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The impact of high-performance work systems on employee innovative behavior: The mediating role of psychological empowerment

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Abstract: In the context of globalization and accelerated technological development, the innovation ability of enterprises has turned into a significant contributor to gaining competitive advantage, which has raised greater demands for employee innovation and brought challenges to the flexibility of organizational management. Guided by social exchange theory, this study aims to explore the effect of high-performance work systems (HPWS) on employee innovative behavior (EIB), and focus on the mediating role of psychological empowerment (PE) in this link. To verify the research hypothesis, data were collected through a questionnaire survey involving employees of medium-sized science and technology enterprises in Yunnan, China, and a total of 595 valid questionnaires were collected. Structural equation modeling was employed to test the hypotheses. The results showed that HPWS significantly promoted the EIB (β = .450; 95% CI: .337 - .554; p < .010), and PE exerted a partial mediating effect on this link (β = .217; 95% CI: .145 - .295; p < .010). The study shows that enhancing HPWS is crucial to promoting the EIB, and it is particularly imperative to take into account the key mediating role of PE in this relationship.

Keywords: *Employee innovative behavior, High-performance work systems, Psychological empowerment.*

1. Introduction

With the advent of the knowledge economy era, global competition is becoming increasingly fierce, technology is developing rapidly, and the environment faced by enterprises is becoming more complex, requiring employees to have higher creativity and flexibility to cope with changes. In this context, high-performance work systems (HPWS) utilized as a strategic human resource (HR) management method are widely used to improve employee behavior and organizational performance [1]. HPWS aims to improve employee skills and motivation by integrating HR practices such as performance evaluation, training, and incentive mechanisms, thereby optimizing behavior and enhancing innovation capabilities [2]. As the core executor of innovation strategy, employee innovative behavior (EIB) is crucial to the success of strategy implementation [3]. Therefore, stimulating employee innovation potential is crucial to the sustainable development of enterprises [4].

Especially in the innovation-driven competitive environment, EIB is regarded as a core component of the enterprise's innovation strategy, which directly determines the organization's innovation output and the effectiveness of strategy implementation [3]. In this process, as an important force in promoting economic growth and providing employment, the improvement of the innovation capabilities of small and medium-sized enterprises (SME) is particularly critical [5, 6]. However, in the context of economic recovery, population aging, and economic growth slowdown, innovation has become the core driving force for economic transformation and sustainable development. Therefore, whether it is SME or large enterprises, innovation has become the most important competitive strategy [5] not limited to R&D investment, but also includes the improvement of employees' innovation enthusiasm [1].

Social exchange theory (SET) emphasizes the reciprocal link between organizations and employees based on trust and commitment, and is widely used in organizational management [7, 8]. Under this

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framework, HPWS is deemed to be an imperative antecedent variable affecting EIB [8]. Research shows that HPWS, combined with a optimistic work environment, can stimulate employees' initiative, problem-solving ability and creativity, thereby supporting innovation activities [9]. In addition, HPWS helps promote EIB by improving their psychological safety and sense of belonging [10] and further affects employees' behavior and organizational performance by strengthening their sense of psychological empowerment (PE) [11].

PE, as an intrinsic motivation mechanism, can enhance employees' autonomy, sense of responsibility and work confidence [11]. Research shows that PE is significantly positively related with EIB [12] and plays a mediating role between knowledge sharing, EIB, empowering leadership and innovation [13]. Given that the new workforce prioritizes work purpose and self-actualization, investigating the impact of PE on EIB is crucial [14].

Thus, this study aims to examine the effect of HPWS on EIB via the PE mechanism, and combine SET to reveal its role in improving EIB. Through this study, it is anticipated to provide management strategies for Chinese SMEs, promote the improvement of employee innovation capabilities, and encourage the effective implementation of corporate innovation strategies.

This research specifically addresses the following questions:

1.Do HPWS significantly influence EIB?
2.Do HPWS significantly influence PE?
3.Does PE significantly influence EIB?
4.Does PE mediate the relationship between HPWS and EIB?

2. Literature Review

2.1. SET

SET, first proposed by Homans [7] emphasizes that individual behavior is guided by a cost-benefit evaluation process. Building upon this foundation, Blau [15] developed a more systematic framework that distinguished between instrumental and affective exchanges, and highlighted the potential power imbalance inherent in exchange relationships [15, 16]. SET has been extensively employed in organizational behavior research, particularly in explaining the interactive mechanisms between employees and organizations [17]. In practice, SET has been instrumental in understanding the sources of employee motivation and behavioral outcomes. Eisenberger, et al. [18] established that employees who feel that they are supported by their organization tend to exhibit higher commitment and reciprocating behaviors. Xiong and Tao [8] further emphasized that strong employee–organization exchange relationships significantly enhance employee engagement and motivation. Zhu, et al. [10] also validated the relevance of SET in the link between EIB and HPWS.

