

High-Performance Work Systems on Performance: The Mediating Roles of Engagement and Innovation in Construction Industry

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Abstract

Keywords:

High Performance Work System, Innovative Work Behavior, Employee Engagement, Employee Performance

This study examines the persistent underachievement of project employees' KPIs at PT XYZ despite increasing organizational profitability by investigating the influence of High-Performance Work Systems (HPWS) on Employee Performance through Employee Engagement and Innovative Work Behavior within a Resource-Based View (RBV) framework. Using a quantitative explanatory and cross-sectional design, data were collected from 208 project-level managerial employees through a five-point Likert-scale questionnaire, exceeding the minimum sample requirement of 163 respondents. Structural Equation Modeling–Partial Least Squares (SEM-PLS) using SmartPLS 4 was employed to evaluate both measurement and structural models. The results reveal that HPWS does not directly affect employee performance but significantly enhances employee engagement and innovative work behavior. Both variables act as partial mediators, translating HPWS practices into improved performance outcomes. These findings suggest that HPWS initiatives should emphasize competency development and innovation-enabling mechanisms rather than administrative compliance. Consistent implementation across projects is essential to ensure effective KPI achievement. Future research should adopt longitudinal designs and incorporate contextual variables such as leadership support or psychological safety.

INTRODUCTION

The Indonesian construction industry, particularly enterprises operating under State-Owned Enterprises (SOEs), plays a pivotal role in national infrastructure development, contributing substantially to strategically significant projects. In pursuit of the 2025 economic growth targets, the government has undertaken massive investments in this sector (Indonesia, 2024), thereby placing heightened performance demands on SOE construction firms. Corporate performance is predominantly assessed through profitability indicators; however, several firms have experienced pronounced financial deterioration. In 2023, PT Wijaya Karya Tbk (WIKA) recorded a net loss of IDR 7.12 trillion, representing an increase of 11,860 percent compared to 2022 (Kontan, 2024), while PT Waskita Karya Tbk (WSKT) reported losses amounting to IDR 3.6 trillion by the third quarter of 2024 (Kumparan, 2024). In contrast, PT XYZ (Persero) did not incur losses, as its profitability improved from IDR 201 billion in 2023 to IDR 225 billion in 2024 (PT XYZ Financial Statements, 2023–2024).

A closer examination of individual Key Performance Indicators (KPIs) among field-based project employees at PT XYZ in 2024 reveals persistent underperformance across projects. The Project Manager of the Bulango Ulu Dam Project Package II achieved only 68 percent of operating

revenue and 31 percent of net profit, despite 90 percent ERP and BIM implementation; the Site Engineering Manager of the Budong-Budong Dam Project achieved 76 percent of net profit with zero percent project innovation. At the Cabean Dam Project, the Site Operation Manager and Site Administration Manager achieved 82 percent of operating revenue and 70 percent of net profit but recorded zero percent innovation, while the Site QHSE Manager of the KIPP Sepaku Phase 2 Project realized only 44 percent net profit with an administrative expense ratio of 238 percent. This pattern indicates suboptimal employee functioning that may undermine organizational performance in Indonesia's construction industry, warranting deeper investigation at PT XYZ amid limited sectoral evidence.

Furthermore, project success depends on on site employees' ability to ensure schedule adherence, budget control, and cost overrun mitigation, prompting firms to adopt High Performance Work Systems alongside rigorous recruitment, competitive compensation, and intensive training to strengthen skills and organizational employee collaboration (Li et al., 2024); Jalali et al., 2023). Although HPWS effectiveness has been reported in Ghanaian multinationals (Abugre & Nasere, 2020), Poland's service sector (Wojtczuk-Turek & Turek, 2021), and UK infrastructure projects (Shi et al., 2024), empirical findings remain inconsistent, as poorly coordinated HPWS may generate negative synergy (Han et al., 2020), individual performance based rewards may foster counterproductive behavior (Banks & Kepes, 2015), and HPWS may intensify work pressure and absenteeism (Flores et al., 2016), justifying renewed scrutiny of the HPWS to performance relationship (Tawk, 2021).

From a Resource Based View perspective, construction projects involve cross functional roles including project managers supported by Site Administration Managers, Site Engineering Managers, and Site Operation Managers whose discretionary authority positions human resources as strategic assets, with HPWS strengthening competencies, commitment, and inimitable capabilities (Lubis, 2022). Prior studies indicate that HPWS enhances Employee Engagement (Al-Ajlouni, 2021; Bhattacharjee & Sarkar, 2023; Huang et al., 2018), fostering affective bonds and superior performance (Al Zeer et al., 2023; Nguyen & Nguyen, 2025), while also enabling Innovative Work Behavior under high project uncertainty through training and adaptability mechanisms (Arshad, 2024; Escribá-Carda et al., 2023; Farrukh & Raza, 2021; Zhu et al., 2022), which improves employee performance (Babu et al., 2024; Rahman et al., 2020).

Prior studies on High Performance Work Systems (HPWS) and Employee Performance (EP) report mixed and context-bound findings. Research in Poland's service sector (Wojtczuk-Turek & Turek, 2021) lacks cross-context generalizability, while evidence from multinational firms in Ghana suffers from subjective performance conceptualization (Abugre & Nasere, 2020). These limitations underscore unresolved gaps in understanding HPWS on performance linkages, particularly within construction firms in developing economies. Responding to calls for more integrative models (Jalali et al., 2023), this study aims to advance theory by simultaneously examining Innovative Work Behavior (TWB) and Employee Engagement (EE) as mediators in the HPWS on Employee Performance relationship, an approach not previously explored, while offering contextual novelty through an empirical focus on Indonesian construction firms.

