ความสัมพันธ์ระหว่างการรับรู้การสนับสนุนทางสังคมกับการมีส่วนร่วมในการทำงานของพนักงาน: โดยพิจารณาผลกระทบต่อสุขภาวะของพนักงานและสภาพแวดล้อมการทำงานทางกายภาพ - กรณีศึกษาจากพนักงานชาวจีนในโรงงานอุตสาหกรรม จังหวัดซานตง ประเทศจีน

The Relationship between Perceived Social Support and Employee Work Engagement: Exploring the Effects of Employee Well-Being and Physical Work Environment - A Case Study of Chinese Employees in the Manufacturing Industry in Shandong Province

อี้ เหวิน โจว[*,1] และ จุนซั่ว เฉิน[2]

I-Wen, Chou[*,1] , and Chun-Shuo Chen[2]

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บทคัดย่อ

การวิจัยนี้มีวัตถุประสงค์เพื่อสำรวจความสัมพันธ์ระหว่างการรับรู้ถึงการสนับสนุนทางสังคม (การสนับสนุนจากหัวหน้างานและผู้ร่วมงาน) กับแรงจูงใจในการทำงานของพนักงานที่เป็นชาวจีน ซึ่งในปัจจุบันพบว่ามีงานวิจัยที่ศึกษาในเรื่องนี้ยังไม่มาก พร้อมทั้งศึกษาประเมินผลกระทบของความสัมพันธ์ระหว่างตัวแปรที่เปลี่ยนแปลงไปตามสภาพแวดล้อมการทำงานทางกายภาพ โดยใช้เครื่องมือวิจัย คือ แบบสอบถามและผู้ตอบแบบสอบถาม คือ พนักงานในอุตสาหกรรมการผลิตขั้นสูงในจังหวัดซานตง ประเทศจีน จำนวน 367 คน นำข้อมูลที่ได้วิเคราะห์ข้อมูลด้วยโปรแกรม MPLUS และ SPSS 25 จากผลการวิจัย พบว่า (1) สุขภาวะของพนักงานมีบทบาทเป็นตัวแปรคั่นกลางส่งผ่านแบบบางส่วนในความสัมพันธ์ระหว่างการรับรู้ถึงการสนับสนุนทางสังคมและแรงจูงใจในการทำงาน การรับรู้ถึงการสนับสนุนทางสังคม (การสนับสนุนจากหัวหน้าและผู้ร่วมงาน) ส่งผลทางบวกต่อสุขภาวะซึ่งส่งผลต่อการเพิ่มแรงจูงใจในการทำงาน (2) การรับรู้ถึงการสนับสนุนทางสังคมส่งเสริมให้เกิดแรงจูงใจในการทำงานมากขึ้น (3) สภาพแวดล้อมทางกายภาพในที่ทำงานมีอิทธิพลกำกับด้านลบทำให้ระดับของความสัมพันธ์ระหว่างสุขภาวะกับแรงจูงใจในการทำงานลดลง การศึกษานี้ช่วยเติมเต็มช่องว่างในงานวิชาการและมอบข้อเสนอแนะอันเป็นเอกลักษณ์สำหรับการบริหารทรัพยากรบุคคล ซึ่งผลจากการวิจัยนี้สามารถใช้เป็นแนวทางอ้างอิงในการบริหารจัดการพนักงานสำหรับธุรกิจหลังจากผ่านเหตุการณ์การระบาดของโรคติดเชื้อไวรัสโคโรนา 2019 และการศึกษานี้ชี้ให้เห็นว่าการเสริมสร้างทั้งการสนับสนุนจากหัวหน้าและผู้ร่วมงานสามารถเพิ่มความสุขของพนักงานและผลักดันให้เกิดแรงจูงใจในการทำงานมากขึ้นด้วย

คำสำคัญ: ความผูกพันในงานของพนักงาน แรงจูงใจในการทำงาน สภาพแวดล้อมการทำงานทางกายภาพ สุขภาวะของพนักงาน การรับรู้ถึงการสนับสนุนทางสังคม จังหวัดซานตง

[1, 2]Lecturer, Faculty of Chinese International College, Dhurakij Pundit University