2.2. HPWS and EIB

A HPWS is a systematic management model consisting of complementary HR practices that aims to boost employee capabilities, motivation and job opportunities, thereby increasing organizational performance [19]. These HR practices include employee training, performance management, incentive mechanisms and employee participation in decision-making, which can enhance employees' innovation capabilities and willingness through resource support and organizational atmosphere construction [20, 21]. Research generally believes that HPWS promote EIB by providing knowledge acquisition channels and innovation opportunities, improving employees' skill levels and work efficiency. In addition, resource inputs such as skill training and incentive mechanisms not only boost employees' sense of self-efficacy, but in addition to it, they also stimulate their creativity Eisenberger, et al. [18] and Zhu, et al. [10]. Escribá-Carda, et al. [22] further confirmed through empirical analysis that HPWS have a significant positive impact on EIB.

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2.3. HPWS and PE

PE refers to employees' perceived sense of competence, meaning, self-determination, and effect at work [23]. HPWS, through supportive HR practices such as information sharing, task autonomy, and participative management, can effectively enhance employees' PE Appelbaum [24] and Messersmith, et al. [25]. Cai, et al. [26] pointed out that HPWS, by creating a trust-based environment and offering developmental resources, significantly strengthen employees' sense of control and job value. Arefin, et al. [11] further validated that HPWS increase employees' sense of PE through enhanced participation and job autonomy. As an intrinsic motivational mechanism, PE strengthens work motivation, self-efficacy, and organizational identification, thereby improving job performance and organizational citizenship behavior [27].

2.4. PE and EIB

PE is considered a vital psychological resource that drives EIB. Park and Kim [28] suggested that empowered employees exhibit greater intrinsic motivation and job involvement, motivating them to engage in exploration of novel approaches and to take innovation-related risks. Yasir, et al. [12] found that highly empowered employees are more proactive, displaying greater creativity and adaptability. Mirza, et al. [9] emphasized that PE enhances employees' confidence and motivation in dealing with complex tasks, thereby promoting innovation performance. Moreover, PE contributes to higher organizational loyalty and affective commitment, which further enhances creative behavior and organizational contribution Farrukh, et al. [29] and Liang, et al. [30]. Zhang and Bartol [31] provided direct evidence of the substantial positive effect of PE on individual innovation. Waheed, et al. [32] argued that PE not only drives behavioral performance but is also a critical mechanism for achieving sustained innovation in organizations.

2.5. PE, HPWS, and EIB

Based on SET, HPWS give employees more responsibilities, power and development opportunities, so that they feel supported and trusted by the organization, thereby enhancing their sense of PE and ultimately promoting EIB Farrukh, et al. [29]. Aristana, et al. [33] pointed out that employees who are psychologically empowered are likelier to actively present novel ideas and actively participate in knowledge sharing and problem solving. HPWS not only improve employees' abilities and motivations through practices such as training, incentives and participation in decision-making, but also stimulate their initiative and creativity from a psychological level Mirza, et al. [9]. Yasir, et al. [12] believe that highly psychologically empowered employees are more likely to adopt innovative solutions and take on uncertainties and challenges at work. Li [34] showed through empirical analysis that PE plays a partial mediating role between HPWS and EIB. In addition, Kim, et al. [35] emphasized that PE is both an important result of employees' perception of HPWS and a key path to stimulate their innovation potential. When organizations offer employees with adequate resource support and an empowering environment, employees are better able to perceive the positive significance of HPWS, thereby enhancing their creative input and promoting the organization's continuous innovation and development.

In summary, prior research has revealed strong interconnections among HPWS, PE, and EIB, thus offering a solid theoretical foundation for the development of the research model. Based on this, the following hypotheses are anticipated (Figure 1):

H_1: HPWS have a significant positive effect on EIB.

H_2: HPWS have a significant positive effect on PE.

H_3: PE has a significant positive effect on EIB.

H_4: PE mediates the relationship between HPWS and EIB.

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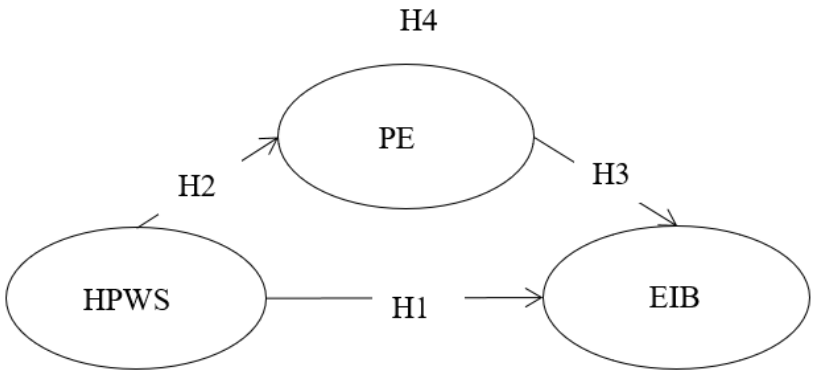


Figure 1.
Research Framework.
Note: Compiled by the Author of This Study.

