


Open Access Article

 <https://doi.org/10.55463/issn.1674-2974.50.5.17>

## How Do Job Happiness Factors Affect Building Construction Workers in Bangladesh?: The Moderating Role of Monitoring System

Mohitul Ameen Ahmed Mustafi<sup>1\*</sup>, Abid Aziz<sup>2</sup>, Mohasina Ankhi<sup>3</sup>, Sonjoy Maitra<sup>4</sup>, Farooq Hossan<sup>4</sup>,  
Md. Monowar Uddin Talukdar<sup>5</sup>, Mir Mohammad Azad<sup>6</sup>

<sup>1</sup> Ph.D. Research Fellow, Logistic Engineering & Management, Chang'an University, Xi'an 710064, China

<sup>2</sup> Department of Business Administration, Uttara University, Dhaka, Bangladesh

<sup>3</sup> Researcher, Dhaka, Bangladesh

<sup>4</sup> Department of Business Administration, Hamdard University Bangladesh, Gazaria, Munshiganj, 1510, Bangladesh

<sup>5</sup> Department of Business Administration, University of Brahmanbaria, Brahmanbaria, Bangladesh

<sup>6</sup> Department of Computer Science and Engineering, Hamdard University Bangladesh, Gazaria, Munshiganj, 1510, Bangladesh

\* Corresponding author: [mustafi559@gmail.com](mailto:mustafi559@gmail.com)

Received: February 3, 2023 / Revised: March 6, 2023 / Accepted: April 18, 2023 / Published: May 31, 2023

**Abstract:** This study aims to investigate the factors that influence job happiness among building construction workers in Bangladesh. The research used a quantitative research design and collected data from 290 construction workers through a structured questionnaire. The collected data were analyzed using descriptive statistics and structural equation modeling. The study used both primary and secondary data sources. In this study, we used a structured questionnaire, with 1 indicating strongly disagree and 5 indicating strongly agree. A purposive sampling technique was used to collect data from Bangladesh construction sector. The research findings revealed several factors that contribute to the job happiness of construction workers. These factors include inspiration, personal traits, and working condition. This study also revealed that moderating factors such as the monitoring factor system can improve job happiness in this sector. Overall, the study suggests that employers in the construction industry should focus on providing inspiration, personal traits, and working conditions to their workers. By addressing these factors, construction companies can improve the job happiness of their workers, which can lead to increased productivity.

**Keywords:** human relations, inspiration, job happiness, monitoring, personal traits, working condition, construction worker, Bangladesh.

### 工作幸福感因素如何影响孟加拉国的建筑工人？：监控系统的调节作用

**摘要：**本研究旨在调查影响孟加拉国建筑工人工作幸福感的因素。该研究采用定量研究设计，通过结构化问卷收集了 290 名建筑工人的数据。使用描述性统计和结构方程模型对收集的数据进行分析。该研究使用了主要和次要数据源。在本研究中，我们使用了结构化问卷，1 表示非常不同意，5 表示非常同意。使用有目的抽样技术从孟加拉国建筑部门收集数据。研究结果揭示了影响建筑工人工作幸福感的几个因素。这些因素包括灵感、个人特质和工

作条件。这项研究还表明，监控因素系统等调节因素可以提高该行业的工作幸福感。总体而言，该研究表明，建筑行业的雇主应重点关注为工人提供灵感、个人特质和工作条件。通过解决这些因素，建筑公司可以提高工人的工作幸福感，从而提高生产力。

**关键词：**人际关系、灵感、工作幸福感、监控、个人特质、工作条件、建筑工人、孟加拉国。

## 1. Introduction

Job happiness is an essential factor in determining the well-being and productivity of workers in any industry. In the construction industry, job happiness is important not only for the individual worker but also for the success of the project and the safety of all those involved. In the literature review, we will explore the relationship between various factors, including human relations, personal traits, working conditions, inspiration, and monitoring, with job happiness among construction workers. Human relations, including communication, cooperation, and teamwork, have been found to have a positive impact on job happiness among construction workers [1]. Positive human relations can enhance job happiness and promote a sense of belonging among workers, leading to higher levels of job happiness. Personal traits such as optimism, self-efficacy and resilience have also been found to be positively associated with job happiness among construction workers. Workers who possess these traits are better able to cope with job demands and stress, leading to higher levels of job happiness. Working conditions, including safety, equipment, salary, workload, job security, and welfare facilities, have also been found to be important predictors of job happiness among construction workers [2]-[4]. Workers who have better working conditions are more likely to experience positive emotions and job fulfillment, leading to higher levels of job happiness. Inspiration, which includes job happiness, organizational commitment, and work inspiration, has been found to be positively associated with job happiness among construction workers [4]. Workers who are inspired by their work and committed to their organization are more likely to experience job fulfillment, leading to higher levels of job happiness. Monitoring, which includes supervision, feedback, and performance appraisal, has also been found to play a positive role in promoting job happiness among construction workers [5]-[6]. Workers who perceive higher levels of monitoring are more likely to experience positive emotions and job fulfillment, leading to higher levels of job happiness.

Overall, these studies suggest that various factors, including human relations, personal traits, working conditions, inspiration, and monitoring, can have a

significant impact on job happiness among construction workers. By understanding these factors, employers can take steps to enhance job happiness, leading to a more productive and safer work environment for everyone involved.

### 1.1. Research Questions

✓ What are the factors that contribute to job happiness among building construction workers in Bangladesh?

✓ What strategies can construction companies in Bangladesh implement to improve the job happiness of their workers?

✓ How does the monitoring system as a moderator of building construction workers in Bangladesh influence their job happiness?

### 1.2. The Objective of the Study

The objective of the study on job happiness factors affecting building construction workers is to identify the key factors that contribute to the happiness of workers in the construction industry. This study aims to explore various factors such as inspiration, personal traits, human relations, monitoring, and working conditions that can influence the happiness of construction workers.

## 2. Literature Review

### 2.1. Personal Traits and Job Happiness

Numerous studies have examined the relationship between personal traits and job happiness. Positive traits such as optimism, self-efficacy, emotional intelligence, and work ethic have been found to be associated with higher levels of job happiness. Self-efficacy, which is the belief in one's ability to perform tasks successfully, has been found to be positively associated with job happiness [7]. Emotional intelligence, which refers to the ability to recognize, understand, and manage emotions in oneself and others, has also been found to be positively associated with job happiness [8]. Workers with high emotional intelligence are better equipped to manage workplace relationships, handle stress, and communicate effectively, leading to higher levels of job happiness. However, not all personal traits have a positive

relationship with job happiness. For example, neuroticism, which is the tendency to experience negative emotions, has been found to be negatively associated with job happiness [9]. Similarly, individuals with a low level of conscientiousness, which refers to the tendency to be organized, responsible, and reliable, tend to have lower levels of job happiness [10]. To conclude, personal characteristics significantly impact job happiness. Optimism, self-efficacy, emotional intelligence, and work ethic have positive associations with job happiness, whereas negative traits such as neuroticism and low conscientiousness are negatively associated with job happiness. Employers can enhance positive personal traits by offering training, coaching, and mentoring to cultivate more positive and gratifying work atmosphere.

