



## How Much does Job Autonomy Matter for Job Performance of Chinese Supervising Engineers: A Quantitative Study

Nan CUI<sup>1</sup>, Shu-Feng XIAO<sup>2</sup>

<sup>1</sup> *First Author* Professor, Management Science and Engineering Administration, Baise University, Guangxi, China; PhD candidate in Seoul School of Integrated Sciences & Technologies, Seoul, Korea.  
E-mail: [cuinan@stud.assist.ac.kr](mailto:cuinan@stud.assist.ac.kr)

<sup>2</sup> *Corresponding Author* Professor, Division of Business Administration, Sookmyung Women's University, Seoul, Korea. E-mail: [bizsxiao@sookmyung.ac.kr](mailto:bizsxiao@sookmyung.ac.kr)

Received: July 22, 2021. Revised: September 09, 2021. Accepted: September 15, 2021.

---

### Abstract

**Purpose** – The purpose of this study is to examine the intermediary role of job satisfaction between job autonomy and job performance and whether the process was adjusted based on the work context.

**Research design, data, and methodology** – This study was conducted by sample survey method on 334 supervising engineers. Data analysis methods were frequency analysis, confirmatory factor analysis, reliability analysis, correlation analysis, and structural equation model analysis.

**Result** – The results of this study suggest that: (1) after controlling for age, position, and working years, job autonomy had a significant positive impact on job performance, (2) job autonomy can not only directly affect job performance but also indirectly affect performance through job satisfaction, (3) job satisfaction has an intermediary effect on job autonomy and job performance, and (4) the relationship between job autonomy and job satisfaction is moderated by the work context, and the result showed a negative moderating effect.

**Conclusion** – This study suggests that job autonomy significantly improves job performance, and the higher job autonomy a supervising engineer has, the more satisfied they are with their work, thus enriching the precursor research on dynamic changes in job performance. When the working environment is poor, supervisors are more sensitive to the perception of job autonomy and have a stronger impact on job satisfaction and performance.

Keywords: Job Autonomy, Job Satisfaction, Job Performance, Work Context, Supervising Engineers

JEL Classification Code: G38, L16, M16, Q17

---

## **1. Introduction**

Entrusted by the construction side of employer, the supervising engineer shall control the quality, cost, and progress of the construction project; manage the contract and information; and coordinate the relationship between the relevant parties in the construction project. As a subordinate field of engineering project management, the supervision industry has grown rapidly with the continuous development of the construction industry. However, the current situation of a supervising engineer is not ideal due to their high personnel turnover rate and inter-firm mobility. Therefore, ensuring the work stability and job performance of a project's supervising personnel have become urgent problems to be solved in the development of the supervision industry. Previous research on supervising engineers has mostly focused on their individual professional skills and the evaluation of their professional qualifications; however, there remains a lack of organizational behavior research on this group of individuals.

In the past, most of the research on supervision engineers focused on professional ability and salary level. Xiang (2019) analyzes the influencing factor of professional quality of supervision engineers, expounds the requirements for the transformation of the whole process engineering consulting to the professional quality of supervision engineers. Zhong (2020) analyzes the relationship among remuneration, social cognition, and job performance. Ding (2020) improves the fuzzy comprehensive evaluation method and puts forward the evaluation standard of two-point system, constructs a complete safety credit evaluation system of supervision enterprises. Therefore, this paper introduces job autonomy and work context in order to examine the job performance of supervising engineers.

Job autonomy means that individuals have enough freedom to control activities in work, which is mainly reflected in the formulation of work standards and the control of work progress (Spreitzer, 1995). Employees can present their views on issues such as work methods, progress, and standards, which will make employees feel more autonomous (Brown, 2005). Job autonomy, as an important work resource (Bakker & Demerouti, 2007), is associated with high internal motivation and can help meet the achievement orientation of knowledge-oriented employees, which is more conducive to work input and job performance.

Engineering supervision differs from the relationship between other general employers and employees. As the representative of the owner on the project, the supervising engineer exercises the management power in the construction process relative to the construction party; however, at the same time, the content of the supervised work is subject to the assessment of the owner. Therefore, the supervision remains subject to the control of the owner. Although the supervisor undertakes the management and coordination of the project, the owner is still in a position of authority over certain aspects, such as the investment management, material procurement, and other activities, which will make it more difficult for the supervising unit to control the construction of the project. Consequently, employees may feel more tired and dissatisfied when they have less autonomy at work. In contrast, a better work environment with greater job autonomy can lead to greater satisfaction (Kim, 2019). Studies have shown that high job autonomy effectively reduces uncertainty at work and emotional distress (Bakker, Veldhoven & Xanthopoulou, 2010; Idaszak & Drasgow, 1987).

Most studies on autonomy have been conducted using the working feature models developed by Hackman and Oldham (1976), which were positively correlated with organizational commitment (Park & Searcy, 2012) and negatively correlated with the tendency to resign. Park (2018) conducted an empirical analysis on the automation industry, demonstrating that job autonomy promotes organizational performance by influencing organizational civic behavior (OCB). Fradkin (2021) compared the different encouraging policies of teachers' autonomy in the United States and Finland and concluded that high creativity and autonomy are associated with significantly reduced teacher turnover rates and improved student performance.