* Corresponding author e-mail: I-wen.cho@dpu.ac.th

Abstract

There is relatively less research on perceived social support (from supervisors and colleagues) and its impact on Chinese employee engagement in the workplace. This study aims to explore the relationship between Perceived Social Support (supervisor and colleague support) and employee work engagement., while also investigating the moderating effects of the physical work environment on these variables. Utilizing a questionnaire survey method, the research concentrates on employees in the advanced manufacturing industry in Shandong Province, China. A total of 367 valid responses were collected for analysis using MPLUS and SPSS 25 The research findings indicate: (1) The employee well-being partially mediates the relationship between perceived social support and employee work engagement. Perceived social support (supervisor support and colleague support) positively contributes to employee well-being, subsequently enhancing work engagement; (2) Perceived social support has positive impact on employee work engagement; (3) The physical work environment act as a negative moderating factor between employee well-being and work engagement. This research fills a gap in the academic literature and provides unique recommendations for human resource management. The findings of this research can serve as a reference for post-pandemic businesses in managing their employees. This research suggests that enhancing both supervisor and colleague support can lead to increased employee well-being, consequently boosting their employee work engagement.

Keywords: Employee Work Engagement., Physical Work Environment, Employee Well-Being, Perceived Social Support, Shandong Province

1. Introduction

Employee work engagement has become increasingly significant. Quiet Quitting characterizes employees who haven't formally resigned but have become dissatisfied with their work or disengaged from their jobs. This pattern may result in hidden costs due to employee turnover and can disrupt team collaboration and corporate culture (Formica & Sfodera, 2022). Additionally, a significant challenge for managers in the modern business environment is ensuring that Chinese employees genuinely integrate into the organization and perpetuate its culture and values. Every employee whose work for an organization must adapt to a new work environment, and the role of social support is crucial in facilitating this adaptation (Kuriakose et al., 2019). The majority of studies concentrate solely on particular groups, such as nurses or teachers, examining the influence of their perceived social support (from supervisors and colleagues) and work engagement (Jasinki & Derbis, 2023; Ramzan et al., 2021; Yang et al., 2019). There is a lack of research on the perceived social support and work engagement of Chinese employees in corporate settings. Therefore, this study aims to explore the relationship between perceived social support (supervisor and colleague support) and employee work engagement.

Key factors influencing employee engagement in today's businesses are of paramount importance. From a sustainable development perspective, Employee's well-being (EWB) has become a critical factor in work engagement, as emphasized by many scholars. They assert that employee's well-being is something companies must highly prioritize, given its significant influence on job performance (Como et al., 2021; Gubler et al., 2021).

Furthermore, Emmett et al. (2020) suggest that organizations should focus on the employee experience to provide solutions aligned with employee well-being. Morgan (2017) emphasizes that a good physical work environment can enhance employees' emotional commitment and work attitudes toward the organization. In summary, in this era, research on the relationship between the physical work environment, employee's well-being, and work engagement is gaining attention. However, there is still a lack of research combining these elements to explore their impact on employee work engagement. Therefore, this study builds on this foundation to investigate how perceived social support (from colleagues and supervisors) influences EWB and its subsequent effects on employee work engagement.

The research questions for this study are:

1. Does perceived social support (from colleagues and supervisors) have a positive impact on employee work engagement?

2. Does the physical work environment act as a moderating factor in the relationship between perceived social support (from colleagues and supervisors), employee well-being, and employee work engagement?

3. Is the relationship between perceived social support (from colleagues and supervisors) and employee work engagement influenced by the mediating role of employee well-being?

2. Literature review

2.1 Perceived Social Support (PSS) (colleagues and supervisors)

Supervisor support and colleague support are rooted in the concept of social support (Zimet et al. ,1988). A term that early scholars interpreted differently, such as Cobb (1976) defined social support as individuals feeling cared for, loved, esteemed, and having a sense of belonging. Perceived social support, as interpreted by Zimet et al. (1988), refers to the subjective perception and evaluation of the degree to which individuals feel supported from external sources—a definition widely accepted by scholars. Chou et al. (2022) defined perceived social support (PSS) as "when a person receives emotional support, her/his subjective overall perception and estimation of being respected, supported, and understood from their family, friends, and teachers". Su et al. (2018) defined perceived social support (PSS) as the personal perception of respect, support, and understanding from colleagues and supervisors on a psychological level.