*H1:* There is a positive relationship between personal traits and job happiness.

## 2.2. Human Relations and Job Happiness

Human relations involve how people interact within an organization and their relationships with each other. The concept of human relations is linked to job happiness as it highlights the importance of establishing a positive and supportive workplace where employees feel respected and valued. Several studies have investigated the connection between human relations and job happiness. For instance, it was revealed that job happiness was linked to social support from colleagues and supervisors, which is a critical element of human relations [11]. As found in [12], staff who felt a sense of belonging to their organization were more likely to be satisfied with their work, demonstrating the significance of creating a favorable organizational culture that promotes community and belonging. Additionally, according to [13], communication, leadership, and teamwork were factors that contributed to job happiness in the manufacturing sector. These are all human relation aspects, implying that developing positive work atmosphere that supports teamwork, effective communication, and supportive leadership can improve job happiness. As proposed in [14], organizations can increase job happiness by using the skills and commitment of their entire workforce, which necessitates teamwork and collaboration, and provides employees with a greater say in decisions that impact their work. Job happiness can be enhanced by being part of a team, tackling challenging and innovative tasks, participating in decision-making, and being acknowledged for outstanding accomplishments [15]. To sum up, building positive human relations is crucial for improving job happiness among employees. Organizations that prioritize establishing a supportive and favorable work environment, encouraging a sense of community, and promoting effective communication, leadership, and teamwork can boost job happiness in

their employees.

*H2:* There is a positive significant relationship between human relations and job happiness.

## 2.3. Inspiration and Job Happiness

Job happiness and inspiration are important factors that influence job happiness and employee well-being. Research in this area has focused on exploring the relationship between inspiration and job happiness as well as identifying the factors that contribute to both inspiration and job happiness. In this literature review, we examine the recent research on inspiration and job happiness, with a focus on studies published since 2021. Recent research suggests that inspiration is positively related to job happiness. For example, [16] found that inspiration was positively associated with job happiness among a sample of employees in the IT industry in China. Another study [17] found that inspiration mediated the relationship between job resources and job happiness among Pakistani healthcare workers. In addition, as found in [18], coworker support, transformational leadership, and meaningful work were all positively related to inspiration among Chinese employees [19].

*H3:* There is a positive significant relationship between inspiration and job happiness.

## 2.4. Working Conditions and Job Happiness

As stated by [14], the quality of working conditions and workplace facilities plays a vital role in influencing both job happiness and productivity. Employees are increasingly inclined to change jobs in pursuit of better working conditions. Hence, it is imperative to prioritize the provision of satisfactory work conditions and facilities to enhance job happiness. This was exemplified in the research on job happiness among South African Quantity Surveyors [15]. Despite working in consistently unsafe conditions, a significant number of respondents emphasized the significance of secure working conditions.

*H4:* There is a positive relationship between working conditions and job happiness.

## 2.5. Job Happiness

In addition to inspiration, several recent studies have explored the factors that contribute to job happiness. For example, as found in [19], job autonomy, job happiness, and social support were all significant predictors of job happiness among Chinese employees. According to [20], job resources, job demands, and job crafting were all important factors that contributed to job happiness among Korean employees. Recent research suggests that inspiration is positively related to job happiness and that both inspiration and job happiness are influenced by various factors in the workplace. Factors such as workplace spirituality, coworker support, transformational

leadership, meaningful work, job autonomy, job happiness, social support, job resources, job demands and job crafting have all been found to contribute to inspiration and job happiness. These findings have important implications for employers and managers who seek to promote employee well-being and job happiness.

### 2.6. Moderating Effect of the Monitoring Constructs on Job Happiness

The moderating effect of monitoring job happiness among Malaysian construction workers was investigated in [5]. The study found that monitoring had a significant moderating effect on the relationship between job happiness and turnover intention among construction workers. Workers who perceived higher levels of monitoring reported lower turnover intention, indicating that monitoring can play a positive role in promoting job happiness and job happiness among construction workers. According to [6], the moderating effect of monitoring was investigated on the relationship between job stress and job happiness among Korean construction workers. The study found that monitoring had a significant moderating effect on the relationship between job stress and job happiness. Workers who perceived higher levels of monitoring reported higher levels of job happiness, indicating that monitoring can mitigate the negative effects of job stress on job happiness. Overall, these studies suggest that monitoring can have a positive moderating effect on job happiness and job happiness among construction workers. Workers who perceive higher levels of monitoring are more likely to experience positive emotions and job fulfillment, leading to higher levels of job happiness.

*H5:* There is a positive relationship between monitoring and job happiness.

*H6:* Monitoring constructs can moderate between personal traits and job happiness.

*H7:* Monitoring constructs can moderate inspiration and job happiness.

*H8:* The monitoring construct can moderate human relations and job happiness.

*H9:* The monitoring construct can moderate working conditions and job happiness.

## 3. Research Method

### 3.1. Conceptual Framework

The objective of this research study is to determine how five distinct factors, namely human relations, inspiration, personal traits, and working conditions, contribute to job happiness within the construction industry in Bangladesh. To explore the impact of these four factors (personal traits, inspiration, human relations, and working conditions) on job happiness, a single moderator, 'monitoring,' was introduced to examine the moderating effects. The model

representing these relationships is illustrated in the accompanying Figure 1.

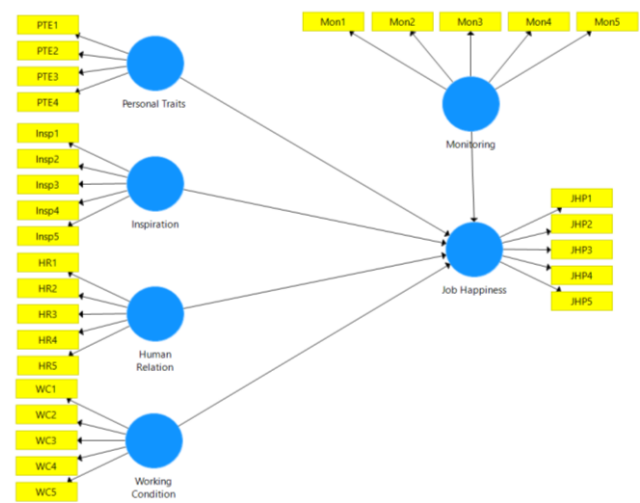


Fig. 1 Conceptual framework (SmartPLS 3.2.9)

### 3.2. Nature of Data, the Selection of Respondents, and Sampling Technique

In this study, we decided to use primary data because secondary data was deemed unsuitable. We gathered perception-based data from 290 construction workers in various districts of Bangladesh. We employed purposive sampling to select the participants because this study had a specific objective to achieve. Purposive sampling is appropriate when researchers need to collect specific preferred data from a particular group of people who meet certain criteria set by the researchers [21]. This sampling technique is convenient when researchers use the sample to conform to specific criteria [22]. We used this sampling technique to gather data from construction workers who could provide us with adequate information on various factors such as human relations, inspiration, job happiness, monitoring, personal traits, and working conditions as perceived by them.