Resource Based View

The Resource-Based View (RBV) asserts that sustainable competitive advantage arises from internal resources that are valuable, rare, inimitable, and non-substitutable. Human resources constitute a central RBV asset, as integrated HR practices such as High-Performance Work

Systems (HPWS) generate unique, difficult-to-imitate value (Gerhart, 2021). RBV further emphasizes strategic capacity building through internal competencies, knowledge, and innovation, supporting the role of HPWS and innovative organizational culture in fostering innovative work behavior (Lubis, 2022). Recent evidence reinforces this perspective, highlighting cross-functional capabilities in the post-COVID-19 context (Chatterjee et al., 2025), employee agility developed through training, coaching, and skill enhancement (Srigouri & Muduli, 2025), and the strategic integration of internal resources (Mehralian, 2025). Accordingly, this study adopts RBV as its overarching framework, conceptualizing HPWS as a strategic resource, organizational culture as an intangible asset, employee engagement as high-value human capital, innovative work behavior as a dynamic capability, and employee performance as the outcome of VRIN-based resource utilization (Naila, 2025).

High Performance Work System, Employee Engagement, and Employee Performance

Research by Wojtczuk-Turek & Turek (2021) demonstrates that well-designed and effectively implemented High-Performance Work Systems (HPWS) enhance productive behaviors while simultaneously mitigating counterproductive behaviors. Core HPWS components such as training and development, compensation, and reward systems directly contribute to higher employee productivity, which in turn elevates employee performance (Abugre & Nasere, 2020). Consistent with these findings, Jalali et al. (2023) report that practices including extensive training, performance-based rewards, and job security strengthen employees' trust in management, thereby exerting a positive influence on performance outcomes. Moreover, Shi et al. 2024b) emphasize that HPWS play a crucial role in enhancing employee well-being, encompassing both happiness and health, which subsequently translates into improved performance. Collectively, these findings suggest that effective HPWS implementation not only enhances individual performance outcomes but also fosters a more supportive and development-oriented work environment. Based on the foregoing discussion, the following hypothesis is proposed:

H1: High-Performance Work Systems have a positive and significant effect on Employee Performance.

High-Performance Work Systems may evoke positive emotions and affective states that lead employees to associate such experiences with their exchange partners or the organization itself (Y. Huang et al., 2018). Employees consequently become more motivated to exert effort for collective and organizational interests rather than purely personal gains (Ahmad et al., 2023; Gervasi et al., 2022). This implies that when HPWS practices are implemented as expressions of organizational goodwill through training and development opportunities, open communication, performance-based compensation, participative decision-making, and employee involvement programs employees are more likely to reciprocate by working diligently and demonstrating heightened engagement in their roles (Bhatti, 2022). The positive association between HPWS and Employee Engagement has been empirically validated by Al-Ajlouni, (2021); Bhattacharjee & Sarkar (2023); Cooke et al. (2019). Accordingly, the following hypothesis is formulated:

H2: High-Performance Work Systems have a positive and significant effect on Employee Engagement.

Shi et al. 2024b) find that high levels of employee engagement encourage employees to work more effectively and productively, ultimately enhancing employee performance. Engaged employees tend to exhibit stronger motivation, commitment, and discretionary effort in their work. Shi et al. (2024a) Similarly, Nguyen & Nguyen (2025) suggest that highly engaged employees are

more inclined to exert maximum effort, underscoring the importance of managerial support such as training and certification, in improving organizational performance. However, contrasting evidence is presented by Sugianingrat et al. (2019), who report that employee engagement does not exert a significant direct effect on performance. They argue that factors such as training, compensation, and managerial policies play a more decisive role in driving performance outcomes, while engagement is more closely associated with motivation and employees' intention to remain with the organization rather than with immediate performance improvements (Sugianingrat et al., 2019). Thus, although engagement enhances motivation and commitment, its direct impact on performance may be contingent upon complementary organizational factors, including training, compensation, and managerial policies. Based on this discussion, the hypothesis is proposed:

H3: Employee Engagement has a positive and significant effect on Employee Performance.

Ismail et al. (2021) reveal that HR practices such as training, development, compensation, and rewards are directly and positively associated with employee performance. Furthermore, employee engagement at work, as an integral element of HPWS, strengthens employees' contribution and commitment, thereby fostering superior performance outcomes (Goyal & Patwardhan, 2025). Engagement has also been shown to function as a mediating mechanism linking training and compensation to improved performance, as evidenced in the study by Abugre & Nasere (2020). This indicates that HPWS, through supportive policies and practices including employee development and job autonomy, create a motivational work environment that encourages deeper employee involvement. When employees perceive themselves as valued, supported, and afforded opportunities for growth, they develop stronger emotional and cognitive connections to their work, resulting in higher levels of engagement (S. Y. B. Huang et al., 2022). Such engagement, characterized by dedication, vigor, and a willingness to give one's best, enhances productivity and work quality (Hendrik et al., 2021). Consequently, employee engagement serves as a critical explanatory mechanism through which HPWS improve employee performance. Based on this reasoning, the following hypothesis is advanced:

H4: Employee Engagement mediates the relationship between High-Performance Work Systems and Employee Performance.

High Performance Work System, Innovative Work Behavior, and Employee Performance

Employees draw upon creativity, imagination, and cognitive intelligence to enhance their innovative capacity (Bos-Nehles & Veenendaal, 2019). Prior empirical evidence has established robust linkages between training and compensation systems (Hon & Lu, 2015), with employee creativity. Accordingly, employees are expected to exhibit innovative behavior within the context of high-performance human resource practices (Bos-Nehles & Veenendaal, 2019). Through the implementation of High-Performance Work Systems (HPWS), employees are able to perceive the organization's commitment and seriousness in developing human capital, which is a critical antecedent for strengthening innovative capability. This argument is consistent with Farrukh & Raza (2021), who demonstrate that HPWS positively shape employees' psychological perceptions, thereby stimulating innovative behavior in the workplace; however, their findings remain confined to the tourism industry. Adopting a similar theoretical stance, the present study posits that the provision of HPWPs enhances employees' innovative work behavior. Based on this rationale, the following hypothesis is proposed:

H5: High-Performance Work Systems have a positive and significant effect on Innovative Work Behavior.

