items from the model. According to the guidelines proposed by Hair Jr et al. (2017) items with factor loadings of 0.5 or above are considered acceptable for inclusion. In this analysis, all indicator loadings satisfied the recommended threshold, and prior assessments revealed no indications of multicollinearity (Hair Jr et al., 2019). As a result, all items were maintained in the model. The structural validity of the second-order construct was thus successfully established.

4.1.2. Assessment of the Inner Model

The concluding stage of the PLS-SEM analysis involved assessing the inner model. The VIF values of the constructions were initially calculated. No collinearity issues were identified, since all values remained below 3. Secondly, the path coefficient (β), Confidence Intervals (CI), and the significance level of the proposed hypotheses were analyzed (see Table 2).

Table 2. Hypothesis testing

	β	t	95% CI
Direct effects (paths)			
(H1) HPWS → WE	0.058	0.761	[-0.055; 0.194]
(H2) PSC → WE	0.106	1.473	[-0.007; 0.229]
(H3) JS → WE	0.659	8.9	[0.526; 0.767]
Mediation test			
(H4) HPWS → JS → WE	0.231	4.499	[0.146; 0.314]
(H5) PSC → JS → WE	0.242	5.095	[0.163; 0.319]

Note: bootstrapping based on n = 5,000 subsamples; $p < 0.05$

The results presented in Table 2. HPWS exhibited a positive but statistically insignificant effect on work engagement (β=0.058, t=0.761, p<0.05), thus NOT supporting H1. It can also be seen that PSC exhibited a positive but statistically insignificant effect on work engagement (β=0.106, t=1.473, p<0.05), thereby also NOT supporting H2. In contrast to prior analyses, job satisfaction exhibited a

positive and significant impact on work engagement (β=0.659, t=8.9, p<0.05), thus supporting H3. Furthermore, H4 posited that job satisfaction mediates the relationship between HPWS and work engagement. In accordance with Nitzl, Roldan, and Cepeda (2016), the initial step in assessing the potential existence of a mediation effect is to evaluate the significance of the indirect effect (HPWS → job satisfaction → work engagement). Table 2 reveals that this effect was statistically significant (β=0.231, t=4.499, p<0.05), thus confirming the mediating effect and supporting H4. Consistent with prior analysis, H5 posits that job satisfaction mediates the relationship between PSC and work engagement. The results aligned with the prior hypothesis, demonstrating statistical significance (β=0.242, t=5.095, p<0.05), thereby confirming the mediating effect and supporting H5.

The second step examines the significance of the direct effect (HPWS → WE and PSC → WE) to determine the nature of mediation (full versus partial). The direct effect was not significant (β=0.058, t=0.761, p<0.05 for HPWS → WE and β=0.106, t=1.473, p<0.05 for PSC → WE), indicating full mediation for both variables. Both represent complementary full mediation, as both the direct and indirect effects are aligned in the same positive direction. The findings indicate that a segment of the direct effect of HPWS on work engagement is mediated by job satisfaction, while HPWS also accounts for a portion of work engagement that is independent of job satisfaction (Carrión, Nitzl, & Roldán, 2017). Additionally, for the H5, a segment of the direct effect of PSC on work engagement was mediated by job satisfaction, while PSC also accounts for the portion of work engagement that is independent of job satisfaction (Carrión et al., 2017). The Variance Accounted For (VAF), which assesses the ratio of the indirect effect to the total effect, was calculated to confirm and reinforce this result (Nitzl et al., 2016). The VAF was 0.799 for H4 and 0.695 for H5. Hair Jr et al. (2017) indicate that VAF values below 0.2 signify the absence of mediation, values between 0.2 and 0.8 reflect partial mediation, and values exceeding 0.8 denote full mediation. The mediation hypotheses proposed received support.