### 3.3. Demographic Information

A total of 290 respondents were deliberately selected from diverse construction companies across various districts in Bangladesh (n = 290). The distribution of sample respondents based on demographic factors, including gender, age, education level, and years of experience in the sector, is presented in Table 1 as part of the questionnaire.

According to the data presented in Table 1, it can be observed that approximately 96% of the participants in the study were males. The age distribution of the respondents reveals that the largest portion, 145 individuals (50% of the total 290), falls within the age range of 21-30. Additionally, Table 1 indicates that 45% of the respondents (131 individuals) have completed their primary education, while 25% (73 individuals) have reached secondary or higher education levels. Furthermore, it shows that 40% of the respondents have accumulated 3-4 years of

professional experience.

Table 1 Demographic information about the respondents

		Number of respondents	Percent
Gender	Male	278	96%
	Female	12	4%
	Total	290	
Age of respondent	21-30 years	145	50%
	31-40 years	116	40%
	41 years and above	29	10%
	Total	290	
Education status of the respondent	Illiterate	87	30%
	Primary	131	45%
	Secondary and Higher	73	25%
	Total	290	
Experience	1-2 years	102	35%
	3-4 years	116	40%
	4 years and above	73	25%
	Total	290	

### 3.4. Univariate Normality Test

According to [23], data is considered to exhibit normal distribution if the skewness falls within the range of -2 to +2 and the kurtosis falls within the range of -7 to +7. In the current table, both the skewness and kurtosis values fall within this threshold ranges. This indicates that our data can be classified as normally distributed.

Table 2 Descriptive statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
				Statistic	Std. Error	Statistic	Std. Error
PTE1	290	3.845	0.758	-0.789	0.143	1.504	0.285
PTE2	290	3.886	0.714	-1.038	0.143	2.606	0.285
PTE3	290	3.745	0.783	-0.738	0.143	1.012	0.285
PTE4	290	3.728	0.747	-0.761	0.143	1.293	0.285
Insp1	290	3.948	0.687	-0.644	0.143	1.396	0.285
Insp2	290	3.952	0.719	-0.604	0.143	0.985	0.285
Insp3	290	4.034	0.690	-0.617	0.143	1.283	0.285
Insp4	290	3.972	0.700	-0.692	0.143	1.399	0.285
Insp5	290	4.000	0.711	-0.699	0.143	0.983	0.285
HR1	290	2.052	0.767	0.883	0.143	1.251	0.285
HR2	290	1.979	0.720	0.759	0.143	1.071	0.285
HR3	290	2.145	0.852	0.866	0.143	0.533	0.285
HR4	290	2.114	0.876	0.972	0.143	0.928	0.285
HR5	290	2.103	0.751	0.668	0.143	0.593	0.285
WC1	290	3.400	0.864	-0.548	0.143	-0.330	0.285
WC2	290	3.262	0.941	-0.395	0.143	-0.745	0.285
WC3	290	3.300	0.913	-0.328	0.143	-0.629	0.285
WC4	290	3.148	0.858	-0.290	0.143	-0.800	0.285
WC5	290	3.252	0.858	-0.310	0.143	-0.593	0.285
JHP1	290	3.734	0.866	-0.779	0.143	0.605	0.285
JHP2	290	3.352	0.949	-0.143	0.143	-0.555	0.285
JHP3	290	3.641	0.842	-0.645	0.143	0.398	0.285
JHP4	290	3.800	0.667	-1.302	0.143	3.344	0.285
JHP5	290	3.762	0.697	-0.870	0.143	1.323	0.285
Mon1	290	3.872	0.873	-1.006	0.143	1.550	0.285
Mon2	290	3.959	0.914	-0.958	0.143	1.040	0.285
Mon3	290	3.903	0.879	-0.734	0.143	0.603	0.285
Mon4	290	3.752	0.992	-0.579	0.143	-0.053	0.285
Mon5	290	3.597	0.933	-0.502	0.143	0.209	0.285

### 3.5. Multivariate Normality Test

To identify potential influential outliers in our analysis, we conducted Cook's distance analysis, as illustrated in Figure 2. Cook's distance can serve multiple purposes, such as identifying noteworthy data points that greatly impact the validity of the analysis or highlighting areas in the dataset where collecting additional data points would be beneficial.

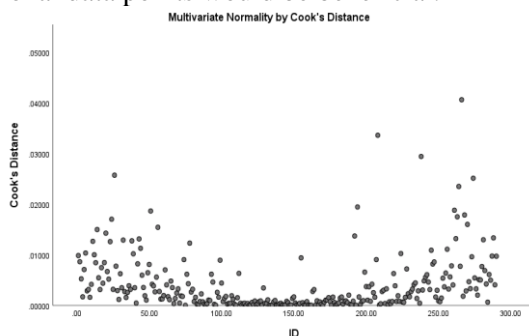


Fig. 2 Multivariate normality

## 4. Results

### 4.1. Model Evaluation

#### 4.1.1. The Measurement Model

Creating Validity and Reliability Table 3 displays the AVE, CR, and Cronbach's alpha results for determining the research model's convergent validity. All latent variables or model constructs have AVE values greater than 0.50. The values of AVE for human relation, inspiration, job happiness, monitoring, personal traits and working condition are 0.725, 0.821, 0.841, 0.637, 0.789, and 0.755, respectively because the AVE values for all constructs are greater than or equal to 0.50, which is acceptable. All model constructs have CR values greater than or equal to 0.80 (0.929, 0.958, 0.941, 0.839, 0.937, and 0.939). Because the CR value is greater than or equal to 0.80, it is acceptable. Cronbach's alpha, on the other hand, was used to assess the internal reliability of the model structures. Cronbach's alpha results are shown in Table 4 (0.906, 0.945, 0.905, 0.75, 0.911, 0.919) and they are all acceptable because they are greater than or equal to 0.70. These findings indicate a strong relationship between the model construction' indicators (see Table 4). Furthermore, as shown in Table 3, the convergence validity of all model constructs is determined by examining their loading values; according to [24], the loading values of the constructs for each indicator of the latent variable should be greater than >0.70 [25]. In this study, four items were eliminated because of their lack of factor loading values (ILV=0.60 -0.70). After the aforementioned items were removed, the structural model was run to determine the influential factors that actually cause the happiness of construction workers in Bangladesh. Also, these findings support the research model's convergence validity, indicating a high level of correlation between all construct indicators (Table 3).