In this study, drawing on the definition of social support within the work context presented by Zimet et al. (1988) and Su et al. (2018), supervisor and colleague support are defined as employees' subjective psychological perceptions of the level of respect, support, and understanding they receive from colleagues and supervisors while working in the workplace.

2.2 Employee Work Engagement (EWE)

Chinese scholars integrate the concept of employee work engagement within the Chinese context and provide distinct definitions. Li (2022) defines work engagement as the specific manifestation of employees' sense of belonging to the organization. Scholars like Wan et al. (2022) define employee work engagement as a form of work performance characterized by employees exhibiting high energy, wholehearted involvement, and strong resilience. Aligned with the cultural context in China, this study embraces Wan et al. (2022)'s definition of employee's work

engagement, characterizing it as a work performance where employees display heightened energy, wholehearted involvement, and robust resilience.

2.3 Physical Work Environment (PWE)

The physical work environment in this study is derived from the dimensions of the physical environment proposed by Morgan (2017). Scholars have presented different definitions for the physical environment. Some argue that employee experience is a form of the organization's long-term commitment, focusing on tracking employees' thoughts and feelings at every single touchpoint in their company journey (Barik & Yadav, 2021). Others provide a more nuanced explanation, stating that employee experience encompasses all interactions between employees and the organization, influenced by three dimensions such as the physical space employees use daily, the organization's culture, and the tools and technology provided by the employer (Itam & Ghosh, 2020). In this study, the definition of the physical environment adopts Morgan's (2017) proposal, representing the actual workplace for employees, including everything employees come into contact within their surroundings.

2.4 Employee Well-Being (EWB)

Warr (1987) was a pioneer in introducing the concept of subjective well-being into organizational research, and this paper defined employee well-being as the overall assessment that employees make of their work experiences and positions. Chou et al. (2022) explicitly defined subject well-being as “the extent to an individual’s subjective evaluation of life in terms of satisfaction and balance between positive and negative effects”. Furthermore, Chou et al. (2022) indicated that subjective well-being possesses subjectivity, stability, and comprehensiveness. This study posits that employee well-being is an extension of employees' subjective sense of well-being. More recently, Zheng et al. (2022) have indicated that employees' life well-being is a crucial resource for effectively coping with job demands. It is characterized as a positive emotional and motivated state, where employees are energized, highly dedicated, and immersed in their work.

2.5 Research Hypothesis

Numerous studies have confirmed a significant positive impact of social support on employee work engagement (Zheng & Ho, 2022; Zhang et al., 2022). In the field of education research, Guo et al. (2021) pointed out a positive relationship between social support and kindergarten teachers' employee work engagement. Based on these arguments, the following hypothesis is proposed:

H1: Perceived social support positively influences employee work engagement.

Wang et al. (2021) conducted interviews with Chinese employees, revealing that the level of social support can influence work attitudes. Additionally, social support significantly impacts employees' mental health, as higher social support correlates with higher positive emotions (Demerouti et al., 2001; Bakker & Demerouti, 2008). Jasinki and Derbis (2023) conducted a study with 163 midwives working in the Polish public health system, finding a significant positive relationship between perceived social support and work engagement, while positive emotions influence both work engagement and job satisfaction. In conclusion, this study posits that social support can enhance employee well-being during crises, consequently increasing employee work engagement. Based on these arguments, the following hypothesis is proposed:

H2: Employee well-being plays a mediating role in the relationship between perceived social support and employee work engagement.

Aydogan and Cerone (2021) found in their research that indoor plants can alleviate stress and fatigue among employees, enhancing their attention. Furthermore, Morgan (2017) mentioned that the physical work environment influences employees' psychological comfort. Moreover, Duque et al. (2020) indicated a significant positive relationship between physical environmental factors and employee work engagement. Combining the findings of the above studies, it can be concluded that the physical work environment has a positive impact on employee well-being. Thus, the hypothesis for this study, H3, is as follows:

H3: Physical work environment has a positive moderating effect in the relationship between employee well-being and employee work engagement.