New changes in the field of work present new requirements for employee careers (Savickas, Nota & Rossier, 2009). Grant, Fried, Paker and Frese (2010) studied the "changes in the work context" while considering the changes in the work itself and the organizational scenario. Multiple authors of cognitive psychology and sociology have examined the importance of the local environment for task completion and how individuals work (Béguin & Clot, 2004; Engeström, 2000). Vischer (2007) proposed the impact of lighting, noise, temperature, and spatial layout on individual activities. Multiple studies on organizational behavior and human resource management have shown that workplace, work contexts, and degree of self-effort affect the completion of multiple tasks (Kahya, 2007; Stavrou, 2005). Through field experiments and an analysis of workers in an industrial company, Pignault and Houssemand (2016) noted that it is important to achieve job skills, task completion, and outcome effectiveness. They also established a list of work scenarios, worker health, and job satisfaction under different environmental conditions (i.e., working space, working atmosphere, facilities, and equipment). When the working space or environment does not meet the requirements, this may lower work efficiency and affect job performance. However, the work context of a

supervising engineer is different from that of a general indoor worker due to the exposure of the engineer to a higher number of work-related risks.

This paper introduces work context to discuss the regulatory effects of job autonomy and job performance. According to the Job Demands-Resources (JDR) model (Bakker, Demerouti & Verbeke, 2004), work features can be divided into work requirements and resources. Negative factors such as role conflict, emotional stress and insecurity at work are called job requirements. In contrast, positive factors at work, such as support from colleagues, job autonomy, and performance feedback are called work resources. The present study aims to: a) explore the impact of job autonomy on job satisfaction and job performance; b) examine whether job satisfaction plays a moderating role between job autonomy and job performance; and c) determine whether the aforementioned mediating role is moderated by the work context.

## **2. Theoretical Background and Hypothesis**

### **2.1. Job Autonomy and Job Performance**

Improving employee performance helps improve an organization's competitive edge and achieve organizational goals. The amount of internal work input and performance depend on the change in available work resources (Xanthopoulou, Bakker, Demerouti & Schaufeli, 2009). First, job autonomy helps employees handle the work on their own, improve their abilities, and meet their needs (Bakker & Demerouti, 2007). Second, job autonomy shows that the organization trusts and encourages its employees, which provides an external incentive effect and contributes to the completion of work goals. Job autonomy motivates the improvement of job performance by meeting individual work needs or achieving work goals (Bakker & Demerouti, 2008).

When there is high work autonomy, there is a greater sense of responsibility and recognition of work. In turn, this helps them perceive that their work is meaningful (Morgeson, Delaney & Hemingway, 2005). As employees think their jobs are meaningful, this prompts them to focus more attention on working efficiently, thus improving productivity (Morrison, 2006). Lee's (2019) analysis of the data from the Merit Principal Survey (MPS) shows that public officials do not consider their performance system just and transparent because performance-based incentives ignore work autonomy. This implies that a high degree of freedom of work can deliver good performance results.

Autonomy is not only a work element but also a work resource as it can be used to deal with work more effectively. Chen and Francesco (2003) believe that the owner must have a clear understanding of the supervising unit and fully believe in their professionalism. If the owner's authority over the project is excessively stringent, it will reduce the job performance of the supervising unit. During the construction cycle of the project, the supervisor shall make a qualified evaluation on the completion of the inspection batch, divisional project, and unit project-the process of which is called "acceptance". Although there are many mandatory provisions to be referred to in the acceptance process, there are still some projects with unclear boundaries. The acceptance of such projects requires the supervising engineer to use his or her professional skills to make appropriate judgments based on experience; therefore, supervision work requires high discretion. In discretionary work, when an employee is given high autonomy, they can use their expertise to mitigate pressure of work in order to achieve better job performance. In conclusion, the following hypothesis is presented:

Hypothesis 1: Job autonomy has a significant positive impact on the job performance of project supervisors.

### **2.2. Job Autonomy and Job Satisfaction**

Hackman and Oldham (1976) proposed that job autonomy is the degree of independence, and discretion in arranging work and that it is a core characteristic of work. A study by Nguyen, Taylor and Bradley (2003) on the impact of job autonomy of individuals in a specific industry found that with the increase of personal control of work, perceptions improved from "no job autonomy" to "small job autonomy", and the improvement of job satisfaction changed significantly. Job autonomy will affect job satisfaction because this reflects the level of trust between the organization and its employees. This trusting relationship is considered the premise of individual success and organizational goals, whereas a lack of trust will lead to lower cooperation and higher supervision costs. In addition, because job autonomy is a type of freedom and authority, this allows the employees to deal with and arrange affairs according to their own discretion, which promotes job satisfaction.

Studies have found that employees' autonomy in decision-making and information delivery can improve their personal work performance and job satisfaction because they are able to express their innovative ideas (Nie, Chua, Yeung, Ryan & Chan, 2015; Van, Ferris, Chang & Rosen, 2016; Wagner, 1994). When an organization cares about

the well-being of its employees and attaches great importance to their investment in work, while the manager fully respects employees' views and provides meaningful decisions and policy support, employees will be more involved in their jobs (Kim, 2019). This shows that a supportive working environment has a positive impact on its employees and improves their sense of autonomy and satisfaction. The study found that appropriate incentive methods can improve the autonomy of employees, and then enhance the well-being indicators (i.e., work satisfaction, work stress, and physical discomfort symptoms), and this process is mediated by work motivation (Nie et al., 2015). A survey about public sector employees showed that employees who use social media frequently achieve higher job autonomy and higher self-determination, both of which can improve their job satisfaction (Mehmet, 2018).