3. Methodology and Research Design

3.1. Participants

To ensure the representativeness and practicality of the data, this study targeted formally employed staff from medium-sized, technology-oriented enterprises registered in Yunnan Province, China. The selected population was chosen to examine the impact of HPWS on EIB, with a specific focus on the mediating role of PE.

A total of 670 questionnaires were disseminated. After eliminating invalid or severely incomplete responses, 595 valid questionnaires remained, producing an effective response rate of 89%. All responses were collected anonymously. Before completing the survey, respondents received detailed information regarding the study's objective and the questionnaire process to enhance the authenticity and accuracy of responses.

The sample was drawn from medium-sized enterprises located in representative cities of Yunnan Province. The demographic characteristics (including education, age, and gender level) closely reflect the general employee distribution in regional technology firms, indicating sound representativeness and external validity.

3.2. Procedure

Data were collected online via the Chinese survey platform "Wenjuanxing" (www.wjx.cn). The research team provided a QR code linked to the questionnaire, allowing participants to access the survey through their mobile devices. Before starting the questionnaire, an informed consent form was presented, clearly stating the purpose of the study, the anonymity principle, and participants' rights. All participants joined the study voluntarily and were informed that they could withdraw at any time without providing a reason. This research received ethical approval from the ethics committee of a university in Thailand and strictly adhered to ethical research standards to ensure the protection of participants' rights.

3.3. Instruments

The study employed standardized scales with well-established reliability and validity, both internationally and domestically. The instruments measured three core constructs: HPWS, PE, and EIB. All items were rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

HPWS Scale: Adapted from Sun, et al. [36] this 27-item scale includes eight dimensions: performance appraisal, extensive training, selective staffing, internal promotion, employment security, incentive compensation, clear job descriptions, and employee participation. The internal consistency coefficient (Cronbach's α) for the scale was .908, indicating high reliability.

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EIB Scale: Sourced from Zhang, et al. [37] this 8-item scale assesses the frequency with which employees generate novel ideas, attempt new approaches, and implement innovations. The Cronbach's α was .844, reflecting strong internal consistency.

PE Scale: Based on the theoretical model by Spreitzer [23] this 12-item scale measures 4 dimensions: meaning, impact, autonomy, and competence. The Cronbach's α was .720, indicating acceptable reliability for the study sample.

3.4. Data Analysis

Data analysis was carried out utilizing SPSS 22 and AMOS 29, comprising two main phases.

Preliminary Phase: Included content validity assessment and initial reliability checks to verify the soundness of the questionnaire design.

Main Analytical Phase: Included item aggregation, descriptive statistics, Confirmatory Factor Analysis (CFA), tests of construct reliability and validity, Common Method Bias (CMB) testing, evaluation of measurement model fit, and Structural Equation Modeling (SEM). Mediation effects were tested using the Bootstrapping method (5,000 resamples, 95% CI).

These analytical procedures ensured the logical construction of the research model, the accuracy of path relationships, and the scientific rigor of the empirical results.

4. Results

Based on the strong reliability and validity demonstrated in the pilot survey and the formal data from 595 valid questionnaires, empirical analysis of the research model was conducted utilizing AMOS 24.0 and SPSS 22.0. Reliability testing, CFA, and discriminant validity (DV) analysis were performed on the scales for HPWS, PE, and EIB to assess measurement quality and theoretical model fit. Descriptive statistics showed that all variables and their dimensions had mean scores above 3, indicating participants held moderately positive to positive attitudes toward the study variables, thus providing a sound basis for subsequent path analysis.

4.1. Reliability Analysis

Cronbach's alpha coefficients were utilized to measure the internal consistency of the three main variables. The alpha values for the eight dimensions of the HPWS scale were as follows: Selective Staffing (.836), Extensive Training (.852), Internal Mobility (.869), Job Security (.772), Job Description (.788), Performance Appraisal (.810), Incentive Compensation (.743), and Employee Participation (.835). The overall alpha for the HPWS scale was .946, far exceeding the recommended threshold of .70, indicating high internal consistency.

The EIB scale had an overall Cronbach's alpha of .887, reflecting strong internal consistency. The PE scale showed the following alpha values: Meaning (.775), Competence (.779), Autonomy (.764), and Impact (.785), with a total scale alpha of .889, confirming stable reliability. All scales and subdimensions met international reliability standards ($\alpha > .700$), demonstrating sound measurement consistency.