Table 3 Exploratory factor analysis with indicator reliability and model fitting information (SmartPLS software 3.2.9)

Factor Name	Indicator	Factor Loading	SM	SD	T value	IR	CA	CR	AVE
Human Relation	HR1 <- Human Relation	0.875	0.801	0.184	4.743	0.766	0.906	0.929	0.725
	HR2 <- Human Relation	0.824	0.765	0.184	4.470	0.679			
	HR3 <- Human Relation	0.851	0.784	0.179	4.768	0.724			
	HR4 <- Human Relation	0.888	0.811	0.183	4.859	0.789			
	HR5 <- Human Relation	0.816	0.756	0.179	4.545	0.666			
Inspiration	Insp1 <- Inspiration	0.921	0.931	0.011	81.911	0.867	0.945	0.958	0.821
	Insp2 <- Inspiration	0.956	0.936	0.010	97.668	0.876			
	Insp3 <- Inspiration	0.889	0.888	0.018	48.967	0.790			
	Insp4 <- Inspiration	0.924	0.923	0.013	70.310	0.854			
	Insp5 <- Inspiration	0.848	0.846	0.024	36.089	0.719			
Job Happiness	JHP1 <- Job Happiness	0.928	0.928	0.011	86.811	0.861	0.905	0.941	0.841
	JHP2 <- Job Happiness	0.899	0.898	0.015	60.466	0.808			
	JHP3 <- Job Happiness	0.924	0.923	0.015	61.723	0.854			
Monitoring	Mon2 <- Monitoring	0.831	0.753	0.209	3.976	0.691	0.75	0.839	0.637
	Mon3 <- Monitoring	0.700	0.626	0.242	2.889	0.490			
	Mon4 <- Monitoring	0.854	0.778	0.213	4.011	0.729			
	PTE1 <- Personal Traits	0.906	0.904	0.018	49.559	0.821			
Personal Traits	PTE2 <- Personal Traits	0.886	0.883	0.023	38.713	0.785	0.911	0.937	0.789
	PTE3 <- Personal Traits	0.874	0.872	0.022	40.383	0.764			
	PTE4 <- Personal Traits	0.886	0.886	0.018	49.702	0.785			
	WC1 <- Working Condition	0.892	0.892	0.016	57.366	0.796			
Working Condition	WC2 <- Working Condition	0.886	0.885	0.015	58.404	0.785	0.919	0.939	0.755
	WC3 <- Working Condition	0.882	0.882	0.016	53.477	0.778			
	WC4 <- Working Condition	0.824	0.823	0.025	33.367	0.679			
	WC5 <- Working Condition	0.860	0.859	0.020	43.122	0.740			

Table 4 Reliability indexes and criteria (SmartPLS software 3.2.9)

Reliability Indexes	Criteria	Reference
AVE	>0.50	Hair et al. (2012), Ringle et al. (2012), Sarstedt et al. (2017)
CR	>0.80	Henseler and Sarstedt (2013)
Alpha	>0.70	Chin et al. (2008), Henseler and Sarstedt (2013)
ILV	0.60 to 0.70	Hair et al. (2012), Ringle et al. (2012), Sarstedt et al. (2017)
IR	≥0.40	Hulland, J. (1999).

Notes: AVE - average variance extracted; CR - composite reliability;  $\alpha$  - the Cronbach alpha; ILV - indicator loading value; IR - indicator reliability

Table 3 also indicates that all T-statistic values were larger than 2.33 at the 1% level of significance, proving that the outer model loadings are highly significant. Therefore, our SEM model can be accepted based on the above evidence. Generally, a global goodness fit (GoF) measure can be conducted for path modeling, defined as the geometric mean of average commonality and average R<sup>2</sup> (particularly, endogenous variables) [26].

$$\text{Formula for calculating GoF} = \sqrt{(\text{AVE} \times \text{R}^2)}$$

In this study, the GoF value was 0.49 (R<sup>2</sup> = 0.316, average AVE = 0.76). Therefore, as evident, the value of GoF exceeded the largest cutoff value (0.36), indicating that the proposed model of this study had better explanation power than that based on the recommended values of GoF small = 0.1, GoF medium = 0.25, and GoF large = 0.36 [27].

#### 4.1.2. Discriminant Validity

For determining the discriminant validity of the model constructs based on the Fornell–Larker criterion, the researchers compared the values of the square root of AVE of each latent variable, which must be higher than its correlations with all other latent variables. The square roots of the AVE coefficients should be confirmed in the correlation matrix and the diagonal [28]. As revealed in Table 5, the discriminant validity established that AVE root square values are higher than correlations with any other constructs or latent variables of the model.

Table 5 Discriminant validity (SmartPLS software 3.2.9)

	1	2	3	4	5	6
1. Human Relations	0.851					
2. Inspiration	0.094	0.906				
3. Job Happiness	0.069	0.406	0.917			
4. Monitoring	0.038	-0.012	0.106	0.798		
5. Personal Traits	0.063	0.468	0.332	0.05	0.888	
6. Working Condition	0.019	0.24	0.431	0.015	0.124	0.869

#### 4.1.3. HTMT Analysis

Table 6 HTMT test (SmartPLS software 3.2.9)

	1	2	3	4	5	6
1. Human Relation						
2. Inspiration	0.105					
3. Job Happiness	0.076	0.436				
4. Monitoring	0.043	0.053	0.105			
5. Personal Traits	0.071	0.499	0.362	0.080		
6. Working Condition	0.050	0.260	0.468	0.039	0.136	

#### 4.2. Common Method Bias Test

Variance inflation factors (VIFs) range from 1 to 10 and upward. The VIF tells us what percentage of variance is inflated for each coefficient. In interpreting the variance inflation factor, generally, 1 represents not

correlated, 1-5 moderately correlated, and greater than 5 represents highly correlated [29]. To examine the influence of multicollinearity among the variables, VIFs were calculated and found to have a maximum value of 1.63 (Table 7), which is at a permissible limit as recommended by [29]. Thus, there is no multicollinearity problem in the factors. A VIF larger than 3.3 is said to be a sign of pathological collinearity and a sign that a model might have common method bias. Here, our model (Table 7) is said to be free of common method bias because the values of all VIFs are equal to or lower than 3.3 [30].

Table 7 Regression weight (SmartPLS 3.2.9)

Hypotheses	Beta	SM	SD	LL	UL	T Statistics	P Values	Decision	f Square	VIF
Personal Traits -> Job Happiness	0.169	0.173	0.055	0.061	0.273	3.084	0.002	Supported	0.033	1.286
Inspiration -> Job Happiness	0.241	0.239	0.060	0.125	0.362	4.038	0.000	Supported	0.063	1.348
Human Relation -> Job Happiness	0.026	0.033	0.061	-0.146	0.100	0.419	0.675	Not Supported	0.02	1.011
Working Condition -> Job Happiness	0.350	0.346	0.055	0.239	0.455	6.378	0.000	Supported	0.169	1.062
Monitoring -> Job Happiness	0.094	0.104	0.054	-0.157	0.155	1.738	0.082	Not Supported	0.023	1.006
R Square	0.316									
SRMR	0.043									
Q <sup>2</sup> value	0.255									

Notes: SRMR ≤ 0.08 [31]; R<sup>2</sup> > 0.30 [28]; Q<sup>2</sup> Value > 0 [32]-[33]; Collinearity Statistic (VIF) < 3 [34]

#### 4.3. Structural Model Assessment

The structural model can be examined by incorporating the estimation of the path coefficients and the variance explained (R<sup>2</sup> values). Specifically, we measured all the relationships of the hypothesized model by describing un-mediating relationships separately. Moreover, using the bootstrapping technique with (5,000 re-samples), we generated coefficients and t-statistics. The structural model represents the path coefficients among the dependent and independent constructs. This model suggested that four independent factors, human relations, inspiration, personal traits, and working conditions, were considered to relate to job happiness in construction workers in Bangladesh. Also, a single mediator construct (monitoring) was considered to relate to job happiness. As per our analysis of variance-based SEM using SmartPLS, the findings revealed that all hypotheses were supported except H3. Further, those corresponding relationships produced t-values higher than 1.96 at a 5% level of significance.