This study adopts the proposed research model based on the Job Demands-Resources Model proposed by Demerouti et al. (2001). The Job Demands-Resources Model encompasses two categories: job demands and job resources, covering factors such as job requirements, job resources, burnout, and disengagement. In this study, the job demand is represented by the physical work environment, while job resources are represented by perceived social support. Adverse job demand factors can lead to a decrease in employee well-being, while job resource-related factors can enhance employee well-being.

Based on the literature review, the following conceptual Framework can be synthesized for the study. The research framework was shown in the below in Figure 1.

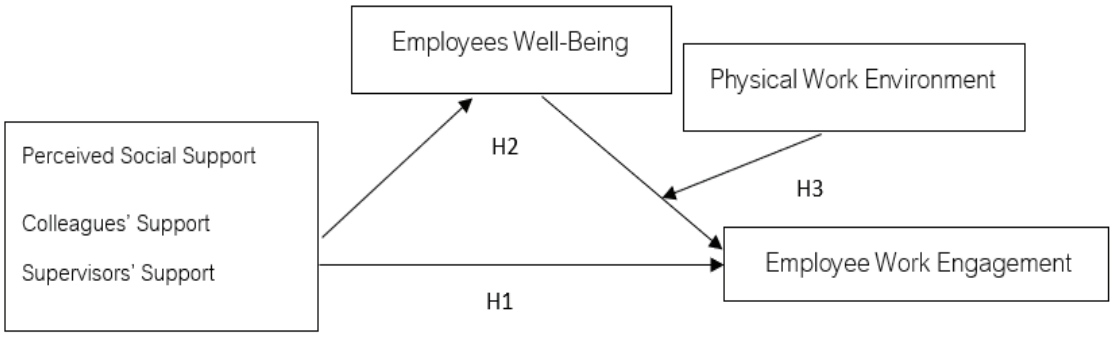

Figure 1 The Conceptual Framework

3.Methodology

3.1 Sampling and Samples

This study's sample is Chinese employees in Manufacturing Industry in Shandong Province. An online questionnaire is conducted. Purposeful sampling is used to collect the questionnaire. SPSS 25.0 and Mplus is used for reliability and regression analysis, and the study finally collect 455 samples. According to the standards proposed by Tinsley and Tinsley (1987), the acceptable ratio of the number of items in a scale to the number of participants is 1:5. With a total of 50 items in this study, it requires collecting 250 valid questionnaires. Invalid questionnaires" refers to survey responses that are deemed unusable or unreliable for analysis due to issues such as incomplete or

inconsistent answers, duplicate entries, or responses that do not meet the criteria set for inclusion in the study, 88 questionnaires were identified as invalid and subsequently excluded from the analysis, leaving 367 questionnaires that met the criteria for being considered valid and usable for the research. According to the standards proposed by Tinsley and Tinsley (1987), calculated by multiplying 50 by 5, the number of valid questionnaires collected for this research is 367, exceeding the scholars' standard.

3.2 Questionnaire Design and Measurements

The questionnaire of this study is divided into two parts. The first part is "basic information", including the respondents' gender and age. The second part is the scale part, which involves the scale items of variables such as "Perceived social support (PSS)", "Employee Work Engagement (EWE), "Employee Well-Being (EWB)", and "Physical Work Environment (PWE)"

This study adopts the Physical Work Environment (PWE) published by Yadav and Vihari (2021), items includes "I tend to experience positive odours" , "The light coming from the sun into the work environment is adequate." and so on.; PSS scale published by Jiang(2000), includes "My friends really try to help me", "There is a special person who is around when I am in need"," and so on ; EWB scale published by Zheng et al. (2015), includes "I can always find ways to enrich my work.", "I find real enjoyment in my work" and so on; EWE scale published by Rich et al. (2010), includes "I work with intensity on my job", "There is a special person who is around"," At work, I am absorbed in my job." and so on. The scale items are assessed using Likert's 5-point scale (1 = strongly disagree, 5 = strongly agree), gauging the extent of participants' agreement with each statement.