4.2. CFA

CFA was conducted to assess structural validity and examine model fit, DV, and convergent validity (CV).

4.2.1. CFA of the HPWS Scale

The CFA results indicated that all item skewness and kurtosis values were below 2, satisfying univariate normality. Although the critical ratio (C.R.) for Mardia's multivariate kurtosis slightly exceeded 1.96, it remained below the cutoff for $p(p + 2)$, thus meeting the requirements for multivariate normality. Model fit indices were satisfactory: $\chi^2/df = 2.174$, RMSEA = .044, SRMR = .021, GFI = .982, CFI = .990, TLI = .985, all within recommended standards ($\chi^2/df < 3$; RMSEA < .06; CFI/TLI >

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.90). Standardized factor loadings ranged from .687 to .788 ($p < .001$), with Composite Reliability (CR) = .899 and Average Variance Extracted (AVE) = .528, indicating good CV.

4.2.2. CFA of the EIB Scale

The EIB scale adopted a single-factor structure. Fit indices were excellent: $\chi^2/df = 1.133$, RMSEA = .015, SRMR = .017, GFI = .991, CFI = .998, TLI = .997. Skewness and kurtosis values satisfied univariate normality, with standardized loadings ranging from .659 to .796 ($p < .001$). CR = .887, and AVE = .500. Although the AVE was just at the minimum threshold, the high CR and significant loadings support acceptable CV.

4.2.3. CFA of the PE Scale

The PE scale comprised four dimensions. CFA showed skewness and kurtosis values below 2, and the multivariate kurtosis C.R. was within acceptable bounds. Fit indices were strong: $\chi^2/df = 1.666$, RMSEA = .033, SRMR = .026, GFI = .977, CFI = .988, TLI = .984. Standardized loadings ranged from .683 to .787 ($p < .001$), all significant. CR = .825 and AVE = .536, supporting solid CV.

4.2.4. DV Analysis

DV tests whether latent constructs are empirically dissimilar and not conceptually overlapping. According to Fornell and Larcker [38] DV is recognized when the square root of a construct's AVE surpasses its associations with other constructs. Additionally, inter-construct correlations above .800 may signal measurement redundancy [39].

HPWS vs. EIB: The correlation between HPWS and EIB was .667, below the .800 threshold. Their AVEs were .528 and .497, respectively, both greater than the squared correlation (.445). Although EIB's AVE was slightly below .50, its high CR (.887) and strong item loadings (> .600) justify its retention per [39].

EIB vs. PE: The correlation between EIB and PE was .625 ($r^2 = .391$), lower than .800. AVEs were .497 (EIB) and .536 (PE), both higher than the squared correlation. CR values of .887 (EIB) and .825 (PE), with most loadings > .600, confirmed acceptable DV and CV, even if some were < .700.

HPWS vs. PE: The correlation between HPWS and PE was .690 ($r^2 = .476$), and their AVEs were .528 and .536, again exceeding the squared correlation. All loadings were above .600, and CR values of .899 (HPWS) and .825 (PE) further verified the robustness of measurement. While some factor loadings were under .700, they remained within an acceptable range and were retained for theoretical completeness.

As shown in Table 1, the AVE summary presents the DV of the latent variables in the model. Through DV assessment, it was found that the AVE values for all factors were higher than the corresponding squared correlations (p^2). All dimensions were found to exhibit DV and are ready to be evaluated in the measurement model.

Table 1.
DV Summary Table of Latent Variables (AVE-Based).

Factor			AVE			ρ^2
HPWS	⟷	EIB	0.529	⟷	0.497	0.445
EIB	⟷	PE	0.497	⟷	0.537	0.391
HPWS	⟷	PE	0.529	⟷	0.537	0.476

Note: compiled by the author of this study.

4.3. CMB Test

Given that this study employed self-reported data from a single source, Common Method Variance (CMV) was addressed using two complementary approaches: Harman's single-factor test and CFA.

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First, according to Harman's single-factor test, 13 factors with eigenvalues greater than 1 were identified, accounting for a cumulative variance of 61.495%. The first factor without rotation explained just 34.389% of the variance, which is well under the critical value of 50% indicating no serious threat of CMV [40].

To further validate these findings, a CFA was conducted using AMOS to compare a single-factor model (all items loaded onto one general factor) with a multi-factor model (13 factors reflecting dimensions of HPWS, EIB, and PE). As shown in Table 2, the fit indices for the single-factor model were significantly worse than those for the multi-factor model ($\triangle\chi^2 = 4089.263$, $\triangle df = 78$, $p < .001$). Specifically, the single-factor model failed to meet recommended thresholds for key indices such as RMSEA, CFI, and TLI. In contrast, the multi-factor model demonstrated a good model fit, supporting the structural independence and measurement validity of the constructs.