Innovative Work Behavior (IWB) refers to employees' proactive actions in generating, promoting, and implementing novel ideas that enhance organizational functioning (Farrukh & Raza, 2021). Farrukh & Raza (2021) further argue that employees who demonstrate IWB possess a heightened ability to adapt swiftly to change, which contributes to overall performance improvement. In line with this view, Zhu et al. (2022) conceptualize IWB as encompassing idea exploration, idea development, and idea implementation, all of which enable employees to produce more efficient and effective solutions in their work. They further note that employees engaged in IWB typically exhibit superior problem-solving capabilities. The positive impact of IWB on Employee Performance has also been corroborated by Arshad (2024) and (Escribá-Carda et al., 2023), who find that IWB enhances employees' capacity to confront challenges and devise innovative solutions that foster organizational advancement. In essence, employees who actively engage in innovative behaviors tend to improve work quality, execute tasks more efficiently, and achieve superior performance outcomes. Accordingly, the following hypothesis is formulated:

H6: Innovative Work Behavior has a positive and significant effect on Employee Performance.

High-Performance Work Systems encompass a set of policies and work practices designed to elevate organizational performance, including continuous training, employee empowerment, and reward systems that recognize individual contributions (Dorta-Afonso et al., 2021). HPWS cultivate a work environment conducive to creativity and innovation, thereby encouraging employees to engage in innovative behaviors such as generating new ideas, implementing creative solutions (Mehralian, 2025), and improving existing processes and systems (Shih & Nguyen, 2025). Such innovative behaviors are a critical determinant of enhanced performance (Tan et al., 2024), as employees who think creatively and introduce innovations are better equipped to perform tasks efficiently and respond effectively to challenges. Consequently, Innovative Work Behavior functions as a key explanatory mechanism linking HPWS to improved employee performance, elucidating how supportive work systems translate into higher productivity and superior performance through employees' innovative actions. Based on this argument, the following hypothesis is proposed:

H7: Innovative Work Behavior mediates the relationship between High-Performance Work Systems and Employee Performance.

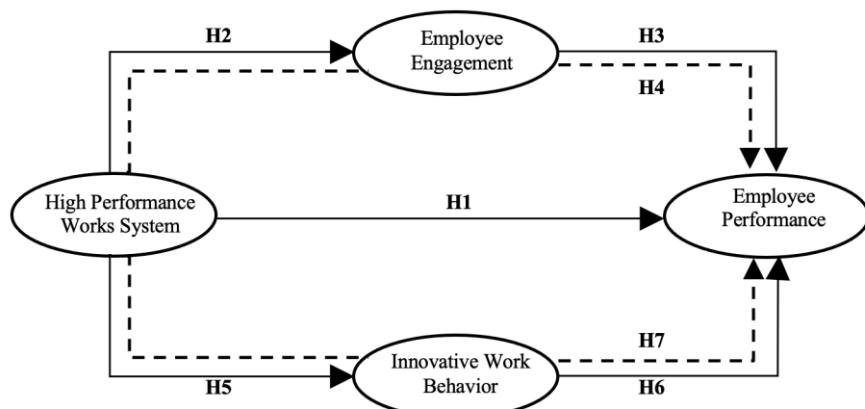


Figure 1. Research Framework

METHODS

This study adopts a quantitative-explanatory approach aimed at elucidating the causal relationships among the variables under investigation. The population comprises all managerial-level employees of PT XYZ assigned to on-site projects, totaling 275 individuals, including Project Managers, Site Administration Managers (SAM), Site Engineering Managers (SEM), Site Operational Managers (SOM), and Site QHSSE Managers (SQM). The minimum sample size was determined using Slovin's formula with a 5 percent margin of error, resulting in a required minimum of 163 respondents. Data were collected through a structured questionnaire employing a five-point Likert scale (1–5). The study applied probability sampling using a simple random sampling technique to ensure representativeness.

The measurement instruments consisted of eight items for the High-Performance Work Systems variable adapted from (Pak & Kim, 2018), five items for Employee Engagement adapted from Li et al. (2019), five items for Innovative Work Behavior adapted from Arshad (2024), and five items for Employee Performance adapted from Zulkifli et al. (2023). The analytical technique utilized was path analysis based on Structural Equation Modeling–Partial Least Squares. Following Hair et al. (2019), the model assessment procedure involved model specification, measurement model identification, structural model evaluation, and hypothesis testing.

In the measurement model evaluation, internal reliability was assessed using composite reliability (> 0.6) and Cronbach's alpha (> 0.6). Convergent validity was examined through factor loadings exceeding 0.7 and Average Variance Extracted (AVE) values greater than 0.5. Discriminant validity was evaluated using the Heterotrait–Monotrait Ratio of Correlations (HTMT), with values required to be below 0.9. Subsequently, after completing the measurement model assessment, the structural model was evaluated in accordance with Hair et al. (2022). This stage involved examining collinearity through Variance Inflation Factor (VIF) values below 3, coefficients of determination, effect sizes, model fit using PLSPredict, and hypothesis testing based on p-values with a 5 percent significance level.

RESULTS AND DISCUSSION

A total of 208 respondents met the inclusion criteria, exceeding the minimum required sample of 163. Most respondents were aged 36–40 years (32.69 percent) and had 6–10 years of work experience (70.67 percent), indicating substantial professional maturity. Site Engineering Managers (SEM) comprised the largest job category (26.44 percent), while male respondents dominated the sample (97.12 percent), reflecting the male-dominated nature of managerial roles in construction. Educational attainment was predominantly Diploma IV or bachelor's degree level (91.34 percent). The largest share of respondents originated from Division II – Water Resources Operations (37.50 percent).

Measurement Model Evaluation

The measurement model evaluation aims to assess the validity and reliability of the measurement instruments employed in this study. According to Hair et al. (2022), the evaluation is conducted by examining the correlations within the outer model through indicators of reliability, internal consistency reliability, convergent validity, and discriminant validity.