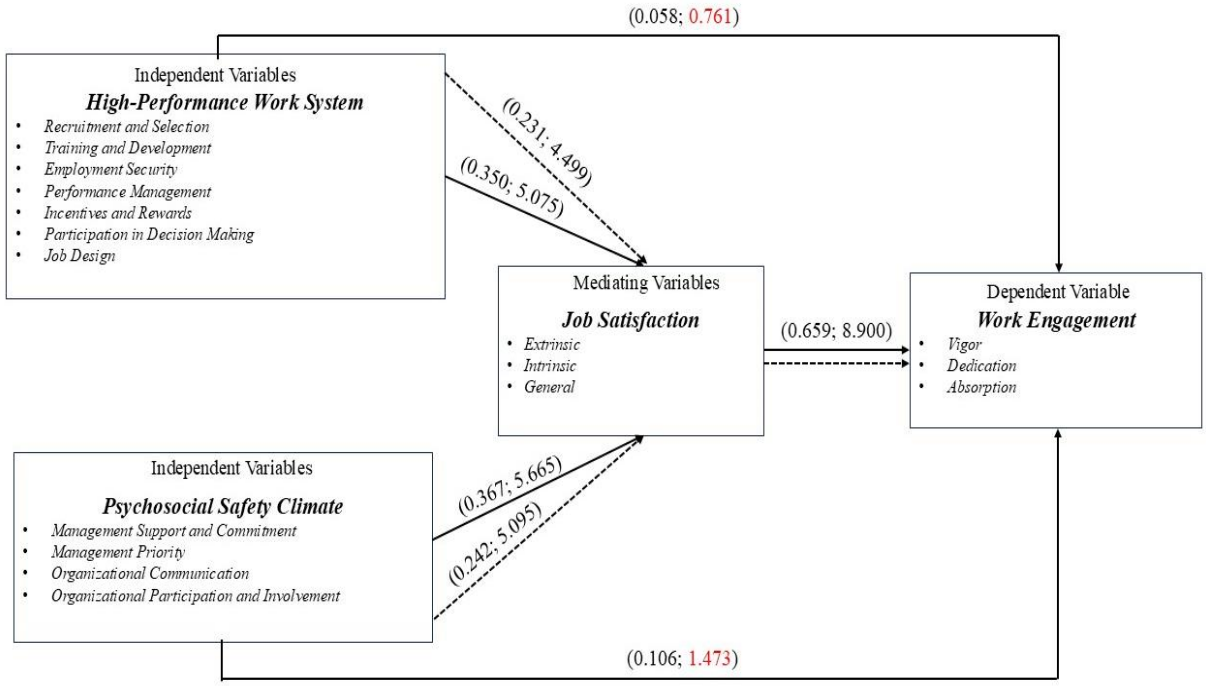

Figure 1. Results of the Proposed Model

The last phase in assessing the inner model involved evaluating the models' explanatory power, represented by the R^2 values of the constructs. Table 3 below reveals that the model accounts for 58.9% of the variance in work engagement and 43.4% of the variance in job satisfaction. According to Hair Jr et al. (2019), the model exhibited moderate explanatory power for job satisfaction, with values ranging from 0.25 to 0.50, and substantial explanatory power for work engagement, with values exceeding 0.50. Finally, the analysis of the model's predictive relevance, indicated by Q^2 values, reveals that all Q^2

values in Table 3 exceed 0, as required by Hair Jr et al. (2017), with the exception of PSC, which suggest a limited influence and indicates that the model's predictive accuracy for these variables is compromised.

Table 3. R^2 values for coefficient of determination of endogenous constructs and Q^2 values for predictive relevance variables

Variable	R^2	Q^2
HPWS	-	0.472
PSC	-	0.000
WE	0.589	0.391
JS	0.434	0.208

4.2. Discussion

This research investigated the influence of High-Performance Work Systems (HPWS) and Psychological Safety Climate (PSC) on employee work engagement, emphasizing both their direct impacts and their indirect roles mediated by increased job satisfaction. Enhancing job satisfaction emerges as a strategic priority for both employees and organizational leadership, particularly in the context of globalization and evolving workplace dynamics. The findings confirmed that HPWS and PSC not only have significant direct effects on work engagement but also contribute indirectly by fostering greater job satisfaction. The following sections elaborate on the theoretical implications and provide practical recommendations for organizational practice based on these insights.