The trusting relationship between organizations and employees is a prerequisite for the success of one's career and the effective realization of organizational goals. The working characteristics of the supervisors determine the changeable and complex situations they face at work, managing which requires a certain level of autonomy. With greater job autonomy, employees have more permissions to make their customer service more satisfied. In conclusion, the following hypothesis is presented:

Hypothesis 2: Job autonomy has a significant positive impact on the job satisfaction of project supervisors.

### **2.3. The Mediating Role of Job Satisfaction**

In recent decades, many research scholars have studied job satisfaction (the overall attitude toward work) and job performance (measure of work performed and progress in achieving goals). Several local and foreign studies have shown that the higher the job satisfaction, the higher the sense of achievement, and that when one is more active at work, it is easier to improve their job performance.

Job satisfaction is an attitude towards work task and work environment. Many social psychology achievements believe that attitude can cause behavioral changes to a certain extent, and some scholars even regard attitude itself as a behavioral tendency (Varma, 2017). Research shows that job satisfaction can be defined an interaction between the organization and employees. Job satisfaction will improve work motivation and achieve specific task objectives, and improve work performance (Mufti, 2019). Research indicates that the increased productivity and reduced turnover are associated with job satisfaction (Wood, Van, Croon & Menezes, 2012). A study on project management shows that when employee satisfaction is improved, employees will be more flexible to use knowledge and skills to complete tasks, achieve organizational goals and improve work performance (Koys, 2003).

Hechanova (2006) investigated the relationship between organizational empowerment, satisfaction, and performance, revealing that empowerment can improve satisfaction. Employee job satisfaction is affected by the changing work resources (Beal, Weiss, Barros & MacDermid, 2005), and employees with adequate work resources are more motivated to achieve and more willing to improve their job performance. Additionally, employees with high job autonomy will obtain positive emotions (e.g., exciting, interest, and enthusiasm), which promote higher job satisfaction (Schaufeli, 2006). Based on the motivational process of the JDR model, high autonomy is associated with better individual performance (Bakker & Demerouti, 2007). If employees in an organization are given full autonomy as important human capital to perceive autonomous support, in return for the organization, employees will make additional efforts to improve work efficiency (Gong, Chang & Cheung, 2010). Job autonomy affects job satisfaction through job engagement and perceived organizational support, and employees are more actively involved in completing work tasks to improve job performance (Chen & Chiu, 2009).

For the project supervision personnel, improving job satisfaction can improve work enthusiasm and healthy competitiveness, which increases the likelihood of achieving goals, thus also improving personal job performance. On the contrary, if job satisfaction is low, this will negatively affect their work efforts and job performance. In conclusion, the following hypothesis is presented:

Hypothesis 3: Job satisfaction has a significant positive impact on the job performance of project supervisors.

Hypothesis 4: Job satisfaction of supervision personnel plays a mediating role between work autonomy and work performance.

### **2.4. Work Context as a Moderator**

The work context is characterized by three factors, work organization, work relations and working conditions (Bruning, 2020). We focused on working conditions to discuss the moderating effect between job autonomy and job satisfaction. Work context can be defined as the physical, chemical and biological environment of work, as well as the conditions of hygiene, safety and the anthropometric characteristics of the work station.

The working environment of supervising personnel is worse than the general work environment of other employees due to the numerous engineering (e.g., falling objects, high-altitude work, and dangerous construction tools) and

climate (e.g., high temperature, low temperature, and typhoons) hazards. Vischer (2007) noted that in an unideal work environment, control over work is reduced; thus, this brings about the positive impact of work authorization. Physical environmental factors in a working environment (e.g., working in noisy environments) affect work authorization to varying degrees. Moreau and Mageau's (2012) study showed that supportive leadership relationships had a positive impact on job satisfaction and supervisor well-being. A study by Althaus, Kop and Grosjean (2013) demonstrated the importance of the work context, especially the autonomy of employees, in making decisions at work and the social support they received. The study also found that higher work support led to reduced work stress and increased job satisfaction.

Although studies indicate that job autonomy is related to job satisfaction and performance, the results do not necessarily apply to all work environments. Other studies on specific fields have found no significant correlation between job autonomy and mental health (Parker, 2003) and organizational commitment (Bakker, Demerouti & Verbeke, 2004). Domenico's (2019) study concluded that autonomous decisions could improve job performance, they it may also cause greater perceived job challenges and decreased job satisfaction due to increased job autonomy. Similarly, a study by Pignalt (2011) found that work situations have a dual effect based on individual perceptions of the environment; the same elements may be considered dominant by some and restrictive for others. Therefore, the work context can enable us to better understand some variables of organizational behavior, such as work pressure, work mobility, and job performance as the relationship between job autonomy, satisfaction, and performance may depend on the specific work context (Figure 1). In conclusion, the following hypothesis is presented:

Hypothesis 5: The relationship between job autonomy and job satisfaction will be positively moderated by work context such that the higher job autonomy, the higher job satisfaction.