Table 1. Result of Indicator and Internal Consistency Reliability

Variable	Measurement Items	Indicator Reliability	Internal Consistency Reliability	
			LF	CA
High Performance Work System (Pak & Kim, 2018)	The selection and job placement process adequately considers the alignment between my personal competencies and project characteristics. (HPWS1)	0.705		
	Sufficient training aligned with job requirements to enhance my technical and managerial capabilities in the project. (HPWS2)	0.751		
	My performance appraisal is conducted based on measurable targets, such as completion time and cost efficiency. (HPWS3)	0.756		
	My supervisor provides clear and constructive feedback following performance evaluations to help improve my work methods. (HPWS4)	0.737	0.825	0.873
	Project bonuses are allocated based on team performance rather than individual achievements. (HPWS6)	0.735		
	Encouraged to propose ideas or solutions to enhance efficiency and quality in project execution. (HPWS7)	0.697		
	Enthusiastic about starting my work each day on the project. (EE1)	0.763		
Employee Engagement (Li et al. 2019),	Proud to be a member of this project team. (EE2)	0.809		
	Remain focused on my work despite experiencing pressure within the project. (EE3)	0.743	0.825	0.877
	Motivated to continuously improve my work performance. (EE4)	0.775		
	Happy while carrying out my work responsibilities. (EE5)	0.742		
	Frequently propose new ideas to solve problems encountered in the project. (IWB1)	0.758		
Innovative Work Behavior (Arshad et al., 2024)	Actively seek new approaches or work methods to improve work efficiency. (IWB2)	0.754		
	Assist the team in implementing new ideas to enhance project outcomes. (IWB3)	0.787	0.794	0.858
	Engage in discussions with colleagues to develop ideas for improving work processes. (IWB4)	0.673		
	Communicate innovative ideas to supervisors to obtain support or approval. (IWB5)	0.726		
	Consistently complete project tasks in accordance with established quality standards. (EP1)	0.768		
Employee Performance (Zulkifli et al., 2023)	The volume or progress of my daily work aligns with predetermined targets. (EP2)	0.761		
	Complete my work within the specified schedule. (EP3)	0.784	0.816	0.872
	My work makes a tangible contribution to the achievement of project targets and overall project success. (EP4)	0.783		
	I am able to work independently without continuously relying on direct supervision. (EP5)	0.697		

Source: Data Processed by SmartPLS4, (2025)

As shown in Table 1, the outer loading results indicate that most measurement items meet the recommended indicator reliability threshold (loading factor > 0.708). Although HPWS7, IWB4, and EP5 exhibit slightly lower loadings, they were retained because they did not compromise subsequent analyses or overall measurement quality. The strongest indicators for

each construct are EE2 for Employee Engagement (0.809), IWB3 for Innovative Work Behavior (0.787), EP3 for Employee Performance (0.784), and HPWS3 for High-Performance Work Systems (0.756), highlighting pride in team membership, implementation of new ideas, timeliness of task completion, and target-based performance appraisal as the most salient dimensions, respectively. One item, HPWS5, was removed due to a loading below 0.6, reflecting inconsistent perceptions of employee involvement in decision-making, as final authority typically rests with the project manager. Reliability analysis further confirms satisfactory internal consistency, with Cronbach's Alpha values ranging from 0.794 to 0.825 and Composite Reliability values from 0.858 to 0.877, with Employee Engagement and High-Performance Work Systems demonstrating the highest reliability.

Table 2. Result of Convergent and Discriminant Validity

Variable	Convergent	Discriminant Validity		
	Validity (AVE)	EE	EP	HPWS
Employee Engagement	0.588			
Employee Performance	0.577	0.612		
High Performance Work System	0.534	0.584	0.519	
Innovative Work Behavior	0.549	0.777	0.748	0.647

Source: Data Processed by SmartPLS4, (2025)

Based on Table 2, all constructs exhibit Average Variance Extracted (AVE) values exceeding the minimum threshold of 0.50 (Hair et al., 2022a). This condition confirms that each construct demonstrates adequate convergent validity and is able to sufficiently represent the underlying concept being measured. Among all constructs, Employee Engagement records the highest AVE value (0.588), indicating the strongest convergent validity within the measurement model. To assess discriminant validity, this study employs the Heterotrait–Monotrait (HTMT) ratio, applying the recommended cutoff value of below 0.90 (Hair et al., 2022a). The results presented in Table 2 indicate that all HTMT values between constructs fall below this threshold, including the highest observed value between Innovative Work Behavior and Employee Engagement (0.777), which remains well within the acceptable range. These findings confirm that all constructs exhibit satisfactory discriminant validity, signifying that each variable is conceptually distinct and that no problematic overlap exists among the constructs.

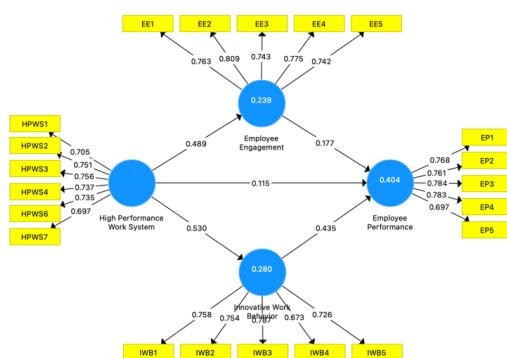


Figure 2. Full Model (Loading Factor)
Structural Model Evaluation

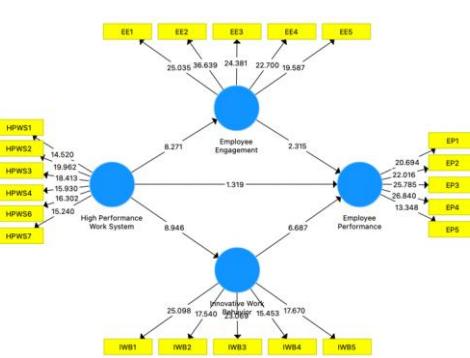


Figure 2. Full Model (Path Coefficient)

To evaluate the structural model, the analysis was conducted by considering several key indicators, namely PLSPredict, the coefficient of determination (R^2), collinearity statistics, effect size measures, and hypothesis testing results (Hair et al., 2022). This comprehensive approach provides an integrated assessment of the quality, predictive capability, and strength of the relationships among variables within the proposed model.