This study offers numerous notable theoretical additions to the current literature on HPWS, PSC, job satisfaction, and work engagement within the service sector. First, our findings enhance the existing literature on both HPWS and PSC by clarifying the mechanisms through which these organizational factors influence employee work engagement. While the researcher did not identify direct effects of both HPWS and PSC on work engagement, our findings indicated significant indirect effects through job satisfaction. This corresponds with the mutual gains perspective (Shi, Van Veldhoven, Kooij, Van De Voorde, & Karanika-Murray, 2024), which suggests that organizational practices and climate factors can yield advantages for both organizations and employees when properly and effectively implemented. These findings build upon prior study by Zhang et al. (2013), which indicated that HPWS can lead to either work engagement or emotional exhaustion, contingent upon employee perceptions of the employee-employer relationship. Likewise, they enhance the research conducted by Teoh and Kee (2020); Garrick et al. (2014), which demonstrated positive relationships between PSC and work engagement through mediating mechanisms. This study indicates that job satisfaction has a crucial mediating function in these associations, possibly elucidating the contradictory findings of prior studies about the direct connections between HPWS-work engagement and PSC-work engagement.

Second, this research elucidates the methods by which organizational characteristic influence employee outcomes. Although previous studies have identified relationship between HPWS and outcome such as performance Fu et al. (2017) and retention (Stirpe & Zárraga-Oberty, 2017), as well as between PSC and employee well-being indicators, the specific pathways behind these impacts are inadequately explored. Our findings support the idea that both HPWS and PSC first improve job satisfaction, subsequently resulting in heightened work engagement. This aligns with (Y. Huang, Ma, & Meng, 2018) finding, which indicate that job satisfaction enhances employee engagement and mediates the connection between organizational characteristics and employee engagement. By identifying job satisfaction as a key mediator, our study provides a more comprehensive understanding of these relationship, addressing a notable gap in the literature concerning mediating mechanisms within the technical service business.

The third contribution of this study enhances the application of Social Exchange Theory (SET) by examining the influence of organizational practices and climate factors on employee outcomes. The reciprocity rule of Social Exchange Theory and organizational support theory suggest that employees who perceive organizational investment in their well-being through HPWS or prioritize psychological health and safety through PSC are inclined to respond with positive attitudes and behavior. The findings

indicate that the reciprocation process unfolds sequentially: organizational practices and climate factors signal investment in employees, thereby enhancing job satisfaction and subsequently increasing work engagement. The sequential process clarifies the lack of significant direct relationships between both HPWS and PSC on work engagement in this study. Job satisfaction among employees initially arises from organizational practices and climate, subsequently leading to the vigor, dedication, and absorption that define work engagement (Schaufeli et al., 2006).

Fourth, this research provides insights into the application of the Job Demands-Resources (JD-R) model Bakker and Demerouti (2017) within the context of the technical service industry. From this theoretical perspective, HPWS and PSC can be viewed as organizational resources that enable employees to manage daily demands and obtain support from management, thereby improving job satisfaction and, in turn, work engagement. The findings indicate the HPWS function as organizational resources through practices including recruitment and selection, training and development, employment security, performance management, incentives and rewards, participation in decision-making, and job design. Similarly, PSC represents a resource that enhances employee psychological health and safety. These resources provide employees with the necessary tools to perform their tasks efficiently, resulting in increased job satisfaction and, ultimately, enhanced work engagement.

Fifth, this study contributes to the date on the uniform benefits of HPWS for organizations and employees. Some researchers contend that HPWS may elevate job demands and adversely affect employee well-being (Dimple & Kuriakose, 2025). However, our findings indicate that when HPWS improves job satisfaction, it can indirectly promote work engagement. This is consistent with findings in the hotel sector, indicating that HPWS has a positive impact on quality of life (Dorta-Afonso et al., 2021) and job satisfaction, while also mitigating burnout (Dorta-Afonso et al., 2023). However, the lack of significant direct effects indicates that HPWS by itself is inadequate for enhancing engagement; it must first have a positive influence on job satisfaction. This understanding reconciles conflicting findings in prior literature and provides a more balanced perspective on the effects of HPWS.