The study involves bilingual translation. This study's survey was bilingual translated by three expert scholars, who are assistant professors from business schools in both China and the United States. The translation covered both Chinese to English and English to Chinese, ensuring that the survey retains representative characteristics in the Chinese context. This thorough process is designed to improve Chinese corporate employees' comprehension of the survey content and reduce the potential for response biases (Wu, 2006).

3.3 Data Collection

This study takes Chinese enterprise employees working in Manufacturing Industry in Shandong Province. as the research objects, and the survey time is from 20 December 2023 to 10 January 2024. This study collaborates with owners and employees from China's top 500 companies, asked these employees to fill in the online questionnaire for this study.

Finally, 455 questionnaires were collected in this study in the above-mentioned way. This study takes to filter out the surveys with identical answers for reverse and forward questions, remove 88 invalid surveys, and end up with 367 valid surveys.

3.4 Reliability and Validity Test

The KMO measure assesses the suitability of data for factor analysis by examining inter-variable relationships, internal consistency reliability, measured through techniques like Cronbach's alpha, assesses how consistently items in a test or scale measure the same underlying construct. KMO values range from 0 to 1, where higher values indicate more suitable data for factor analysis. A common rule of thumb is that a KMO value above 0.6 is considered acceptable, and values closer to 1 are preferable. Higher values of Cronbach's alpha indicate greater

internal consistency, suggesting that the items in the scale are measuring the same thing consistently. A commonly accepted threshold for reliability is 0.7 (Kaiser, 1974).

After testing the reliability of the collected questionnaires, this study obtained the KMO (Kaiser-Meyer-Olkin) values for the physical work environment, perceived social support, and employee well-being are 0.915, 0.926, and 0.950, respectively. Additionally, the KMO values for employee work engagement is 0.959. These values indicate that the data are highly suitable for factor analysis(Kaiser, 1974).

The internal consistency reliability analysis, measured by Cronbach's α values, considers α coefficients between 0.50 and 0.60 as acceptable, between 0.60 and 0.70 as moderate, and α coefficients above 0.70 as high reliability (Fornell & Larcker ,1981). In this study, the Cronbach's α values for construct reliability are as follows: physical work environment (α = 0.915), perceived social support (α = 0.948), employee well-being (α = 0.952), and job engagement (α = 0.959). All α coefficients for the constructs are above 0.9, indicating very high reliability for the questionnaire in this study (Fornell & Larcker ,1981).

In this study, Confirmatory Factor Analysis (CFA) was utilized. Composite Reliability (CR) and Average Variance Extracted (AVE) emerge as vital indicators for evaluating convergent validity within latent variables in Structural Equation Modeling (SEM). Both CR and AVE play a crucial role in scrutinizing Convergent Validity and Discriminant Validity among constructs. The assessment of convergent validity in this study involved examining the relationship among diverse measures of the same construct.

The AVE values in this study ranged from 0.554 for the physical work environment to the highest at 0.713 for supervisor support. Notably, the average AVE values for all variables exceeded the threshold of 0.5. Furthermore, the CR values for all variables surpassed 0.9, aligning with the recommendation set forth by Fornell and Larcker (1981), which suggests that AVE values should surpass 0.5, and CR should exceed 0.6.

Despite ensuring the anonymity of respondents during the questionnaire collection process, which helps reduce social desirability and response bias, and randomly arranging the order of questions in the questionnaire to minimize the impact of preceding questions, there may still be common method variance. This study employs two methods to examine it: confirmatory factor analysis and Harman's single-factor test, as detailed below.

1. The $\chi 2$ value for this study is 4757.154, with 1524 degrees of freedom (df), and a p-value of 0.000 (<0.05). The chi-square degrees of freedom ratio ($\chi 2$/df) is 3.121, meeting the recommended standard of being less than 5.00 by scholars such as Schumacker & Lomax (2004). Furthermore, the goodness-of-fit indices for the measurement model meet the criteria, with the Comparative Fit Index (CFI) satisfying the recommended standard of being above 0.8 by scholars like Doll et al. (1994).