After applying structural equation modeling through SmartPLS software, personal traits were significantly positively related to job happiness ( $\beta = 0.169$ ,  $t = 3.084$ ,  $p < 0.01$ ), inspiration was significantly positively related to job happiness ( $\beta = 0.241$ ,  $t = 4.038$ ,  $p < 0.01$ ), and working condition was significantly positively related to job happiness ( $\beta = 0.350$ ,  $t = 6.378$ ,  $p < 0.01$ ). So, our hypotheses H<sub>1</sub>, H<sub>2</sub>, and H<sub>4</sub> were supported. But Human Relations and Monitoring were not had significant relationships with Job Happiness ( $\beta = 0.026$ ,  $t = 0.419$ ,  $p > 0.05$ ), and ( $\beta = 0.094$ ,  $t = 1.738$ ,  $p > 0.05$ ), respectively. Thus, our hypotheses H<sub>3</sub> and H<sub>5</sub> were supported.

As suggested in [35], R<sup>2</sup> values for endogenous

latent variables are considered 0.26 (significant), 0.13 (reasonable), and 0.02 (insignificant), whereas [36] recommended  $R^2$  values for endogenous latent variables as 0.67 (significant), 0.33 (reasonable) and 0.19 (insignificant). Table 7 indicates that the coefficient of determination ( $R^2$ ) is 0.316 for the dependent variable, i.e., Job Happiness, explaining that the five independent variables can explain 31.6% of the variance of Job Happiness for Bangladeshi construction firms. This result is accepted in compliance with [35].

The predictive variables in this model are characterized as having small, medium, or high impact sizes based on  $f^2$  values of 0.02, 0.15, and 0.35, respectively [35]. This model's results indicate that all associations are extremely influential since all  $f^2$  values are more than 0.02.

Here, the model fit information shows that the standardized root mean squared residual (SRMR) is 0.043, which is also less than the suggested good fit to the data [31] ( $SRMR \leq 0.08$ ). The fit indices showed a good model fit for the data (Table 7). When PLS-SEM exhibits predictive relevance, it can well predict the data points of indicators. A  $Q^2$  value larger than zero ( $Q^2$  value  $\geq 0$ ) for a certain endogenous latent variable indicates that the PLS path model has predictive relevance for the constructs [37]. Table 7 shows that the four independent constructs were relevant to the single-dependent construct (Job Happiness) because the  $Q^2$  value is greater than zero.

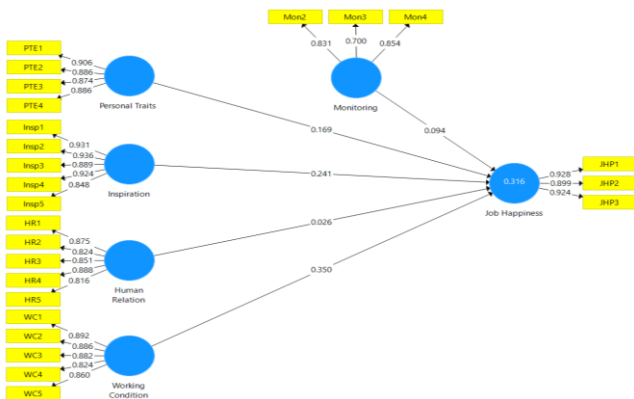


Fig. 3 Path model (SmartPLS 3.2.9)

#### 4.4. Moderating Effect

When considering the moderator construct 'monitoring', it was revealed that the monitoring variable dampens the positive relationship between personal traits, human relations, working conditions, and job happiness. On the other hand, monitoring strengthens the positive relationship between inspiration and job happiness. Therefore,  $H_6$ ,  $H_8$  and  $H_9$  were supported.

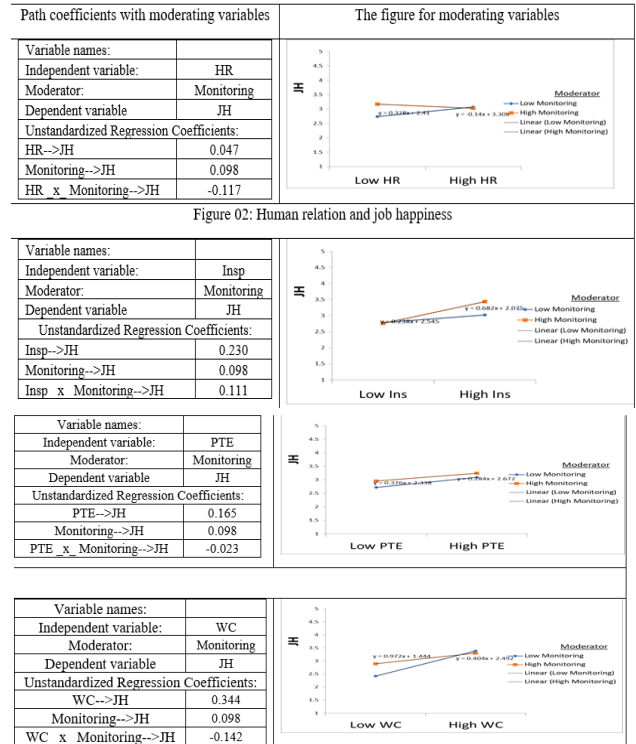


Fig. 4 Monitoring effects for research variables

## 5. Discussion

The research findings largely correspond to prior research, providing further validation for existing knowledge regarding job happiness. Specifically, we observed a significant positive correlation between personal traits and job happiness, which is consistent with the findings of [7]-[10]. This suggests that individual characteristics, such as personality traits, strongly influence job happiness. Furthermore, we discovered a substantial positive association between inspiration and job happiness, supported by the research of [16]-[18]. This indicates that experiencing inspiration at work has a beneficial impact on job happiness.

Additionally, our study reveals that favorable working conditions have a significant positive effect on job happiness, in line with studies by [14] and [15]. This highlights the importance of comfortable physical surroundings in promoting individual job happiness. However, we unexpectedly found little impact on job happiness regarding interpersonal relationships, contradicting the results of other studies. This emphasizes the need for further research into the dynamics of interpersonal relationships and their influence on job happiness.

Regarding moderating effects, our study demonstrates that monitoring plays a crucial role in strengthening the relationships between human relations, inspiration, working conditions, and personal traits, which is consistent with the research conducted by [7]-[10], [14]-[18]. This implies that effective monitoring enhances the impact of these factors on job happiness, underscoring the significance of supervisory

practices in establishing a positive work environment.