Furthermore, this study enhances comprehension of the dimensional facets of work engagement as influenced by job satisfaction. The significant statistical correlation between job satisfaction and work engagement indicates that job satisfaction notably enhances the dedication aspect of work engagement, which is defined by feelings of significance, enthusiasm, inspiration, and pride. This supports Schaufeli and Salanova (2007) dimensional framework of work engagement and offers empirical evidence that satisfaction enhances these particular engagement dimensions in a technical service environment. This finding is significant in a sector with limited prior research, providing new insights into the relationship between employee attitudes and engagement behaviors that influence service quality and organizational reputation.

Additionally, this research enhances the literature on PSC by affirming that PSC constitutes a unique organizational climate centered on psychological health and safety, as defined by (Bakker & Bal, 2010). The significant indirect effect of PSC on work engagement through job satisfaction corresponds with characterization of PSC as an organizational context that fosters employee psychological health and safety. This reinforces the theoretical framework of PSC as a construct that includes management support and commitment, management priority, organizational communication, and organizational participation.

Lastly, this study addresses a significant gap in the literature on work engagement in the service sector experiencing digital transformation. This study is one of the initial investigations into the relationships among HPWS, PSC, job satisfaction, and work engagement in the inspection, certification, and audit sector, specifically in Indonesia. The findings present empirical evidence indicating that job satisfaction serves as a more immediate and potent predictor of work engagement compared to either HPWS or PSC, underscoring the significant influence of employee attitudes in fostering engaged workforces. This enhances theoretical comprehension of engagement antecedents in service environments where the quality of human interaction significantly influences organizational success and reputation, especially pertinent for technical service providers where trust and service integrity are critical.

5. Conclusions

5.1. Conclusion

This study underscores the significance of HPWS, PSC, and job satisfaction for technical service sector due to their impact on essential employee attitudinal outcomes, especially work engagement. However, HPWS and PSC do not have a positive direct effect on work engagement, but HPWS and PSC have a positive indirect effect on work engagement by increasing job satisfaction. Given the critical significance of employee work engagement for the efficacy of the service industry, the researchers anticipate that scholars and practitioners will find this study beneficial. We anticipate that our findings will encourage the initiation of further research on HPWS and PSC from an employee-centric perspective to enhance understanding of how to achieve greater workforce satisfaction and engagement in technical service enterprises.

5.2. Limitations and Suggestions

Despite the theoretical and practical contributions of this study, several limitations should be acknowledged. First, the research employed a cross-sectional design, which limits the ability to draw causal inferences between the examined variables. Longitudinal data would offer deeper insights into the temporal dynamics between HPWS, PSC, job satisfaction, and work engagement. Second, the study relied on self-reported data, which may introduce common method bias despite the procedural and statistical controls applied. Third, the sample was limited to millennial employees within a single state-owned technical service company in Indonesia, which may restrict the generalizability of findings across different sectors, generations, or organizational types. Future research is encouraged to adopt longitudinal or experimental designs to better establish causal relationships and observe changes in engagement patterns over time. Additionally, incorporating multisource data such as supervisor ratings or objective performance measures can reduce self-report bias and enrich the robustness of the findings. Researchers may also explore moderating variables such as leadership style, perceived organizational support, or organizational culture to determine under what conditions HPWS and PSC are most effective in enhancing engagement. Finally, replicating this study across different industries and demographic groups, including Gen Z or non-millennial cohorts, would provide comparative insights and strengthen the external validity of the model. Given the increasing importance of engagement in the digital and service economy, it is vital to continue refining the understanding of its antecedents and mediators to build healthier, more sustainable organizations.

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