2. Hair et al. (1998) pointed out that if the first factor explains more than 40%, there may be a common method bias. In this study, the first factor explains a variance 18%(below 40%). Therefore, this study employed confirmatory factor analysis and Harman's single factor test to examine the common method variance among variables. The results indicate that this study does not have common method bias.

4. Research Results

4.1 Demographic Information

The demographic information for the entire sample is shown in the table below Table 1. It can be observed that, in terms of gender, the highest proportion among the participants in this study is 'female' at 62.94%, with 37.06% being male. Regarding the years of tenure in the current company, 40% of the sample has '1-5 years' of experience, and the proportion of those with '5-10 years' is 32.43%. In terms of age, over 30% of the sample falls into the '31–35 years old' category. Analyzing the average monthly income of the participants in this study, a relatively high proportion, 29.92%, earns 'above 6501 (Chinese Yuan) monthly. See below Table 1.

Table 1 The Results of Demographic Information

Name	Options	Frequency	Percentage (%)
Gender	Male	136	37.06
	Female	231	62.94
Job Tenure	1-5 years	148	40.33
	5-10 years	119	32.43
	Over 10 years	100	27.25
Age	Under 20 years old	0	0
	21–25 years old	33	8.99
	26–30 years old	56	15.26
	31–35 years old	138	37.6
	36–40 years old	65	17.71
	41–45 years old	35	9.54
	46–50 years old	15	4.09
	Over 51 years old	25	6.81
Average monthly income -	2500	50	13.62
Chinese Yuan	2501-4500	101	27.52
	4501-6500	106	28.88
	6501	110	29.97

4.2 Hierarchical Regression

Hierarchical regression refers to a statistical method used to examine the contribution of multiple independent variables to the variance in a dependent variable. This study employed hierarchical regression analysis by SPSS 25.0 with perceived social support as the independent variable and work engagement as the dependent variable.

Table 2. in the first stratum, control variables were introduced, and in the second stratum, the adjusted R-squared was determined to be 0.456, with an F-value of 82.122 ($p < 0.01$). The results indicate a significant positive relationship between perceived social support and work engagement, with a Beta value of 0.491 ($p < 0.01$) in Table 2. All VIF values are less than 3. The values in parentheses in the table are T-values.

Table 2 The regression analysis results for the PSS on EWE. (N=367)

The regression analysis results for the perceived social support on employee work engagement. (dependent variable: employee work engagement)				
	Model 1	VIF	Model 2	VIF
Gender	-0.081	1.089	0.048	1.119
	(-1.284)		(0.996)	
Educational Background	0.070	1.353	0.022	1.368
	(1.880)		(0.774)	
Job Tenure	-0.032	1.559	-0.041	1.559
	(-0.659)		(-1.104)	
Position	-0.100*	1.081	-0.076*	1.082
	(-2.111)		(-2.096)	
Age	0.069**	1.500	0.056**	1.503
	(2.731)		(2.888)	
Average monthly income -	0.091*	1.579	0.078**	1.580
Chinese Yuan	(2.349)		(2.666)	
PSS			**0.491****	1.067
			(16.179)	
R^2	0.091		0.467	
Adjusted R^2	0.076		0.456	
F	F (6,360)=6.023**		F (7,392)=82.122***	

Note. * p<0.05 ** p<0.01

The result of Hierarchical regression for employee well-being as a mediating role in the relationship between perceived social support and employee work engagement, shown in below Table 3. The values in parentheses in the table are T-values.

Table 3 The result of Hierarchical regression (M= Employee Well-Being, EWB) (N=367)

Employee well-being as a mediating role in the relationship between perceived social support and employee work engagement

(dependent variable: employee work engagement)