Both Harman's test and CFA results consistently indicate that this study is not seriously affected by CMB. The measurement instruments exhibit sound validity and reliability, making them suitable for next SEM analysis.

Table 2.
Comparison of Single-Factor and Multi-Factor CFA Models.

Model	χ^2	*df*	χ^2/df	$\triangle\chi^2$	$\triangle df$	*p*
Single-Factor Model	5207.129	1034	5.036	4089.263	78	0.000***
Multi-Factor Model	1117.866	956	1.169			

Note: ***$p < .001$.

4.4. Measurement Model (Construct Validity)

To ensure that the measurement tool has good theoretical fit and statistical validity, this study used AMOS to conduct CFA based on the theoretical framework of SEM to systematically evaluate the degree of match between each latent construct and the observed variables. The analysis focuses on model fit, factor loading, DV, and CV and to verify whether the validity and reliability foundation of the constructed measurement model is solid.

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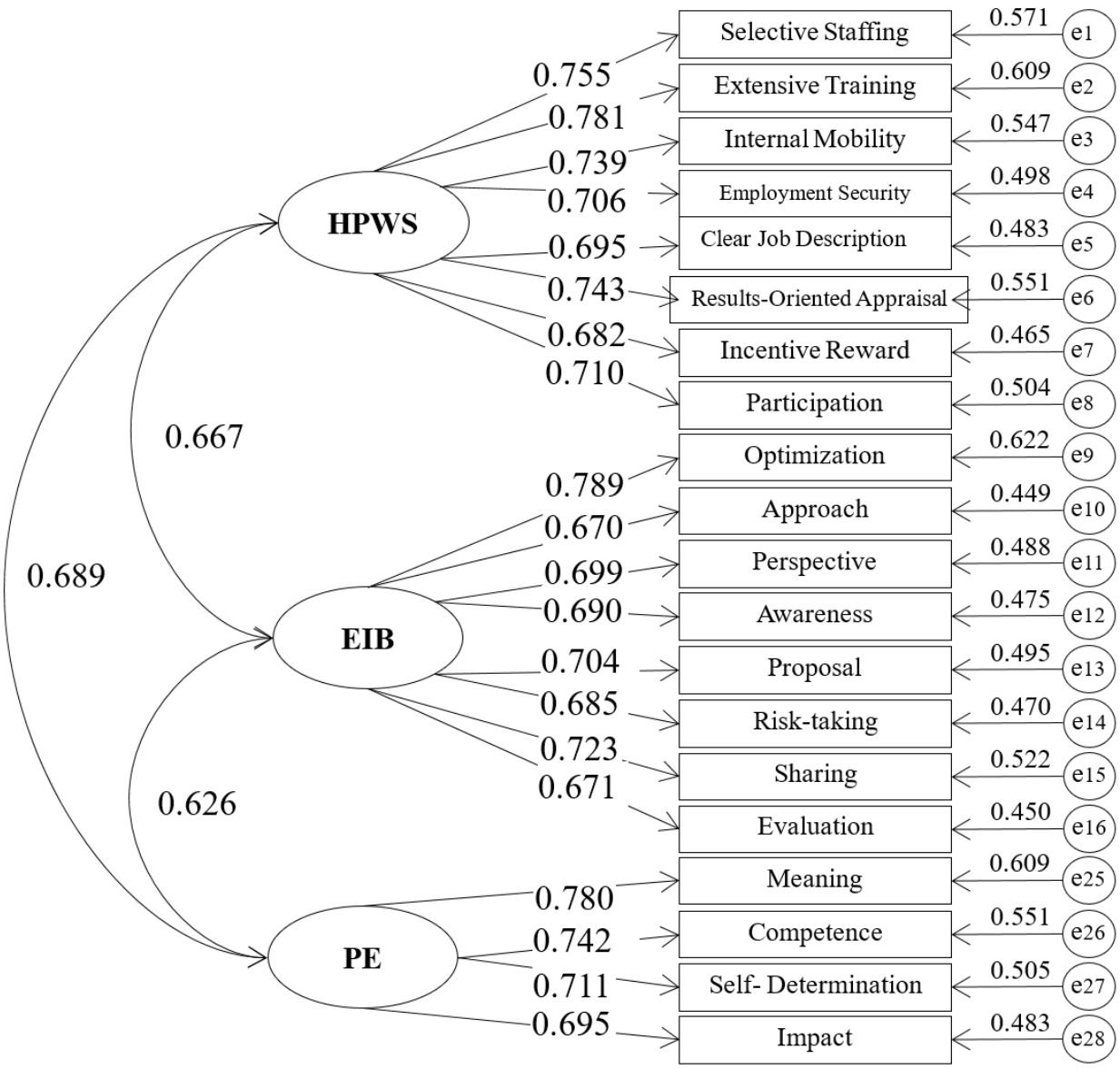


Figure 2.
Measurement Model Diagram.
Note: This figure presents the measurement model constructed by the author.