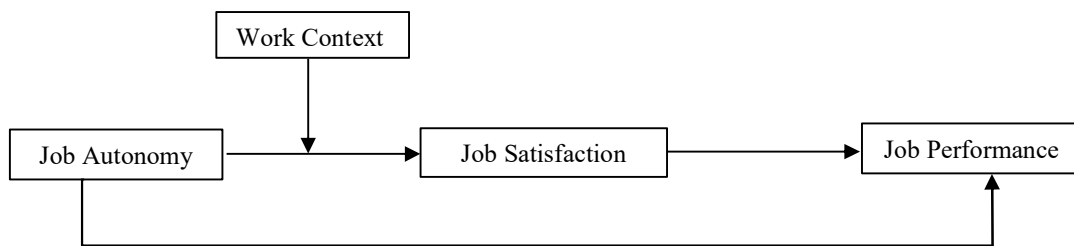


Figure 1: Research Model

### 3. Methodology

#### 3.1. Date Collection

The target population for this study were the supervising engineers in China. The questionnaire survey method was used to obtain the data of each observation variable for determining the correlation between variables and analyze the research assumptions to assess the relationship among job autonomy, work context, job satisfaction, and job performance. A total of 350 questionnaires were distributed, 322 questionnaires were returned, and 314 valid questionnaires were finally obtained for analysis. Owing to the particularity of the working environment in the construction industry, 82.05% of the participants were male, 17.95% female, 55.56% were aged 18 to 30, 35.1% were aged 30 to 50, and 9.34% were over the age of 50, and 60.68% have a bachelor's degree or above.

#### 3.2. Measurement

The scales measuring of job autonomy, work context, job satisfaction, and job performance were based on the mature scales developed abroad (Table 1), which were appropriately corrected to reflect the characteristics of supervising engineers and ensure that the questionnaire had a good confidence validity. The items were answered on five-point Likert scale (1 = "strongly disagree"; 5 = "strongly agree").

Some demographic statistical variables such as gender, managerial status, and years of service plays an effective role to job performance. Men are more responsive to performance than women, and working seniority reduce employee motivation for performance (Leigh, 2013; Perry, Engbers & Jun,2009; Taylor & Taylor, 2011). We incorporated gender, age, position, working seniority and education as control variables. We used a dummy variable to measure gender which man equals 0 and woman equals 1. Age was measured as an ordinal variable, where 1= "18

to 25 years old," 2= "26 to 30 years old," 3= "31 to 40 years old," 4= "41 to 50 years old," 5= "51 to 60 years old," 6= "above 60 years old." Position was measured as an ordinal variable, where 1= "non team leader," 2= "team leader," 3= "managers." Working seniority was measured as an ordinal variable, where 1= "1 to 5 years," 2= "6 to 10 years," 3= "11 to 15 years," 4= "16 to 20 years," 5= "over 20 years." Education was measured as an ordinal variable, where 1= "less than high school," 2= "some college credit but no degree," 3= " bachelor's degree or above."

**Table 1:** Measurement of Variables

Variables	Sample Questions	References
Job autonomy	<ol style="list-style-type: none"> <li>1. My supervisor leaves it up to our team to decide how to go about our job.</li> <li>2. Management trusts our team to make work-related decisions without getting permission first.</li> <li>3. In our team, it's important to check things first with the team leader before making a decision.</li> <li>4. Our team leaders keep too tight a reign on the way things are done in the team.</li> </ol>	Gonzalez-Mule, Courtright, Degeest, Seong & Hong (2014)
Work context	<ol style="list-style-type: none"> <li>1. I can choose where I work (my office or my workstation).</li> <li>2. I work in a 'polluted' environment (dust, vapors, fumes, etc.).</li> <li>3. I work in a specific climate (cold, hot, humid, etc.).</li> <li>4. I work without any risk of accident.</li> <li>5. I work in a noisy environment.</li> </ol>	Pignault & Houssemand (2016)
Job satisfaction	<ol style="list-style-type: none"> <li>1. Approved by the Owner and the construction unit.</li> <li>2. with a strong sense of achievement for the work.</li> <li>3. Obtain the approval of the owner and the construction unit.</li> <li>4. Have a strong sense of accomplishment for work.</li> </ol>	Spector (1985)
Job performance	<ol style="list-style-type: none"> <li>1. I can finish the work with high quality.</li> <li>2. I will actively solve the difficulties in the work.</li> <li>3. I ask for a challenging work assignment.</li> <li>4. I exercise personal discipline and self-control.</li> <li>5. I persist in overcoming obstacles to complete a task.</li> </ol>	Scotter & Motowidlo (1996)

### 3.3. Reliability and Validity Testing

We checked the Cronbach's alpha coefficient to test the internal consistency of the constructs. As showed in Table 2, Cronbach's alpha values of all the constructs are over 0.7. We conducted confirmatory factor analysis (CFA) to assess the validity of our measures. The fit indices ( $\chi^2/df=1.718$ , CFI = 0.959, IFI = 0.959, TLI = 0.948, NFI = 0.909, RMSEA = 0.078) suggest that the model provides a satisfactory fit to the data. All factor loadings are highly significant ( $p < 0.001$ ), and the average variance extracted (AVE) value of each construct was greater than 0.5, and the combined confidence ratio (CR) was greater than 0.8, suggesting adequate convergent validity. Then we assessed discriminant validity by comparing with correlations between study constructs. As showed in Table 3, the root of AVE figure of each construct is higher than these correlation values. These results indicate that our measures possess adequate reliability and validity. We present the basic descriptive statistics and correlations of the variables in Table 3.