	EWE	VIF	EWB	VIF	EWE	VIF
Gender	0.048	1.119	0.176**	1.119	0.010	1.142
	(0.996)		(2.722)		(-0.220)	
Educational	0.022	1368	-0.119**	1.368	0.061*	1.405
Background	(0.774)		(-3.131)		(2.357)	
Job Tenure	-0.041	1.559	-0.133**	1.559	0.003	1.591
	(-1.104)		(-2.706)		(0.093)	
Position	-0.076*	1.082	0.151**	1.082	-0.126**	1.112
	(-2.096)		(3.129)		(-3.806)	
Age	0.056**	1.503	0.111**	1.503	0.019	1.581
	(2.888)		(4.325)		(1.070)	
Average monthly	0.078**	1.580	0.107**	1.580	0.043	1.613
income –	(2.666)		(2.729)		(1.614)	
Chinese Yuan						
PSS	**0.491****	1.067	0.346**	1.067	0.377**	1.285
	(16.179)		(8.557)		(12.582)	
Employee well-being					0.330**	1.351
					(9.252)	
R^2	0.474		0.260		0.576	
Adjusted R^2	0.464		0.245		0.566	
F	F (7,359)=		F (7,359) =		F (8,358) =	
	46.293**		17.995**		60.753**	

Note. * p<0.05 ** p<0.01

From the above Table 3, it can be observed that the Beta value for the impact of perceived social support on employee work engagement is from 0.491** (to p<0.01) to 0.377**(p<0.01). After introducing the mediating variable, employee well-being, it is noticeable that the BETA value of the main effect has shown a decrease. Therefore, employee well-being serves as a partial mediating effect.

And this study tests the Moderating Effect Analysis of Physical Work Environment. The Below Table 4 is testing moderating effect analysis results of Physical Work Environment on the relationship between Employee Well-being and Employee work engagement. In this study, Model 1 includes the independent variable (Employee Well-being) and control variables. Model 2 builds upon Model 1 by adding the moderating variable (Physical Work

Environment). Model 3 extends Model 2 by introducing the interaction term (the product of the independent variable and the moderating variable), EWB*PWE = Employee Well-being * Physical Work Environment.

Table 4 Moderation Effect Analysis Results of Physical Work Environment.

Moderation Effect Analysis Results of Physical Work Environment (Dependent Variable: EWE)						
	Model 1	VIF	Model 2	VIF	Model 3	VIF
Gender	-0.124*	1.369	-0.088	1.103	0.099*	1.110
	(-2.405)		(-1.850)		(-2.078)	
Educational	0.114**	1.583	0.082**	1.395	0.077**	1.402
Background	(3.698)		(2.883)		(2.704)	
Job Tenure	0.033	1.100	0.022	1.585	0.021	1.585
	(0.830)		(0.587)		(0.578)	
Position	-0.169**	1.577	-0.160**	1.101	-0.152**	1.109
	(-4.294)		(-4.425)		(-4.205)	
Age	0.007	1.611	-0.001	1.580	-0.006	1.594
	(0.333)		(-0.027)		(-0.284)	
Average monthly	0.031	1.122	0.016	1.618	0.016	1.618
income	(0.975)		(0.528)			
					(0.560)	
EWB	0.515**	1.369	0.389**	1.328	0.426**	1.485
	(13.204)		(9.980)		(10.429)	
PWE			0.369**	1.294	0.324**	1.465
			(8.179)		(6.810)	
EWB*PWE					**-0.155****	1.228
					(-2.778)	
R^2	0.388		0.485		0.496	
Adjusted R^2	0.376		0.473		0.483	
F	(7,359)=		(8,358)=		(9,357)=	
	32.553**		42.076**		38.960**	

Note. * p<0.05 ** p<0.01

From the Table 4 above, it is evident that the interaction term between employee well-being and the physical work environment exhibits statistical significance, with a Beta value of -0.155 (t = -2.778, p < 0.05). This indicates that the physical working environment serves as a negative moderator in the relationship between perceived social support and employee work engagement. The results of hypothesis presented in Table 5.

Table 5 The results of hypothesis

Hypothesis	Results
H1: Perceived social support positively influences employee work engagement.	Accepted
H2: Employee well-being plays a mediating role in the relationship between perceived social support and employee work engagement.	Accepted
H3: Physical work environment has a positive moderating effect in the relationship between employee well-being and employee work engagement.	Rejected

Based on the findings presented in Table 5, it is evident that H1, stating that perceived social support positively influences employee engagement, is accepted. Additionally, H2, which proposes that employee well-being acts as a mediating factor in the relationship between perceived social support and employee engagement, is also accepted. However, regarding H3, we have observed differences that stem from our hypothesis (This indicates that physical working environment serves as a negative moderator). This will be further discussed in the subsequent chapter.