The measurement model included three core constructs: HPWS, EIB, and PE. The CFA results demonstrated a good overall model fit (χ^2/df = 1.403; RMSEA = .026; CFI = .982; TLI = .981; GFI = .947). All fit indices met the recommended thresholds, indicating strong structural compatibility of the model.

All standardized factor loadings were statistically significant ($p < .001$), with most values ranging from .670 to .789. This suggests that the observed items effectively represent their respective latent constructs. CR values for all constructs exceeded .800, and AVE values were generally above .500, in line with Fornell and Larcker [38] criteria for CV. Although a few items had factor loadings slightly below .700 and R^2 values under .500, the overall CR and AVE levels were acceptable. Given the theoretical relevance of these items, they were retained to preserve content validity.

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In terms of DV, following the Fornell-Larcker criterion, the square root of each construct's AVE was compared to its correlations with other constructs. All constructs met this requirement, for instance, the square root of HPWS's AVE was .727, which was greater than its correlation with EIB (.667). These results assure that the latent variables are empirically distinct, thus supporting DV of the measurement model.

Table 3.
Summary of CV Indicators.

Factor	CR	AVE	SQRT(AVE)
HPWS	0.900	0.529	0.727
BIE	0.887	0.497	0.705
PE	0.823	0.537	0.733

Note: This table summarizes the CR, AVE, and the square root of AVE for each latent construct. Compiled by the author.

In addition, the absolute values of the standardized residuals were all less than 2.58, and the C.Rs of the path coefficients were all greater than 1.96 and significant, indicating that the model predictions were not significantly different from the observed values, and the path relationship was robust and reliable. The Hoelter index was 491 ($p = .050$), which also exceeded the minimum sample recommended value of 200, further verifying the stability of the sample size and model estimation.

In summary, the measurement model constructed in this study performed well in terms of fit, CV, and DV, and had a good reliability and validity foundation, which could provide a solid guarantee for subsequent structural path analysis and mediation effect testing.

4.5. SEM Analysis

This study uses AMOS software to construct an SEM to test the path relationship and theoretical hypothesis between HPWS, PE and EIB. The model fitting results show that the overall indicators perform well, supporting the high fit between the model structure and the sample data.

Specifically, the chi-square degree of freedom ratio (χ^2/df) of the model is 1.437, which is lower than the recommended upper limit of 3, indicating that the overall model fits well [41]. Regarding residual-based indices, RMSEA = .027, SRMR = .029, and RMR = .031, all below the cutoff of .080, indicating low residual discrepancy. Absolute and incremental fit indices also performed well: GFI = .963, AGFI = .953, NFI = .959, CFI = .987, IFI = .987, and TLI = .981, all exceeding the recommended threshold of .900, suggesting excellent consistency between model structure and observed data. Additionally, the parsimony fit indices, PNFI = .843 and PGFI = .766, both surpassed the minimum recommended value of .500, confirming a good balance between model complexity and explanatory power [42].

Taken together, these results confirm that the overall model exhibits a strong goodness-of-fit and is suitable for path analysis.

4.5.1. Path Coefficient Analysis

The findings of the path analysis are shown in Figure 3. All the main path coefficients are significant. First, the HPWS has a significant positive effect on EIB ($\beta = .450$, $p < .001$), which verifies hypothesis H1 and indicates that high-performance HR practices in organizations help improve employees' innovation intentions and behavioral performance. Second, the HPWS has a significant impact on PE ($\beta = .689$, $p < .001$), which supports hypothesis H2, indicating that good institutional support can significantly boost employees' psychological perception and autonomy. Moreover, the positive effect of PE on EIB has also been verified ($\beta = .316$, $p < .001$), confirming hypothesis H3.