This study aligns with previous research by confirming the positive relationships between personal traits, inspiration, and working conditions and job happiness. However, our finding of an insignificant influence of human relations on job happiness provides a fresh perspective. Additionally, we emphasize the significant moderating effect of monitoring on the relationships between various factors and job happiness, reinforcing the notion that effective monitoring practices can enhance job happiness. Further research is necessary to deepen our understanding of these relationships and explore other potential factors that contribute to job happiness among individuals in different contexts.

### 5.1. Managerial Implications

As revealed, several management ramifications from the study on job happiness elements impact building construction workers that might enhance the overall satisfaction and productivity of workers in the construction sector. Clear objectives should be set by managers and reflect their employees' beliefs and aspirations. To promote employee engagement and motivation, they should also offer chances for advancement and development, rewards for excellence in work, and open lines of communication. By providing sufficient safety supplies and training as well as making sure that the working environment is secure and comfortable, managers should place a high priority on the welfare of their employees. They should also guarantee that workers have access to the tools and equipment they should perform their tasks properly and efficiently. By developing a culture of support, acknowledgment, and personal growth, managers may encourage good personality qualities such as resilience, flexibility, and positivism. Through instruction, coaching, and mentoring, they may help employees acquire these qualities. Managers in the construction sector may use these elements as a general framework for building a positive and fulfilling workplace that encourages employee satisfaction and job happiness. By doing this, they may raise the organization's bottom line by enhancing productivity and decreasing turnover.

### 5.2. Practical Implications

The study has some useful ramifications that construction businesses could consider when promoting the well-being and happiness of their workers at work: each unique attribute of the output have already been covered. As a result, employers may think about selecting workers who have a good attitude and motivation for their work. To help staff members enhance their abilities and confidence, they may also provide training and development programs, which can improve their happiness at work. Working conditions are the second discovery. By doing this, businesses

may guarantee that the workplace is secure, orderly, and furnished with everything needed for workers to do their jobs well. The provision of suitable safety gear and financial support for facility upkeep and maintenance may both enhance employee well-being. The third factor is inspiration. As a result, businesses may aid workers in discovering meaning and purpose in their jobs by offering them chances for professional growth and recognition. The development of a strong business culture and mission statement may also assist employees in making a connection with the bigger picture of their job. Monitoring is the last moderating component. As a result, businesses can effectively monitor and oversee employees and offer regular feedback and assistance. Employee motivation may be boosted by setting clear standards, mentoring, and rewarding good work. Additionally, variables including job happiness, character qualities, working environment, and motivational factors may function as moderators of the observation factor. Finally, we draw the conclusion that construction businesses may foster a productive work environment that is advantageous to both the employees and the business as a whole by emphasizing the health and happiness of their employees while they are at work.

### 5.3. Limitations and Further Scope for Research

It is important to acknowledge the limitations of this study, which was conducted in a single nation, as it poses several significant constraints. To gain a more comprehensive understanding, it is essential to compare the findings with studies conducted in different countries and cultural contexts. This will allow for a more robust analysis of workplace happiness among construction workers on a global scale. Additionally, while the study examined numerous work satisfaction variables that are applicable to real-life business settings, there may be other variables that were not explored in this research. Exploring additional moderating variables in future studies can provide further insights into the factors that influence workplace happiness among construction workers. The authors of this study encourage future researchers to consider these limitations and build upon them to enhance the knowledge surrounding the happiness of Bangladeshi construction workers in their work environment. Conducting further research will contribute to a more comprehensive understanding of the subject and facilitate the development of targeted strategies and interventions to improve job happiness and well-being within the construction industry in Bangladesh.

## 6. Conclusions and Recommendations

The study conducted on job happiness factors affecting building construction workers reveals that multiple elements play a role in shaping their overall job happiness. One significant factor is inspiration, as

workers who find motivation and inspiration in their work tend to experience higher levels of job happiness. This can be fostered through the establishment of clear goals and objectives, providing opportunities for personal growth and advancement, and recognizing and praising exemplary performance. When workers are inspired, they are more likely to feel a sense of purpose and satisfaction in their roles.

Building construction employees' job happiness is significantly impacted by their working circumstances as well. Higher levels of employee happiness are correlated with access to secure and enjoyable working surroundings, suitable tools and equipment, and helpful coworkers. Employees' general happiness with their jobs is significantly impacted when they feel safe and supported at work. Furthermore, among building construction employees, fair pay, benefits, and job security have a big impact on their happiness at work. Employees are happier and more satisfied in their jobs when they are paid fairly for their work and have a secure position. Personal qualities such as resiliency, flexibility, and optimism are also critical for happiness at work.

Workers that possess these traits are better equipped to handle the difficulties typical of the building construction sector, such as long hours, physically taxing activities, and tight deadlines. When people have these qualities, they are better able to deal with challenges and have a positive view, which increases their enjoyment at work. In conclusion, it is feasible to raise the job happiness of building construction employees by putting an emphasis on elements such as boosting motivation, improving working circumstances, and nurturing personal traits that promote resilience and optimism. Managers and employers may use these components as a roadmap to develop a happy and productive workplace that benefits both workers and the company as a whole.

Workers that possess these qualities are better prepared to deal with frequent issues in the building construction industry, such as long hours, labor demands, and tight deadlines. People that possess these characteristics are better at dealing with problems and have a positive attitude, which boosts their love for their profession. To summarize, increasing job happiness in the construction business is achievable by concentrating on components such as raising motivation, improving working circumstances, and cultivating character attributes that foster resilience and optimism. These factors may be used as a guideline by managers and employers to build a productive workplace that benefits both employees and the firm as a whole. Organizations may foster an environment in which employees feel valued, motivated, and pleased by prioritizing these qualities, which leads to increased productivity and overall success.