**Table 2:** Reliability and Validity

Construct	Items	Factor loading	AVE	Composite reliability (CR)	Cronbach's $\alpha$
Job autonomy	Job autonomy 1	0.71	0.67	0.89	0.89
	Job autonomy 2	0.85			
	Job autonomy 3	0.93			
	Job autonomy 4	0.78			
Work context	Work context 1	0.69	0.54	0.87	0.74

	Work context 2	0.82			
	Work context 3	0.69			
Job satisfaction	Job satisfaction 1	0.81	0.71	0.90	0.91
	Job satisfaction 2	0.94			
	Job satisfaction 3	0.90			
	Job satisfaction 4	0.72			
Job performance	Job performance 1	0.91	0.76	0.95	0.95
	Job performance 2	0.96			
	Job performance 3	0.88			
	Job performance 4	0.90			
	Job performance 5	0.91			
	Job performance 6	0.75			

**Table 3:** Descriptive Statistics and Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9
1. Gender	0.18	0.39	–								
2. Age	3.48	1.26	-0.02	–							
3. Position	2.24	0.68	0.13	-	–						
4. Working seniority	1.71	1.03	-0.04	0.53**	-	–					
5. Education	2.59	0.53	-0.02	0.10	-0.01	0.11	–				
6. Job autonomy	3.27	1.02	-0.10	0.01	-0.09	0.07	-0.04	0.82			
7. Work context	3.09	1.00	-0.10	0.07	0.00	0.05	0.11	0.64**	0.73		
8. Job satisfaction	3.25	1.03	-0.03	0.07	-0.11	0.07	-0.06	0.76**	0.51**	0.84	
9. Job performance	3.59	0.99	-0.06	0.09	-0.15	0.13	0.09	0.73**	0.60**	0.76**	0.87

Note: \*p<0.05; \*\*p<0.01. The diagonal data is the square root of AVE.

#### 4. Results of Hypothesis Testing

We tested Hypothesis 1 in Model 1, as shown in Table 4, to examine the relationship between the job autonomy and job performance. The coefficient for job autonomy is positive and significant ( $\beta = 0.73, p < 0.001$ ). Therefore, Hypothesis 1 was supported. Then we tested Hypothesis 2 in Model 2 to examine the relationship between the job autonomy and job satisfaction. As shown in Table 4, the coefficient is positive and significant ( $\beta = 0.76, p < 0.001$ ). Therefore, Hypothesis 2 was supported. In Model 3, we tested the relationship between the job satisfaction and job performance, and mediating effect of job autonomy on job performance via job satisfaction. The coefficient for job satisfaction is positive and significant ( $\beta = 0.49, p < 0.001$ ). Therefore, Hypothesis 3 was supported. Model 3 includes 3 main constructs (i.e., job autonomy, job satisfaction, job performance) and control variables, and  $R^2$  of job performance ( $R^2 = 0.65$ ) is greater than in Model 1 ( $R^2 = 0.56$ ), which shows the direct relationship between the job autonomy and job performance. Moreover, Table 5 demonstrates that the indirect effect of mediation variable showed 0.08 respectively and the bootstrap confidence interval [0.23, 0.53] does not include 0. Thus, Hypothesis 4 was supported.

**Table 4:** Mediation Model Test of Job Satisfaction

Variable	M1: Job performance		M2: Job satisfaction		M3: Job performance	
	$\beta$	t	$\beta$	t	$\beta$	t
Gender	0.03	0.44	0.05	0.74	0.01	0.10
Age	0.00	-0.04	0.08	0.89	-0.04	-0.51

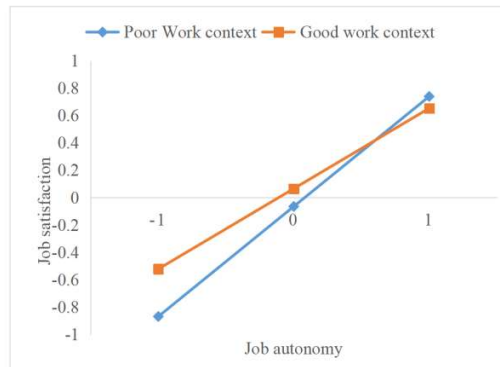
Position	-0.07	-0.98	-0.03	-0.34	-0.06	-0.92
Work experience	0.04	0.47	-0.05	-0.54	0.07	0.81
Education	0.11	1.70	-0.03	-0.50	0.12	2.18
Job autonomy	0.73	11.34***	0.76	12.35***	0.36	4.04***
Job satisfaction					0.49	5.56***
$R^2$	0.56		0.59		0.65	
Adjusted $R^2$	0.53		0.57		0.58	
F statistics	23.02***		26.16***		29.52***	

Note: \*p<0.05; \*\*p<0.01; \*\*\* p<0.001.