Table 3. Result of PLSPredict

Items	PLS RMSE	LM RMSE	PLS MAE	LM MAE
EE1	0.715	0.724	0.559	0.563
EE2	0.683	0.683	0.564	0.543
EE3	0.805	0.830	0.588	0.609
EE4	0.602	0.596	0.500	0.482
EE5	0.674	0.688	0.528	0.545
EP1	0.665	0.676	0.541	0.547
EP2	0.776	0.790	0.604	0.618
EP3	0.697	0.714	0.553	0.559
EP4	0.654	0.666	0.514	0.516
EP5	0.699	0.716	0.536	0.540
IWB1	0.650	0.663	0.490	0.501
IWB2	0.646	0.655	0.517	0.518
IWB3	0.594	0.601	0.494	0.498
IWB4	0.614	0.625	0.484	0.487
IWB5	0.680	0.687	0.513	0.509

Source: Data Processed by SmartPLS4, (2025)

Based on the PLSPredict results in Table 3, most indicators show that the PLS Root Mean Square Error (RMSE) and Mean Absolute Error (MAE) values are lower than or comparable to those of the linear benchmark model. Consistent with (Hair et al., 2022a), this pattern indicates satisfactory predictive capability, as the PLS model generally produces equal or smaller prediction errors. This trend is evident across most indicators of Employee Engagement, Employee Performance, and Innovative Work Behavior. Although a few indicators, namely EE2, EE4, and IWB5, exhibit slightly higher PLS errors than the linear model, the differences are marginal. Overall, these results confirm that the structural model demonstrates adequate predictive power for estimating indicator values in new or out-of-sample data.

Table 4. Coefficient of Determination

Variable	R2	R2 Adj.
Employee Engagement	0.239	0.235
Employee Performance	0.404	0.395
Innovative Work Behavior	0.280	0.277

Source: Data Processed by SmartPLS4, (2025)

Table 4 shows that the model explains 39.5 percent of the variance in Employee Performance ($R^2 = 0.395$), classified as moderate according to Chin et al. (1998), leaving 60.5

percent explained by factors outside the model. The explanatory power for Employee Engagement is weaker ($R^2 = 0.235$), indicating that 23.5 percent of its variance is explained, while 77.5 percent remains unaccounted for, also classified as weak (Chin et al., 1998). Similarly, Innovative Work Behavior exhibits an R^2 of 0.277, meaning 27.7 percent of its variance is explained by the model, which likewise falls within the weak category, suggesting substantial influence from external factors not examined in this study. The assessment of the structural model reveals distinct patterns in how High-Performance Work Systems (HPWS) affect performance outcomes. As detailed in Table 5, the path analysis yields critical insights into the magnitude and significance of each relationship

Table 5. Result of Collinearity Statistics, Effect Size, and Hypothesis Testing

Path		Org. Sample (O)	F2	VIF	T Stats	P Values	Result
H1	High Performance Work System -> Employee Performance	0.115	0.015	1.470	1.319	0.188	Not Supported
H2	High Performance Work System -> Employee Engagement	0.489	0.314	1.000	8.271	0.000	Supported
H3	Employee Engagement -> Employee Performance	0.177	0.030	1.761	2.315	0.021	Supported
H4	High Performance Work System -> Employee Engagement -> Employee Performance	0.086	-	-	1.998	0.046	Supported
H5	High Performance Work System -> Innovative Work Behavior	0.530	0.390	1.000	8.946	0.000	Supported
H6	Innovative Work Behavior -> Employee Performance	0.435	0.170	1.863	6.687	0.000	Supported
H7	High Performance Work System -> Innovative Work Behavior -> Employee Performance	0.230	-	-	4.846	0.000	Supported

Source: Data Processed by SmartPLS4, (2025)

According to the Table 5. In regards to the direct relationship, the analysis shows that HPWS does not have a statistically significant direct impact on Employee Performance ($\beta = 0.115$, $t = 1.319$, $p = 0.188$). Since the T-statistic falls below the critical value of 1.96, Hypothesis H1 is not supported. This result is pivotal; it statistically confirms that the mere implementation of HPWS practices, such as training and appraisals, does not automatically translate into higher KPI achievement without behavioral intermediaries. In contrast, HPWS acts as a powerful antecedent for employee psychological states. The influence of HPWS on Innovative Work Behavior is particularly robust ($\beta = 0.530$, $t = 8.946$, $p < 0.001$), making it the strongest path in the entire model. Similarly, HPWS exerts a strong positive effect on Employee Engagement ($\beta = 0.489$, $t = 8.271$, $p < 0.001$). Thus, Hypotheses H2 and H5 are supported, indicating that HPWS is highly effective in fostering an innovation-oriented and engaged workforce.

When examining the drivers of Employee Performance, Innovative Work Behavior demonstrates a dominant influence ($\beta = 0.435$, $t = 6.687$, $p < 0.001$) compared to Employee Engagement ($\beta = 0.177$, $t = 2.315$, $p = 0.021$). Although both Hypotheses H3 and H6 are supported, the path coefficient for innovative behavior is nearly 2.5 times larger than that of engagement. This disparity highlights that active problem-solving behaviors contribute significantly more to project success than emotional engagement alone. The mediation analysis

clarifies the mechanism of impact. Since the direct effect of HPWS on Employee Performance is non-significant ($p = 0.188$), while the specific indirect effects are significant, the model demonstrates a full mediation (indirect-only) mechanism, correcting the assumption of partial mediation. Via Employee Engagement (H4), the indirect path (HPWS \rightarrow EE \rightarrow EP) is statistically significant but relatively weak ($\beta = 0.086$, $t = 1.998$, $p = 0.046$). This supports Hypothesis H4, suggesting that engagement serves as a valid, albeit smaller, conduit for performance. Via Innovative Work Behavior (H7), the indirect path (HPWS \rightarrow IWB \rightarrow EP) is highly significant and substantively stronger ($\beta = 0.230$, $t = 4.846$, $p < 0.001$). This supports Hypothesis H7.