5.Conclusion and Discussion

The Job Demands-Resources (JD-R) model posits that work resources comprise positive elements within the work environment, with perceived social support (from supervisors and colleagues) being a crucial resource. This support encompasses emotional and informational aspects, exerting a positive influence on employee well-being. Building on Demerouti et al.'s (2001) theoretical framework, this study extends the model by suggesting that resources like perceived social support and a favorable physical work environment can motivate employees, leading them to view work as a source of happiness. For example, higher levels of perceived social support enhance employee well-being, thereby increasing work engagement. This study further elaborates on the relationships among the antecedent variable (perceived social support), the mediating variable (employee well-being), and the outcome variable (work engagement) within the JD-R model.

Additionally, the study reveals a noteworthy finding that a higher level of physical work environment, when combined with elevated employee well-being, leads to lower levels of employee work engagement. These results contribute to bridging gaps and addressing limitations in existing academic literature. Specifically, it highlight:.

Firstly, perceived social support positively influences employee engagement, aligning with previous research findings (Zheng & Ho, 2022; Zhang et al., 2022). This indicates that providing higher levels of supervisor and colleague support in the workplace can lead to increased work engagement among employees. While earlier studies have primarily focused on nurses and teachers, this research targets corporate employees, rendering these results both innovative and contributory. Therefore, companies should prioritize fostering support relationships among employees and between employees and their supervisors, promoting work engagement through adequate supervisor support. This approach not only enhances employee performance but also improves the overall work atmosphere and teamwork, thus driving the company's continuous development and success. In summary, based on the findings

of this study regarding the positive direct and indirect relationships between supervisor support, colleague support, and work engagement, managers should closely monitor the levels of colleague and supervisor support perceived by employees. They should develop human resource management strategies and make improvements to the work environment based on employee feedback to increase work engagement.

Furthermore, this study reveals that employee well-being partially mediates the relationship between perceived social support and employee work engagement. This aligns with the findings of Jasinki and Derbis (2023), but our research confirms the mediating role of well-being, whereas previous studies have primarily explored the mediating effect of positive emotions in the relationship between perceived social support and employee work engagement. This constitutes a significant innovation in our study.

Finally, the physical work environment demonstrates a negative moderating effect between employee well-being and employee work engagement, contradicting our initially hypothesized positive moderating effect. Based on the findings of Yang et al. (2023), an increasing number of Chinese companies are emulating Google's practice of allowing employees to design their own office spaces to actively foster engaging work environments. Nevertheless, scholars emphasize that traditional Chinese beliefs maintain a clear boundary between work and leisure activities. When there are fewer leisure activities, Chinese employees can obtain social support resources, thereby enhancing their work engagement. This aspect merits further exploration in future research. Existing literature, exemplified by Aydogan and Cerone (2021), which found that the presence of indoor plants can alleviate stress and fatigue in employees and enhance attention, has primarily focused on Western enterprises. According to traditional Chinese beliefs, when the boundaries between play and work are clearly defined, Chinese employees' work engagement improves. This conclusion echoes the findings of this study, which indicate that the physical work environment negatively moderates the relationship between employee well-being and work engagement. Although a good physical work environment and high well-being are generally considered important factors for enhancing work engagement, this study found that when both are present simultaneously, they may have the opposite effect. Companies need to provide a comfortable work environment while avoiding making it too relaxing to ensure employees can stay focused on their work tasks, thereby improving work engagement. Therefore, it is recommended that companies, when designing work environments, not only focus on comfort but also consider how to help employees maintain focus on their work tasks. The distinctive context and culture of China have yielded innovative research results in this study, making a significant contribution.

6.Limitations and Suggestions for Further Research

While this study brings innovation and contributes to the academic field, it is not without limitations. Firstly, the research is limited to employees in the new energy sector in Shandong Province. Although it holds representativeness, future research is recommended to expand the investigation to other provinces in China to verify the consistency of results. Furthermore, there is a need for deeper exploration in forthcoming research to thoroughly examine the moderating impact of the physical work environment, assessing its consistency across various provinces or industries within the Chinese context.

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