**Table 5:** Result of Verification of Mediating Effect by Bootstrap Method

Hypotheses	BootSe	BootLLCI	BootULCI
Hypothesis 1 (Job autonomy → Job performance)	0.06	0.58	0.83
Hypothesis 2 (Job autonomy → Job performance)	0.06	0.63	0.88
Hypothesis 3(Job autonomy → Job satisfaction → Job performance)	0.08	0.23	0.53

Hypothesis 5 assess the moderating role of work context. Model 4 demonstrates that the coefficient for the interaction of work context with job autonomy is statistically significant but negative ( $\beta = -0.12, p < 0.05$ ). Then we plotted the simple slopes for the relationship between job autonomy and job satisfaction at one standard deviation above and below the mean of work context (see Figure 2). Figure 2 indicates the regression coefficients for each level of work context is respective. The strength of the relationship between job autonomy and job satisfaction varied by the degree of work context. In other words, when employees engaged in good work context, job autonomy was associated with lower job satisfaction. In contrast, when employees engage in poor work context, the simple slopes indicated that job autonomy was associated with high job satisfaction. Thus, Hypothesis 5 was not supported. We will discuss the reasons in next section.



**Figure 2:** The Moderate Effect of Work Context

**Table 6:** Moderated Mediation Model Test

Variable	M4: Job Satisfaction		M5: Job Performance	
	$\beta$	t	$\beta$	t
Gender	0.11	0.65	0.02	0.10
Age	0.06	0.73	-0.04	-0.51
Position	-0.04	-0.40	-0.09	-0.92
Work experience	-0.04	-0.49	0.06	0.81
Education	-0.07	-0.49	0.23	2.18
Job autonomy (JA)	0.70	8.28***	0.34	4.04
Job satisfaction			0.42	5.01***
Work context (WC)	0.07	0.78		



JA×WC	-0.12	-2.08**	
R <sup>2</sup>	0.60		
F statistics	23.73**		

Note: \*p<0.05; \*\*p<0.01; \*\*\* p<0.001.

## 5. Discussion and Conclusions

From the perspective of the JDR model, with job satisfaction as the intermediary and work variable, a regulated intermediary model was constructed to clarify the how the job autonomy of supervising engineers regulates job satisfaction and its regulatory effect on work performance. The empirical analysis results are as follows:

First, the regression coefficient of job autonomy is significantly positive among all the regression results. This indicates that the higher job autonomy a supervising engineer has, the more satisfied they are with their work. The autonomy obtained by the supervising engineer reflects the trust of the construction unit and the project manager in the supervision engineer and gives supervision discretion in handling problems; this helps promote active work, better complete tasks, and improve the job performance of employees. Second, our research showed a negative moderating relationship between job autonomy and job satisfaction according to Hypothesis 5. The working environment of the supervision engineer is different from the general indoor office, in contrast, they usually need to work in the construction site. Despite the risks and uncertainties of outdoor work environment, employees can master the front-line production situation to make the right response strategy. Although physical comfort is in a bad working environment, psychological comfort is affected by the environmental choice or job empowerment that users feel through decision-making (Vischer, 2007). Under poor working conditions, supervisory engineers are more sensitive to job empowerment, and less autonomy can lead to greater satisfaction. Another possibility is that the effect of job autonomy on job satisfaction is not a simple linear relationship. Autonomy can be a kind of available work resource, but also a kind of work stress leading to the decrease of satisfaction. Therefore, the correlations between job autonomy and job satisfaction may become more complex in different work context.

The theoretical significance of this study mainly includes the following aspects. First, the results enrich the job demand-resource (JDR) model and confirm the previous research results of job resources-job satisfaction-job performance. Most existing studies associate job autonomy, leadership support, and development opportunities. For example, Xanthopoulou et al. (2009) found that the daily level of autonomy, guidance, and team atmosphere are related to objective financial performance. A survey of Bakker and Bal (2010) on the average level of weekly job autonomy shows that job performance is related to the promotion opportunities and leadership support are brought by autonomy, and job engagement plays a mediating role in this process. Although this is valuable, the significance of each job resource in improving employee input and performance remains unclear. Therefore, the present study specifically explores the value of job autonomy in improving job satisfaction and performance. The results show that job autonomy significantly improves job satisfaction and performance, thus enriching the precursor research on dynamic changes in job performance. Second, previous studies on the performance of supervision engineers mostly focus on technical level and professional skills. This study introduces organizational behavioral variables such as job autonomy and work context to explore the antecedents of the performance of supervision engineers. Third, this study constructs a regulated mediation model to investigate the moderating role of the work context to study the job satisfaction of supervision engineers from the perspective of environmental psychology.

Our results provide some practical implications to the job performance of supervision engineers. First, by giving employees more autonomy, they can gain more satisfaction and thus enjoy higher work performance. The supervision engineers need the support of job empowerment in many aspects of acceptance. Organization should empower engineers to make more independent decisions. Secondly, this study showed that when the working environment is poor, supervisors are more sensitive to the perception of job autonomy and have a stronger impact on job satisfaction. Since the unsatisfactory physical environment leads to physical comfort, employees may suffer from emotional exhaustion and other adverse reactions, which will reduce satisfaction and job performance. Therefore, the supervision and construction units should work together to create a good working environment to improve the job satisfaction and performance of the supervising engineer. Third, organizations should consider the degree of job empowerment in different working environments and make reasonable use of the dual identity of job autonomy resources and pressure to improve individual satisfaction and job performance.