Effect Size (f^2) Analysis To further detail the practical significance beyond p -values, the effect size (f^2) analysis reinforces the dominance of innovation. Innovative Work Behavior yields a moderate-to-large effect size on Employee Performance ($f^2 = 0.170$), whereas the effect of Employee Engagement is small ($f^2 = 0.030$) and the direct effect of HPWS is negligible ($f^2 = 0.015$). This granular detail confirms that the "HPWS to Performance" model relies heavily on the organization's ability to stimulate innovation rather than just engagement or direct compliance.

DISCUSSION

The Effect of High-Performance Work Systems on Employee Performance

The results indicate that High-Performance Work Systems (HPWS) do not have a statistically significant effect on Employee Performance, as evidenced by a p -value exceeding the 0.05 threshold; therefore, Hypothesis H1 is not supported. This finding is consistent with Han et al. (2020), who highlight the risk of poor alignment and lack of synergy in HPWS implementation, which may prevent such systems from exerting an immediate impact on performance outcomes. However, this result stands in theoretical contrast to prior studies by Abugre & Nasere (2020); Jalali et al. (2023); Shi et al. (2024), which argue that HPWS through mechanisms such as training, performance-based compensation, and employee empowerment can directly enhance employee motivation and performance. From a statistical perspective, indicator HPWS3 exhibits the highest loading factor, indicating that target-based and measurable performance appraisal systems represent the most dominant dimension of HPWS in the construction industry context. Although the company has implemented various HPWS practices, including training and certification programs aimed at strengthening the technical and managerial competencies of on-site personnel, the empirical findings suggest that these initiatives have not yet translated into direct improvements in Employee Performance.

This condition is further reflected in the very small effect size ($f^2 = 0.015$), which falls into the minimal category according to (Hair et al., 2022a), indicating that HPWS contribute only marginally to the explained variance in Employee Performance. Instead, performance in construction projects appears to be more strongly shaped by internal employee processes, particularly Employee Engagement and Innovative Work Behavior, which are closely associated with on-site problem-solving, time efficiency, and work quality. The demanding nature of construction project work requires employees to rely heavily on accumulated experience, team-based work culture, and adaptability to field pressures. This interpretation is reinforced by the demographic profile of the respondents, the majority of whom are between 36 and 40 years old with six to ten years of professional experience. Such employees tend to develop work patterns that are more strongly influenced by practical field experience than by formalized structural HR policies. Based on these findings, organizations are encouraged to strengthen and integrate

HPWS implementation more comprehensively so that these systems can generate a more meaningful impact on employee KPI achievement within construction project environments.

The Effect of High-Performance Work Systems on Employee Engagement

The results demonstrate that High-Performance Work Systems (HPWS) have a positive and statistically significant effect on Employee Engagement, as indicated by a p-value of 0.000; therefore, Hypothesis H2 is supported. This finding is theoretically consistent with Bhattacharjee & Sarkar (2023); Cooke et al. (2019); Y. Huang et al. (2018), who argue that HPWS foster strong reciprocal relationships between organizations and employees through integrated practices such as selective recruitment, training and development, performance appraisal, and achievement-based compensation. This relational mechanism aligns with the Resource-Based View, which posits that the strategic management of internal resources through high-performance work systems enhances the quality of human capital as a core organizational asset (Gerhart, 2021). Among the HPWS indicators, HPWS3 emerges as the most dominant, exhibiting the highest loading factor and underscoring the pivotal role of measurable, target-based performance appraisal systems in shaping employees' perceptions of HPWS within project environments. Nevertheless, the training dimension represented by HPWS2 also records a relatively high loading factor, indicating that technical and managerial training remains a critical component in fostering positive perceptions of HPWS, such training enhances employees' confidence, preparedness, and clarity of work direction, thereby strengthening their engagement.

This relationship is further corroborated by a moderate effect size ($f^2 = 0.314$), suggesting that HPWS exert a substantive influence on Employee Engagement. In practical terms, consistent target-based evaluations, adequate training provision, and team-based reward systems play a vital role in enhancing employees' vigor, dedication, and concentration, particularly within construction project settings that demand high levels of mental resilience and work commitment. These findings also reflect the high-pressure nature of on-site project work, where employees routinely face stringent deadlines, cost deviations, and rigorous quality standards. In such contexts, fair and supportive work systems become essential determinants of Employee Engagement. From a demographic perspective, the majority of respondents occupy Site Engineering Manager (SEM) positions and possess undergraduate qualifications (D-IV or S1, 88.94 percent). This educational background strengthens their capacity to absorb training inputs effectively, thereby amplifying the positive impact of HPWS on engagement. Accordingly, these findings provide important managerial implications, suggesting that organizations should enhance the quality of training programs, clarify reward mechanisms, and ensure consistent HPWS implementation across projects to sustain and strengthen Employee Engagement.

The Effect of Employee Engagement on Employee Performance

The analysis indicates that Employee Engagement has a positive and statistically significant effect on Employee Performance, as reflected by a p-value of 0.021; therefore, Hypothesis H3 is supported. This finding is consistent with the theoretical arguments advanced by Nguyen & Nguyen (2025); Shi et al. (2024), who posit that highly engaged employees tend to exhibit stronger motivation, sustained focus, and greater perseverance in task execution, which subsequently translate into improved performance outcomes. Shi et al. (2024) further emphasize that employees' emotional and cognitive involvement in their work is critical in ensuring that work outputs are effective, efficient, and aligned with organizational quality standards. Within the

Employee Engagement construct, indicator EE2 records the highest loading factor (0.809), indicating that pride in being part of the project team constitutes the most salient expression of employee engagement. This sense of pride is particularly relevant to Employee Performance, as emotional attachment and team identification encourage employees to remain productive, meet deadlines, and maintain work quality despite project-related pressures. However, when assessed through the lens of effect size, this relationship falls within the small category according to Hair et al. (2022), with an f^2 value of 0.030.