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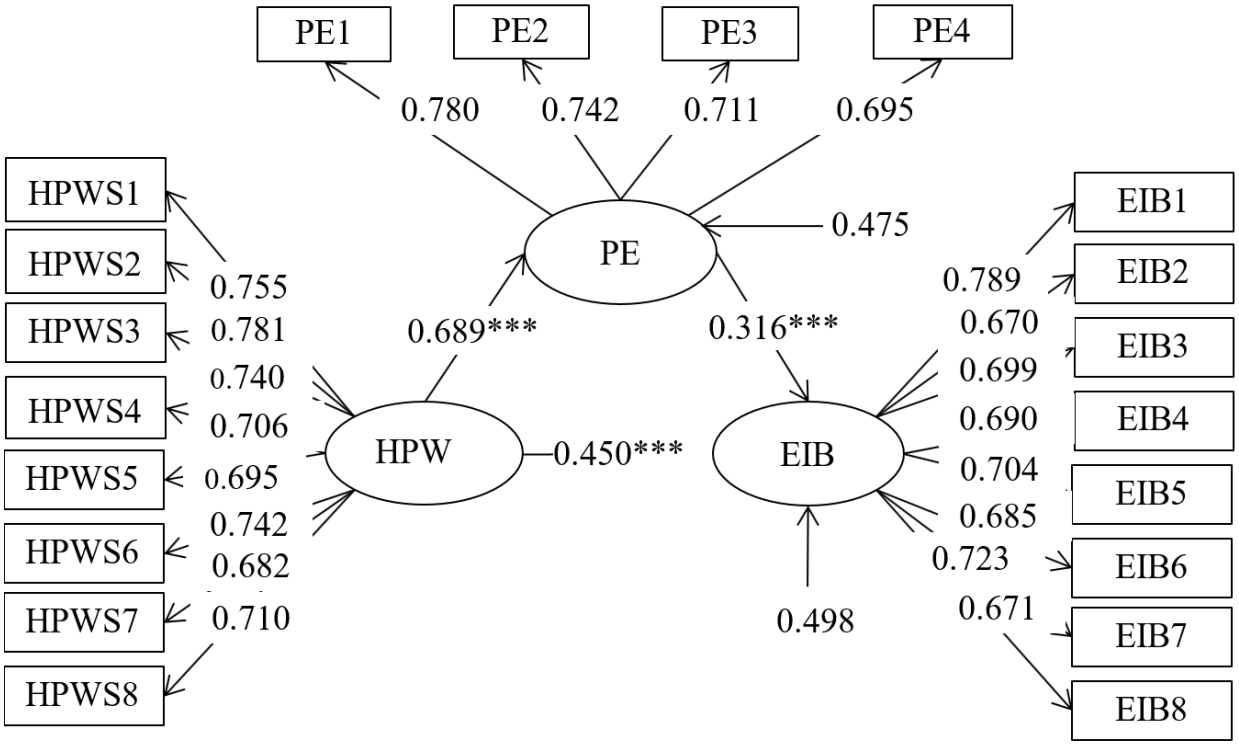


Figure 3.
Path Diagram of the SEM.
Note: This figure illustrates the structure and path coefficients of the SEM model.HPWS, EIB , PE; ***$p < .001$. Compiled by the author.

4.5.2. Mediation Effect Testing

To scrutinize the mediating role of PE in the relationship between HPWS and EIB, a bootstrapping procedure was conducted with 5,000 resamples and a 95%CI, following the approach recommended by Hayes [43].

The results showed that the direct effect of HPWS on EIB was .450 (95% CI: [.337, .554], p < .010), which was statistically significant. The indirect effect through PE was also significant, with a value of .217 (95% CI: [.145, .295], p < .010). In both cases, the CIs did not include zero, indicating the existence of a statistically significant mediation effect.

Moreover, the total effect of HPWS on EIB was estimated at .667 (95% CI: [.609, .713], p < .010), confirming a strong overall positive influence. These results support Hypothesis H4, demonstrating that PE partially mediates the link between HPWS and EIB.

Table 4.
Summary of Path Coefficient and Mediation Effect Analysis.

Path	Estimate	*SE*	95% CI	
			Lower, Upper	*p*
HPWS → EIB (Direct)	0.450	0.051	[0.337, 0.554]	0.004
HPWS → PE	0.689	0.034	[0.621, 0.758]	0.003
PE → EIB	0.316	0.052	[0.210, 0.417]	0.004
HPWS → EIB (Indirect through Professional Identity)	0.217	0.038	[0.145, 0.295]	0.003
HPWS → EIB (Total)	0.667	0.026	[0.609, 0.713]	0.007

Note: This table summarizes the direct and indirect effect estimates using bootstrap analysis. HPWS = HPWS; EIB = EIB; POS = Perceived Organizational Support; PE = PE.

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In summary, the outcomes of the SEM path analysis and the mediation effect test are highly consistent, indicating that HPWS can not only directly promote EIB, but also play an indirect role by improving the level of PE. Research hypotheses H1 to H4 are all empirically supported, verifying the effectiveness of this research model in theoretical logic and practical path.

5. Discussion

This study constructs a SEM based on SET, systematically explores the effect path of HPWS on EIB, and focuses on examining the mediating mechanism of PE. The results support all research hypotheses, further deepen the theoretical connection between HPWS, PE and EIB, and provide empirical evidence for management practice. The following discussion is from four aspects.