Although this study enriches existing research to some extent, there are still some limitations that need to be addressed. First, all answers from the participants were self-reported, which could result in the problem of common method bias. Therefore, future studies could collect data via different sources to minimize the impact of homologous

variance on the study results (Doty & Glick, 1998). Second, the present study is focused on only one industry; thus, the generalizability of results is somewhat limited. Future studies may consider the use of survey data from multiple regions and different industries to repeatedly verify the study results to broaden the scope of the study conclusions. Third, the performance of this study was subjectively evaluated by employees, including objective performance, especially in positions or industries, etc. Third, future studies need to explore other influencing factors and internal mechanisms of changes in job performance. Kim, Kolb and Kim (2013) point out that the impact of work input on job performance is mainly based on a resource perspective. Owing to the complexity of changes in job performance, future research should also make an in-depth study of other influencing factors, such as mood and personality changes on internal performance. Finally, this study focuses on the relationship between work situation and job satisfaction, and further research should be conducted on the moderating relationship between job autonomy and job performance. In addition, future research might investigate the influence of other dimensions in work situation on job satisfaction and job performance.

## References

- Althaus, V., Kop J. L., & Grosjean, V. (2013). Critical review of theoretical models linking work environment, stress and health: Toward a meta-model. *Le Travail Humain*, 76(2), 81–103.
- Bakker, A. B., & Bal, P. M. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organizational Psychology*, 83(1), 189–206.
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328.
- Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International*, 13(3), 209–223.
- Bakker, A. B., Demerouti, E., & Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource Management*, 43(1), 83–104.
- Bakker, A. B., Veldhoven, M., & Xanthopoulou, D. (2010). Beyond the demand control model: Thriving on high job demands and resources. *Journal of Personnel Psychology*, 9(1), 3–16.
- Beal, D. J., Weiss, H. M., Barros, E., & MacDermid, S. M. (2005). An episodic process model of affective influences on performance. *Journal of Applied Psychology*, 90(6), 1054–1068.
- Béguin, P., & Clot, Y. (2004). Situated action in the development of activity. *Activites*, 1(2), 50–63.
- Brown, M. E. (2005). Ethical leadership: A social learning perspective for construct development and testing. *Organizational Behavior and Human Decision Processes*, 97(2), 117–134.
- Bruning, C. (2020). Work context in the automotive industry and damage to workers' health. *Brazilian Journal of Management*, 13(2), 424–444.
- Chen, Z. X., & Francesco, A. M. (2003). The relationship between the three components of commitment and employee performance in China. *Journal of Vocational Behavior*, 62(3), 490–510.
- Chen, C., & Chiu, S. (2009). The mediating role of job involvement in the relationship between job characteristics and organizational citizenship behavior. *The Journal of Social Psychology*, 149(4), 474–494.
- Ding, G. L. (2020). Research on safety credit evaluation system of construction supervision enterprise. *Construction Economy*, 41(1), 41–45.
- Domenico, B. (2019). The ambivalent effects of participation on performance and job stressors: The role of job crafting and autonomy. *Human Performance*, 32(5), 220–241.
- Doty, D., & Glick, W. (1998). Common methods bias: Does common methods variance really bias results? *Organizational Research Methods*, 1(4), 374–406.
- Engeström, Y. (2000). Activity theory as a framework for analyzing and redesigning work. *Ergonomics*, 43(7), 960–974.
- Fradkin, A. (2021). Teacher autonomy, motivation, and job satisfaction: Perceptions of elementary school teachers according to self-Determination theory. *Elementary Education Online*, 20 (2), 198–205.
- Gong, Y., Chang, S., & Cheung, S. (2010). High performance work system and collective OCB: A collective social exchange perspective. *Human Resource Management Journal*, 20(2), 119–137.