## References

- [1] CHOU JS, & WANG YY. The relationship between human relations and job happiness among construction workers in Taiwan. *International Journal of Environmental Research and Public Health*, 2019, 16(22): 4353.
- [2] LIM JW, YEW MC, YEW MK, & TEO TS. Impact of working conditions on job happiness of Malaysian construction workers. *Journal of Construction in Developing Countries*, 2018, 23(1): 29-45.
- [3] SINGH AK, & PRAKASH A. Impact of working conditions on job happiness of Indian construction workers. *Journal of Engineering, Design and Technology*, 2019, 17(5): 1107
- [4] NI G, ZHU Y, ZHANG Z, QIAO Y, et al. Influencing mechanism of job happiness on safety behavior of new generation of construction workers based on Chinese context: The mediating roles of work engagement and safety knowledge sharing. *International Journal of Environmental Research and Public Health*, 2020, 17(22): 8361.
- [5] BAKAR NAA, BAKAR AAA, OSMAN WN, & ABDULLAH R. Moderating effect of monitoring on the relationship between job happiness and turnover intention among construction workers. *Journal of Engineering, Design and Technology*, 2019, 17(3): 641-652.
- [6] CHOI SJ, & KIM JH. The moderating effect of monitoring on the relationship between job stress and job happiness in Korean construction workers. *Sustainability*, 2021, 13(2): 725.
- [7] STAJKOVIC AD, & LUTHANS F. Self-efficacy and work-related performance: A meta-analysis. *Psychological Bulletin*, 1998, 124(2): 240-261.
- [8] BRACKETT MA, & MAYER JD. Convergent, discriminant, and incremental validity of competing measures of emotional intelligence. *Personality and Social Psychology Bulletin*, 2003, 29(9): 1147-1158.
- [9] JUDGE TA, & BONO JE. Relationship of core self-evaluations traits--self-esteem, generalized self-efficacy, locus of control, and emotional stability--with job happiness and job performance: A meta-analysis. *Journal of Applied Psychology*, 2001, 86(1): 80-92.
- [10] BARRICK MR, & MOUNT MK. The big five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, 1991, 44(1): 1-26.
- [11] GAZIOGLU S, & TANSEL A. Job happiness in Britain: individual and job-related factors. *Applied Economics*, 2006, 38(10): 1163-1171.
- [12] ELLICKSON MC, & LOGSDON K. Determinants of job happiness of municipal government employees. *State and Local Government Review*, 2001, 33(3): 173-184.
- [13] AHRARI S, ROSLAN S, ZAREMOHZZABIEH Z, MOHD RASDI R, & ABU SAMAH A. Relationship between teacher empowerment and job happiness: A Meta-Analytic path analysis. *Cogent Education*, 2021, 8(1): 1898737.
- [14] MULLINS, JL. Management and organizational behavior, seventh edition, Prentice Hall, 2005.
- [15] BOWEN P, CATTELL K, DISTILLER G, and EDWARDS PJ. Job happiness of South African quantity surveyors: an empirical study. *Construction Management and Economics*, 2008, 26: 765-780.
- [16] HANUM, A L, HU Q, WEI W, ZHOU H, & MA F. Professional identity, job satisfaction, and intention to stay among clinical nurses during the prolonged COVID-19

- pandemic: A mediation analysis. *Japan Journal of Nursing Science*, 2022, 20(2), e12515, <https://doi.org/10.1111/jjns.12515>
- [17] RAFIQ M, SHAHZAD F, FARRUKH M, & KHAN I. The psychological mechanism linking life satisfaction and turnover intention among healthcare workers during the COVID-19 Pandemic. *Work*, 2022, 71(3): 505-514.
- [18] ZHOU L, WINGWON B, & CHOTIVANICH P. The influence of Employees Engagement and Organizational Culture as a Mediator of Transformational Leadership on Employee Performance of Government University in Fujian Sheng, People's Republic of China. *Journal of Business Administration. The Association of Private Higher Education Institutions of Thailand*, 2023, 12(1): 45-62.
- [19] NI G, LI H, JIN T, HU H, & ZHANG Z. Analysis of factors influencing the job happiness of new generation of construction workers in China: A study based on DEMATEL and ISM. *Buildings*, 2022, 12(5): 609.
- [20] ZHANG H, SONG M, & HE H. Solution to the "innovation speed dilemma": A cross-national study of the roles of transformational leadership. *Journal of Engineering Management*, 2021, 35(6): 10-23.
- [21] KIM W, HAN SJ, & PARK J. Is the role of work engagement essential to employee performance or "nice to have"? *Sustainability*, 2019, 11:1050
- [22] SEKARAN U, and BOUGIE R. *Research Methods for Business: A Skill Building Approach*. London, UK: John Wiley & Sons Ltd, 2010
- [23] BLUMBERG B, COOPER DR, and SCHINDLER PS. *Business Research Methods* (11th ed.). New York, NY, USA: McGraw Hill, 2011.
- [24] HAIR JF, BLACK WC, BABIN BJ. & ANDERSON RE. *Multivariate Data Analysis*. Pearson, NJ: Pearson Education Inc., 2010
- [25] SARSTEDT M, RINGLE CM, & HAIR JF. Treating unobserved heterogeneity in PLS-SEM: A multi-method approach. In: LATAN, H., & NOONAN, R. (Eds.) *Partial Least Squares Path Modeling*. Springer, Cham, 2017: 197-217. [https://doi.org/10.1007/978-3-319-64069-3\\_9](https://doi.org/10.1007/978-3-319-64069-3_9)
- [26] FORNELL C. and LARCKER DF. Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 1981: 382-388.
- [27] CHIN WW. How to write up and report PLS analyses. In: VINZI, V.E, CHIN, W.W, HENSELER, J, WANG, H. (Eds.), *Handbook of Partial Least Squares: Concepts, Methods and Applications in Marketing and Related Fields*. Springer, Berlin, 2010: 655-690.
- [28] AKTER S, D'AMBRA J, & RAY P. An evaluation of PLS based complex models: the roles of power analysis, predictive relevance and GoF index. *Proceedings of the 17th Americas Conference on Information Systems*, 2011, 2: 151
- [29] HAIR JF, SARSTEDT M, PIEPER TM, & RINGLE CM. The use of partial least squares structural equation modeling in strategic management research: a review of past practices and recommendations for future applications. *Long Range Planning*, 2012, 45(5-6): 320-340.
- [30] HAIR JF, ANDERSON RE, TATHAM RL, & BLACK WC. *Multivariate Data Analysis* (5<sup>th</sup> Edition). Upper Saddle River, New Jersey, USA: Prentice Hall, 1998
- [31] KOCK N. Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 2015, 11(4): 1-10.
- [32] HU LT, & BENTLER PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 1999, 6(1): 1-55.
- [33] GEISSER S. A Predictive Approach to the Random Effects Model. *Biometrika*, 1974, 61(1): 101-107.
- [34] STONE M. Cross-Validatory Choice and Assessment of Statistical Predictions. *Journal of the Royal Statistical Society*, 1974, 36(2): 111-147.
- [35] HULLAND J. Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*, 1999, 20(2): 195-204.
- [36] COHEN J. *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale: Erlbaum, 1988
- [37] CHIN WW, PETERSON RA, & BROWN SP. Structural equation modeling in marketing: Some practical reminders. *Journal of Marketing Theory and Practice*, 2008, 16(4): 287-298.
- [38] HAIR JF, HULT GTM, RINGLE CM, SARSTEDT M, & THIELE KO. Mirror, mirror on the wall: a comparative evaluation of composite-based structural equation modeling methods. *Journal of the Academy of Marketing Science*, 2017, 45: 616-632.