First, the study verifies the significant positive impact of HPWS on EIB (H1). HPWS significantly improves employees' capabilities, motivation and work resources through performance evaluation, systematic training and incentive mechanisms, thereby promoting the occurrence of EIB. This result is consistent with the result found by Miao, et al. [21] emphasizing the key role of performance management and incentive mechanisms in stimulating employees' innovative motivation. In addition, Mirza, et al. [9] also pointed out that a supportive work environment can effectively enhance employees' creative responses when facing challenges. The empirical results of this study further illustrate that HPWS builds an organizational atmosphere conducive to innovation through capacity building, motivation stimulation and resource support.

Secondly, the study confirmed the positive effect of HPWS on employee PE (H2). By improving work autonomy, information transparency and participation in decision-making, HPWS enhanced employees' sense of meaning, control and influence, and significantly improved their PE level. This result is in line with the research of Arefin, et al. [11] and Mirza, et al. [9] confirming that high-performance practices can enhance employees' subjective initiative and psychological participation, thereby improving their intrinsic motivation and enthusiasm. The four dimensions of PE proposed by Spreitzer [23] were also effectively reflected in this study, indicating that HPWS can fully stimulate employees' psychological identity and sense of responsibility.

Thirdly, PE was proven to have a significant promoting effect on EIB (H3), further strengthening its theoretical status as an intrinsic motivation mechanism. When employees feel a higher level of empowerment, they tend to be more creative, take more risks, and are willing to propose new ideas and take EIBs [12, 13]. The results of this study show that PE not only helps to enhance employees' motivation for innovation, but also significantly reduces their counterproductive behavior and turnover intention [29, 44] and enhances their organizational loyalty and commitment to innovation.

Finally, the mediation effect analysis verified hypothesis H4, that is, PE plays a significant mediating role between HPWS and EIB. Both path analysis and Bootstrap results show that high-performance practices indirectly enhance EIB by enhancing their sense of PE. This mechanism can be explained by SET: organizations convey trust and value to employees through institutional support, and employees return it back to the organizations with sophisticated work engagement and innovation [15, 29]. In this process, PE plays a key bridging role, promoting knowledge sharing, suggestion making, and proactive improvement behavior [33, 35].

In summary, PE is not only statistically significant as a mediating variable of HPWS affecting employee innovation, but also theoretically reflects its bridge function connecting organizational institutions and employee behavior. HPWS builds a psychological foundation for employees to participate in innovation through structural support and empowerment practices.

6. Conclusion and Implications

6.1. Research Conclusions

Based on SET, this study constructed a SEM to explore the mechanism of HPWS on EIB and verified the mediating effect of PE. The results display that HPWS significantly improves employees'

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ability, motivation and resource perception through performance management, training and development, and incentive mechanisms, thereby promoting the occurrence of EIB.

Institutional support not only directly stimulates employee innovation, but also effectively improves the level of PE by enhancing their work autonomy, sense of meaning and influence, thereby stimulating intrinsic motivation. The positive effect of PE on EIB has been fully verified. Employees with a higher sense of empowerment are more inclined to take risks, propose new ideas and actively implement improvements, while showing higher organizational commitment and sense of responsibility.

Further analysis confirmed that PE plays a significant mediating role in the relationship between HPWS and EIB, highlighting a functional chain of "institutional incentive – psychological activation – behavioral output". This model reveals the internal logic of how organizational systems stimulate individual innovation via psychological mechanisms. The study enriches the theoretical model of HPWS and offers empirical support and strategic guidance for organizations seeking to foster employee innovation through optimized HR practices.

6.2. Limitations and Future Research Directions

Notwithstanding the theoretical and empirical contributions of this study, numerous limitations remain, offering opportunities for upcoming research:

First, the cross-sectional design restricts the ability to infer causal relationships or observe dynamic changes over time. Future studies may employ longitudinal designs or experimental approaches to strengthen causal inference.

Second, the sample was restricted to medium-sized enterprises in Southwest China, limiting generalizability. Future research should examine the model across different industries, regions, and organizational types to test its broader applicability and robustness.

Third, this study did not incorporate other potentially significant variables such as organizational culture, leadership style, or team climate, which may affect the mechanisms linking psychological states to innovation. Future models could incorporate additional mediators and moderators to build a more complex, multi-level framework.

Finally, the study relied primarily on quantitative self-reported data, which may not fully capture employees' deeper perceptions or behavioral motivations. Future research could benefit from mixed-method approaches, such as case studies or in-depth interviews, to explore underlying psychological mechanisms and contextual responses in greater detail.

Overall, future research should aim to refine the theoretical framework of HPWS by improving methodological designs, expanding variable scope, and adapting to different organizational contexts, thereby deepening our understanding of how to effectively stimulate employee innovation.

Institutional Review Board Statement:

This study was approved, on 9 April 2024, by the Ethical Committee of Dhurakij Pundit University (Ref. No. DPU_BSH 0904/2567).

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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