This suggests that although the direct influence of Employee Engagement on Employee Performance is statistically meaningful, it is not the dominant driver of performance in construction project settings. Rather, engagement primarily enhances employees' work resilience, readiness to cope with pressure, and consistency in achieving targets. Engaged employees tend to demonstrate greater initiative, heightened concern for work outcomes, and stronger adaptability to dynamic field conditions, thereby supporting performance improvement. From a demographic standpoint, the majority of respondents possess six to ten years of work experience and predominantly occupy Site Engineering Manager (SEM) positions. This composition indicates that most respondents are in a mature career phase and have developed a strong understanding of project work procedures. Consequently, their level of engagement plays a crucial role in determining task execution effectiveness and target achievement. These findings suggest that organizations should reinforce engagement-enhancing initiatives such as career development programs, coaching, strengthened on-site leadership, and a supportive work culture to ensure improvements in Engagement contribute optimally to Employee Performance.

The Mediating Effect of Employee Engagement on the Relationship between High-Performance Work Systems and Employee Performance

The hypothesis testing results indicate that High-Performance Work Systems (HPWS) exert a positive effect on Employee Performance through Employee Engagement. The mediation identified in this relationship is partial mediation, as the direct effect of HPWS on Employee Performance is not statistically significant, whereas the indirect effect through Employee Engagement is significant. This finding suggests that HPWS enhance Employee Engagement through practices such as training, target-based performance appraisal, and team-based compensation, and that Employee Engagement subsequently increases employees' focus, motivation, and dedication at work, thereby improving Employee Performance (Cooke et al., 2019; Y. Huang et al., 2018). These results further reinforce the findings of Bhattacharjee & Sarkar (2023), who assert that engagement functions as a psychological mechanism mediating the relationship between HR policies and employee performance outcomes. Consistent with the highest-loading indicator (EE2) within the Employee Engagement construct, pride in being part of the project team emerges as a central driver of enhanced performance.

This pattern indicates that intrinsic and affective forms of engagement are more effective in improving employee performance than reliance on formal incentives or HR policies alone. Accordingly, the findings support the interpretation that HPWS, in isolation, are insufficient to generate performance improvements unless they are accompanied by heightened levels of Employee Engagement. The limited direct influence of HPWS on Employee Performance is evidenced by the small effect size ($f^2 = 0.015$), which falls into the minimal category according to Hair et al. (2022). In contrast, the effect of Employee Engagement on Employee Performance, although still categorized as small, is comparatively stronger ($f^2 = 0.030$). This disparity

underscores that HPWS should primarily be leveraged as antecedents of employee engagement in order to achieve more meaningful performance gains. From a managerial standpoint, these findings suggest that organizations should not rely solely on HPWS as a direct performance-enhancement strategy. Instead, management must ensure that HPWS practices are deliberately designed to strengthen employee engagement through relevant training programs, clear and timely feedback mechanisms, a culture of recognition, and the development of project leadership that encourages employee participation. Such efforts can ensure that HPWS transcend their administrative function and effectively foster work engagement that translates into improved Employee Performance.

The Effect of High-Performance Work Systems on Innovative Work Behavior

The analysis demonstrates that High-Performance Work Systems (HPWS) have a positive and statistically significant effect on Innovative Work Behavior, as indicated by a p-value of 0.000; therefore, Hypothesis H5 is supported. This finding is consistent with prior studies by Arshad, (2024); Bos-Nehles & Veenendaal (2019); Farrukh & Raza (2021), which suggest that HPWS enhance employees' perceptions of organizational support and provide the resources necessary for generating and implementing new ideas. Moreover, this result reinforces the Resource-Based View, which posits that the enhancement of strategic capacity through the optimization of internal competencies, knowledge, and innovation strengthens the role of HPWS and an innovation-oriented organizational culture in shaping employees' innovative work behavior (Lubis, 2022). Among the HPWS indicators, HPWS3 related to target-based performance appraisal, emerges as the most dominant dimension in reflecting HPWS practices in this study. This finding indicates that clarity of targets, measurable performance criteria, and transparent evaluation standards constitute the primary elements through which employees perceive HPWS within construction project settings.

This relationship is further substantiated by a moderate effect size ($F^2 = 0.390$), indicating that HPWS exert a substantive and meaningful influence on the development of innovative behavior among project employees. In the execution of construction projects, employees frequently encounter design changes, schedule deviations, and technical constraints. Project personnel who receive adequate training, role clarity, and supportive performance appraisal systems are more confident in proposing novel ideas and seeking more efficient work approaches. Conversely, weak or inconsistent HPWS implementation may constrain employees' innovative capacity, leading to routine-based work behavior and slower responses to project challenges, thereby jeopardizing KPI achievement. In line with the demographic profile of this study where most respondents are drawn from Division II – Water Resources, a division characterized by high technical complexity and frequent on-site challenges, the relevance of HPWS in stimulating Innovative Work Behavior becomes particularly evident. The dominance of respondents from this division supports the interpretation that consistent and well-integrated HPWS are critical in fostering sustained innovation in environments that demand rapid and creative problem-solving..

The Effect of Innovative Work Behavior on Employee Performance

The analysis reveals that Innovative Work Behavior (IWB) has a positive and statistically significant effect on Employee Performance, as indicated by a p-value of 0.000; therefore, Hypothesis H6 is supported. This finding is consistent with prior studies by Escribá-Carda et al. (2023); Farrukh & Raza (2021); Zhu et al. (2022), which demonstrate that employees who actively

engage in innovative behavior are better able to identify alternative work methods, generate improvement-oriented ideas, and implement creative solutions that directly enhance performance outcomes. Innovative behavior enables employees to respond more effectively to work-related challenges, resulting in faster task completion, improved efficiency, and adherence to project quality standards. This conceptualization is fully aligned with the present study's findings, which indicate that IWB contributes substantially to employee performance. Notably, indicator IWB3 exhibits the highest loading factor, suggesting that employees' involvement in implementing innovations rather than merely generating ideas, plays a critical role in driving performance.