#### 参考文献:

- [1] CHOU JS, 和 WANG YY. 台湾建筑工人人际关系与工作幸福感的关系 国际环境研究与公共卫生杂志, 2019, 16 (22) : 4353。
- [2] LIM JW、YEW MC、YEW MK 和 TEO TS。工作条件对马来西亚建筑工人工作幸福感的影响。发展中国家建设学报, 2018, 23(1) : 29-45。
- [3] SINGH AK, 和 PRAKASH A. 工作条件对印度建筑工人工作幸福感的影响。工程、设计与技术学报, 2019, 17 (5) : 1107
- [4] NI G, ZHU Y, ZHANG Z, QIAO Y, 等。中国背景下工作幸福感对新一代建筑工人安全行为的影响机制:工作投入与安全知识共享的中介作用国际环境研究与公共卫生杂志, 2020, 17 (22) : 8361。
- [5] BAKAR NAA, BAKAR AAA, OSMAN WN, 和 ABDULLAH R. 监测对建筑工人工作幸福感与离职倾向之间关系的调节作用。工程设计与技术学报, 2019, 17(3): 641-652。
- [6] CHOI SJ, 和 KIM JH. 韩国建筑工人工作压力与工作幸福感关系监测的调节作用。可持续发展, 2021, 13(2) : 725。
- [7] STAJKOVIC AD, 和 LUTHANS F. 自我效能和工作相关绩效: 荟萃分析。心理通报, 1998, 124(2) : 240-261
- [8] BRACKETT MA, 和 MAYER-JD. 情商竞争指标的收敛性、判别性和增量有效性。人格与社会心理学通报, 2003, 29 (9) : 1147-1158。
- [9] JUDGE TA 和 BONO JE. 核心自我评价特征——自尊、广义自我效能、控制源和情绪稳定性——与工作幸

福感和工作绩效的关系：荟萃分析。应用心理学杂志, 2001, 86(1): 80-92。

[10] BARRICK MR, 和 MOUNT MK. 大五人格维度和工作绩效：荟萃分析。人事心理学, 1991, 44(1): 1-26。

[11] GAZIOGLU S, 和 TANSEL A. 英国的工作幸福感：个人和工作相关因素。应用经济学, 2006, 38(10): 1163-1171。

[12] ELLICKSON MC, 和 LOGSDON K. 市政府雇员工作幸福感的决定因素。州和地方政府评论, 2001, 33(3): 173-184。

[13] AHRARI S, ROSLAN S, ZAREMOHZZABIEH Z, MOHD RASDI R 和 ABU SAMAH A. 教师赋权与工作幸福感之间的关系：元分析路径分析。令人信服的教育, 2021, 8(1): 1898737。

[14] MULLINS, JL. 管理与组织行为, 第七版, 普伦蒂斯·霍尔, 2005。

[15] BOWEN P, CATTELL K, DISTILLER G 和 EDWARDS PJ. 南非工料测量师的工作幸福感：一项实证研究。建设管理与经济, 2008, 26: 765-780。

[16] HANUM, A L, HU Q, WEI W, ZHOU H, 和 MA F. 在长期的新冠肺炎大流行期间临床护士的职业认同、工作满意度和留任意愿：中介分析。日本护理科学杂志, 2022, 20(2), e12515, <https://doi.org/10.1111/jjns.12515>

[17] RAFIQ M, SHAHZAD F, FARRUKH M 和 KHAN I. 新冠肺炎大流行期间医护人员的生活满意度和离职意向之间的心理机制。作品, 2022, 71(3): 505-514。

[18] ZHOU L, WINGWON B, 和 CHOTIVANICH P. 员工敬业度和组织文化作为变革型领导的中介因素对中国福建省政府大学员工绩效的影响。工商管理杂志。泰国私立高等教育机构协会, 2023, 12(1): 45-62。

[19] NI G, LI H, JIN T, HU H, 和 ZHANG Z. 中国新一代建筑工人工作幸福感影响因素分析：基于德马泰尔和ISM的研究。建筑, 2022, 12(5): 609。

[20] ZHANG H, SONG M, 和 HE H. “创新速度困境”的解决：变革型领导作用的跨国研究。工程管理学报, 2021, 35(6): 10-23。

[21] KIM W, HAN SJ, 和 PARK J. 工作投入对于员工绩效至关重要还是“值得拥有”？可持续发展, 2019, 11:1050

[22] SEKARAN U 和 BOUGIE R. 商业研究方法：技能建设方法。英国伦敦：约翰·威利父子有限公司, 2010。

[23] BLUMBERG B, COOPER DR 和 SCHINDLER PS. 商业研究方法（第11版）。美国纽约州纽约市：麦格劳希尔, 2011。

[24] HAIR JF, BLACK WC, 和 BABIN BJ. 安德森重新。多变量数据分析。新泽西州皮尔逊：皮尔逊教育公司, 2010。

[25] SARSTEDT M, RINGLE CM 和 HAIR JF. 处理偏

最小二乘扫描电镜中未观察到的异质性：一种多方法。见：LATAN, H. 和 NOONAN, R. (编) 部分最小二乘路径建模。查姆·施普林格, 2017: 197-217。

[https://doi.org/10.1007/978-3-319-64069-3\\_9](https://doi.org/10.1007/978-3-319-64069-3_9)

[26] FORNELL C. 和 LARCKER DF. 具有不可观测变量和测量误差的结构方程模型：代数和统计。营销研究杂志, 1981: 382-388。

[27] CHIN WW. 如何撰写和报告 PLS 分析。见：VINZI, V.E, CHIN, W.W, HENSELER, J, WANG, H. (编), 偏最小二乘手册：营销及相关领域的概念、方法和应用。施普林格, 柏林, 2010: 655-690。

[28] AKTER S, D'AMBRA J 和 RAY P. 基于偏最小二乘法的复杂模型的评估：功效分析、预测相关性和戈夫指数的作用。第17届美洲信息系统会议论文集, 2011, 2: 151

[29] HAIR JF, SARSTEDT M, PIEPER TM 和 RINGLE CM. 偏最小二乘结构方程模型在战略管理研究中的应用：对过去实践的回顾和对未来应用的建议。长远规划, 2012, 45(5-6): 320-340。

[30] HAIR JF, ANDERSON RE, TATHAM RL 和 BLACK WC. 多元数据分析（第五版）。美国新泽西州上萨德尔河：普伦蒂斯·霍尔, 1998。

[31] KOCK N. 偏最小二乘扫描电镜中的常见方法偏差：完全共线性评估方法。国际电子协作杂志, 2015, 11(4): 1-10。

[32] HU LT, 和 BENTLER PM. 协方差结构分析中拟合指数的截止标准：传统标准与新替代标准。结构方程模型：多学科期刊, 1999, 6(1): 1-55。

[33] GEISSER S. 随机效应模型的预测方法。生物计量学, 1974, 61(1): 101-107。

[34] STONE M. 统计预测的交叉验证选择和评估。英国皇家统计学会杂志, 1974, 36(2): 111-147。

[35] HULLAND J. 在战略管理研究中使用偏最小二乘法(偏最小二乘法)：最近四项研究的回顾。战略管理杂志, 1999, 20(2): 195-204。

[36] COHEN J. 行为科学的统计功效分析。希尔斯代尔：埃尔鲍姆, 1988

[37] CHIN WW, PETERSON RA, 和 BROWN SP. 营销中的结构方程模型：一些实用的提醒。营销理论与实践杂志, 2008, 16(4): 287-298。

[38] HAIR JF, HULT GTM, RINGLE CM, SARSTEDT M 和 THIELE KO. 镜子，墙上的镜子：基于复合材料的结构方程建模方法的比较评估。营销科学院学报, 2017, 45: 616-632。