- Gonzalez-Mule, E., Courtright, S. H., Degeest, D., Seong, J. Y., & Hong, D. S. (2014). Channeled autonomy: the joint effects of autonomy and feedback on team performance through organizational goal clarity. *Journal of Management*, 42(7), 2018–2033.
- Grant, A. M., Fried, Y., Parker, S. K., & Frese, M. (2010). Putting job design in context: Introduction to the special issue. *Journal of Organizational Behavior*, 31(2–3), 145–157.
- Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 16(2), 250–279.
- Hechanova, M. R. (2006). Psychological empowerment, job satisfaction and performance among Filipino service workers. *Asian Journal of Social Psychology*, 9(1), 72–78.
- Idaszak, J. R., & Dragow, F. (1987). A revision of the job diagnostic survey: Elimination of a measurement artifact. *Journal of Applied Psychology*, 72(1), 69–74.
- Kahya, E. (2007). The effects of job characteristics and working conditions on job performance. *International Journal of Industrial Ergonomics*, 37(6), 515–523.
- Kim, B. (2019). Relationships between social support, job autonomy, job satisfaction, and burnout among care workers in long-term care facilities in Hawaii. *Educational Gerontology*, 45(1), 57–68.
- Kim, W., Kolb, J. A., & Kim, T. (2013). The relationship between work engagement and performance: A review of empirical literature and a proposed research agenda. *Human Resource Development Review*, 12(3), 248–276.
- Koys, D. (2003). How the achievement of human-resources goals drives restaurant performance. *Cornell Hotel and Restaurant Administration Quarterly*, 44(1), 17–24.
- Lee, H. W. (2019). Moderators of the motivational effects of performance management: A comprehensive exploration based on expectancy theory. *Public Personnel Management*, 48(1), 27–55.
- Leigh, A. (2013). The economics and politics of teacher merit pay. *CESifo Economic Studies*, 59(1), 1–33.
- Mehmet, A. D. (2018). Examining the effects of social media use on job satisfaction in the Australian public service: Testing self-determination theory. *Public Performance & Management Review*, 40(2), 300–327.
- Moreau, E., & Mageau, G. A. (2012). The importance of perceived autonomy support for the psychological health and work satisfaction of health professionals: Not only supervisors count, colleagues too. *Motivation and Emotion*, 36(3), 268–286.
- Morgeson, F. P., Delaney, K. K., & Hemingway, M. A. (2005). The importance of job autonomy, cognitive ability, and job-related skill for predicting role breadth and job performance. *Journal of Applied Psychology*, 90(2), 399–406.
- Morrison, E. W. (2006). Doing the job well: An investigation of pro-social rule breaking. *Journal of Management*, 32(1), 5–28.
- Mufti, M. (2019). Influence of leadership style on job satisfaction of NGO employee: The mediating role of psychological empowerment. *Journal of Public Affairs*, 5(9), 1–11.
- Nguyen, A. N., Taylor, J., & Bradley, S. (2003). Job autonomy and job satisfaction: new evidence. *Lancaster University Management School Working Paper*.
- Nie, Y. Y., Chua, B. L., Yeung, A. S., Ryan, R. M., & Chan, W. Y. (2015). The importance of autonomy support and the mediating role of work motivation for well-being: Testing self-determination theory in a Chinese work organization. *International Journal of Psychology*, 50(4), 245–255.
- Park, R., & Searcy, D. (2012). Job autonomy as a predictor of mental well-being: The moderating role of quality-competitive environment. *Journal of Business & Psychology*, 27(3), 305–316.
- Park, R. (2018). The roles of OCB and automation in the relationship between job autonomy and organizational performance: a moderated mediation model. *The International Journal of Human Resource Management*, 29(6), 1139–1156.
- Parker, S. K. (2003). Longitudinal effects of lean production on employee outcomes and the mediating role of work characteristics. *Journal of Applied Psychology*, 88(4), 620–634.
- Pignault, A., & Houssemand C. (2016). Construction and initial validation of the work context inventory. *Journal of Vocational Behavior*, 92(2), 1–11.
- Pignault, A. (2011). Perception of work context exploratory study of low qualified operators. *Bulletin of the Transilvania University of Brasov*, 4(2), 73–84.
- Perry, J. L., Engbers, T. A., & Jun, S. Y. (2009). Back to the future? Performance-related pay, empirical research, and the perils of persistence. *Public Administration Review*, 69(1), 39–51.
- Savickas, M. L., Nota L., & Rossier, J. (2009). Life designing: A paradigm for career construction in the 21st century. *Journal of Vocational Behavior*, 75(3), 239–250.
- Schaufeli, W. B. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement*, 66(4), 701–716.

- Scotter, J. R., & Motowidlo, S. J. (1996). Interpersonal facilitation and job dedication as separate facets of contextual performance. *Journal of Applied Psychology, 81*(5), 525–531.
- Spreitzer, G. M. (1995). Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of Management Journal, 38*(5), 1442–1465.
- Stavrou, E. T. (2005). Flexible work bundles and organizational competitiveness: A cross-national study of the European work context. *Journal of Organizational Behavior, 26*(8), 923–947.
- Spector, P. E. (1985). Measurement of human service staff satisfaction: Development of the job satisfaction survey. *American Journal of Community Psychology, 13*(6), 693–713.
- Taylor, J., & Taylor, R. (2011). Working hard for more money or working hard to make a difference? Efficiency wages, public service motivation, and effort. *Review of Public Personnel Administration, 31*(1), 67–86.
- Van, A., Ferris, D. L., Chang, C. H., & Rosen, C. C. (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management, 42*(5), 1195–1229.
- Varma, C. (2017). Importance of employee motivation and job satisfaction for organizational performance. *International Journal of Social Science and Interdisciplinary Research, 6*(2), 10–20.
- Vischer, J. C. (2007). The effect of the physical environment on job performance: Towards a theoretical model of workspace stress. *Stress and Health, 23*(3), 175–184.
- Wagner, J. A. (1994). Participation's effects on performance and satisfaction: A reconsideration of research evidence. *Academy of Management Review, 19*(2), 312–330.
- Wood, S., Van V. M., Croon, M., & Menezes, L. M. (2012). Enriched job design, high involvement management and organizational performance: The mediating roles of job satisfaction and well-being. *Human Relations, 65*(4), 419–445.
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Work engagement and financial returns: A diary study on the role of job and personal resources. *Journal of Occupational and Organizational Psychology, 82*(1), 183–200.
- Xiang, P. C. (2019). Research on the professional quality improvement of supervision engineers under the whole process engineering consulting. *Construction Economy, 40*(5), 24–29.
- Zhong, J. B. (2020). Analysis on the influence path of engineering supervisors' work performance. *Journal of Civil Engineering and Management, 37*(2), 64–69.