This relationship is further reinforced by a strong effect size ($f^2 = 0.303$), which falls within the large category according to Hair et al. (2022), indicating that IWB exerts a highly substantive influence on Employee Performance. The magnitude of this effect reflects the fundamental role of innovation in construction project environments that demand rapid, efficient, and timely problem-solving. Innovative Work Behavior is instrumental in helping employees navigate on-site pressures arising from schedule deviations, design changes, resource constraints, and fluctuating environmental conditions. Employees who demonstrate high levels of innovative behavior tend to proactively seek solutions, improve work processes, and foster team collaboration, thereby achieving significantly higher performance levels. From a demographic perspective, the majority of respondents in this study are drawn from Division II – Water Resources, a division characterized by high technical complexity and substantial variability in field conditions, including challenging terrain and environmental constraints.

Consequently, employees within this division must exhibit heightened levels of creativity and adaptability to ensure uninterrupted project execution. This context further underscores the relevance of IWB as a critical determinant of Employee Performance, given the innovation-intensive nature of the work. These findings provide a strong empirical basis for organizations to strengthen competency development initiatives, expand opportunities for employee-driven innovation, and adapt project leadership practices to better support innovative behavior, thereby fostering sustainable performance improvements.

The Mediating Effect of Innovative Work Behavior on the Relationship between High-Performance Work Systems and Employee Performance

The hypothesis testing results indicate that High-Performance Work Systems (HPWS) exert a positive effect on Employee Performance through Innovative Work Behavior (IWB). The mediation identified in this relationship is partial mediation, as the direct effect of HPWS on Employee Performance is not statistically significant, whereas the indirect effect through Innovative Work Behavior is significant. This finding suggests that HPWS primarily function by shaping work conditions that encourage innovative behavior, which subsequently becomes a key driver of enhanced employee performance. The results are consistent with the studies of Farrukh & Raza (2021); Zhu et al. (2022), which demonstrate that HPWS strengthen employees' psychological capacity and readiness to innovate, ultimately leading to improved performance outcomes. This mediation pattern further reinforces the argument advanced by Escribá-Carda et al. (2023), who posit that Innovative Work Behavior constitutes a critical mechanism linking contemporary HR practices to individual performance outcomes. The mediating role of IWB is clearly reflected in indicator IWB3, which exhibits the highest loading factor and emphasizes that employees' ability to assist teams in implementing new ideas is the most dominant aspect driving performance improvement.

This finding underscores that the value of innovation lies not merely in idea generation, but in the effective implementation of ideas that directly enhance efficiency, effectiveness, and work quality. This phenomenon is particularly salient given that the majority of respondents are drawn from Division II – Water Resources, a division characterized by high levels of technical complexity and problem-solving demands, where innovative behavior represents an essential asset for sustaining optimal performance. The findings further demonstrate that HPWS alone are insufficient to directly enhance employee performance. HPWS primarily provide external support in the form of training, target-based performance appraisal, and team-based compensation, while actual performance improvements materialize only when this support is internalized and enacted through Innovative Work Behavior. This limitation of HPWS as a direct performance driver is evident in the very weak effect size for the HPWS–Employee Performance relationship ($f^2 = 0.005$), compared to the large effect size observed for the relationship between Innovative Work Behavior and Employee Performance ($f^2 = 0.303$). This contrast indicates that HPWS are most effective when strategically oriented toward cultivating innovative behavior rather than directly targeting performance outcomes.

These results suggest that the indirect pathway through Innovative Work Behavior represents the primary mechanism through which HPWS enhance employee performance in construction project environments. From a strategic perspective, the findings imply that organizations should not only strengthen HPWS implementation but also ensure that each HPWS practice explicitly encourages innovation. This can be achieved through the reinforcement of problem-solving programs, the provision of opportunities for experimentation with new work methods, the introduction of team-based innovation rewards, and the enhancement of project leadership quality that supports creativity. Through such an approach, HPWS can transcend their administrative role and evolve into a powerful innovation-driven system capable of generating sustainable improvements in Employee Performance.

CONCLUSION

This study was initiated to resolve the performance paradox within PT XYZ, where organizational profitability has improved despite the persistent underachievement of project-level employees' Key Performance Indicators (KPIs). By integrating the Resource-Based View (RBV), this research clarifies the mechanism through which High-Performance Work Systems (HPWS) influence Employee Performance in the Indonesian construction industry. The empirical results provide a nuanced answer to the research problem. First, contrary to the expectation that better HR systems directly produce better results, this study confirms that HPWS has no significant direct effect on Employee Performance (H1 Rejected). This indicates that in complex project environments, the mere presence of training, rigorous selection, and performance appraisals is insufficient to drive individual output. Second, the study establishes that HPWS functions exclusively as an antecedent that activates employees' psychological and behavioral capabilities. The relationship is fully mediated by Employee Engagement and Innovative Work Behavior⁴. A critical finding is the dominance of Innovative Work Behavior, which demonstrated a substantially larger effect size ($f^2 = 0.170$) compared to Employee Engagement ($f^2 = 0.030$). This suggests that while emotional engagement is necessary, the actual translation of HR practices into project success primarily occurs when employees actively generate and implement new solutions to overcome field constraints.

Theoretically, this study extends the RBV framework by demonstrating that HPWS

constitutes a potential resource, but it only becomes a realized strategic asset when transformed through specific dynamic capabilities, specifically innovation and engagement. It challenges the universalist perspective of HPWS by showing that in developing economy construction firms, the direct link is broken without these behavioral mediators. Managerially, for PT XYZ and similar SOEs, the implication is clear: HR strategies must shift from administrative compliance to innovation enablement. Since target-based appraisals were identified as the strongest HPWS dimension, management should redesign these appraisals to explicitly reward innovative problem-solving rather than just routine task completion. Strengthening the "pride in team membership" (the strongest engagement indicator) is also vital to build resilience against project pressures.

The conclusions should be interpreted within specific boundaries. The study employed a cross-sectional design, which limits the ability to map how engagement fluctuates across the long lifecycle of a dam or infrastructure project. Additionally, the focus on a single state-owned enterprise restricts generalizability to the private sector. The moderate R² value (39.5%) suggests that other unobserved variables, such as site leadership style or psychological safety, also play significant roles. Future research should adopt longitudinal designs to capture these temporal dynamics and expand the scope to include multi-firm comparisons to validate these mechanisms across the broader construction industry.

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