Exploring the impact of job satisfaction on turnover intention among professionals in the construction industry

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Abstract:	

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Purpose - Turnover intention is a critical predictor of an employee's turnover behaviour. A high level of turnover rate significantly affects the productivity and morale of an enterprise. Previous research has indicated that job satisfaction plays a critical role in influencing an employee's turnover intention, but the underlying factors related to job satisfaction remain under-explored, which impedes the development of effective strategies for reducing turnover intention. In addition, little research examined job satisfaction and turnover intention in the context of the COVID-19 pandemic, specifically in the Chinese construction industry. This study aimed to investigate the impact of job satisfaction on turnover intention among professionals in the construction industry.

Design/methodology/approach - A questionnaire survey was employed to collect viewpoints from 449 professionals in the Chinese construction industry, followed by descriptive analysis, correlation analysis and structural equation modelling analysis to derive results.

Findings - The findings indicate that professionals in the industry generally have a slightly high level of job satisfaction while a slightly low level of turnover intention in the special period of the pandemic outbreak. *Leadership and management*, *training and career development*, and *interpersonal relationship* are critical underlying factors leading to their turnover intention. Although demographic factors have no moderating effect between job satisfaction and turnover intention, among them, *age*, *marital status*, and *years of working experience* have strongly positive relationships with job satisfaction while significantly negative relationships with turnover intention.

Originality/value - The findings provide valuable insights to fully understand the critical factors leading to turnover intention from the perspective of job satisfaction, which is helpful in developing effective measures to address the turnover problems for enterprises in the Chinese construction industry and those industries with similar characteristics in other regions.

Keywords: Job satisfaction; Turnover intention; Professional; China

1. Introduction

Employee turnover is defined as the voluntary termination of employment with an employer, which has become a significant concern in the global construction industry (Ayodele et al., 2020; Chih et al., 2016). Due to the high-risk, complex, and temporary nature of the construction industry, turnover can lead to substantial cost implications and decreased productivity for enterprises in the construction industry, as well as frustration and a lack of morale among professionals (Chih et al., 2016; Nauman et al., 2021). The Chinese construction industry is one of the largest construction markets globally, accounting for approximately 20% of all construction investment worldwide (Mordor Intelligence, 2023). In 2021, the number of employees working in the industry reached 81.8 million, ranking second among all the industries (NBS, 2022). Facilitated by the initiatives of the 14th Five-Year Plan (2021-2025), the Chinese construction industry is planned to achieve an average annual growth rate of 4.4% between 2024 and 2027, with an estimated investment exceeding $13 trillion by 2030 (Research and Markets, 2023; Mordor Intelligence, 2023). Despite its significant contribution to economic development, the Chinese construction industry is characterised by intense competition across a large number of enterprises, and it has encountered significant employee turnover problems in recent years (Sang et al., 2020). The Chinese Turnover and Compensation Survey Report showed that the turnover

rate in the real estate development sector reached 21.6% in 2021, ranking third among all the industries in China (China Daily, 2021). This might be because the construction industry has faced significant negative influences from the COVID-19 pandemic, leading to difficulties such as lockdown-induced labor shortages, construction site closures, schedule delays, and project suspensions (Wang et al., 2023). These difficulties, together with economic slowdown, elevated job stress and insecurity among professionals in the construction industry (Liang et al., 2023), which in turn reduce their job satisfaction. Nauman et al. (2021) noted that unforeseen events such as the pandemic introduce uncertainty into individuals' career development, potentially leading to turnover behavior. Notably, Liang et al. (2023) reported a substantial 95% increase in the average unemployment rate of construction workers in the United States, rising from 4.5% in 2019 to 8.7% in 2020. The relatively high turnover rate, exacerbated by the COVID-19 pandemic and subsequent organizational restructuring of enterprises in the construction industry, has led to significant talent loss and reduced productivity, hindering the sustainable development of the industry. For instance, the Gallup organization survey reported that the cost of replacing an employee can range from one-half to two times of his/her annual salary (Mcfeely and Wigert, 2019), resulting in excessive expenditures and resource wastage for enterprises. It is, therefore, imperative to investigate the antecedents leading to turnover intention (TI) among professionals in the Chinese construction industry, including designers, consultants, and construction professionals.

Job satisfaction (JS) has been widely recognized as a critical factor affecting turnover intention among professionals in the construction industry (Parker and Skitmore, 2005; Sang et al., 2009; Djastuti, 2015; Kerdngern and Thanitbenjasith, 2017; Chung et al., 2017; Wang et al., 2020).

However, existing research on the relationship between job satisfaction and turnover intention has primarily focused on overall job satisfaction, neglecting the impacts of underlying factors related to job satisfaction on turnover intention (Dodanwala and Santoso, 2022; Wang et al., 2020). Examining the influence of different job satisfaction dimensions on turnover intention contributes to a deeper understanding of the underlying causes of turnover for professionals in the construction industry, which is helpful in achieving sustainable growth for enterprises in the industry through more effective measures of turnover rate reduction. Theoretically, the findings also advance the knowledge through identifying the critical precursors of turnover intention from the perspective of job satisfaction in the domain of construction industry. Furthermore, few studies have explored the moderating effect of individual demographic factors (e.g., gender, age) on the relationship between job satisfaction and turnover intention in the construction industry. Uncovering the moderating role of demographic characteristics can help develop more targeted human resources management strategies to meet the unique needs and motivations of different types of professionals in the industry. Finally, little research has explored job satisfaction and turnover intention among professionals in the construction industries in the context of the COVID-19 pandemic. This is important as existing studies indicated that the pandemic had a significant influence on the vulnerable construction industry (Duan et al., 2023), which has also resulted in a negative influence on job satisfaction and turnover intention of employees in other industries (Labrague and de los Santos, 2021). Understanding the impact of job satisfaction on turnover intention during the COVID-19 pandemic period is imperative for employers in the construction industry to develop more effective strategies in achieving talent retention and sustainable business growth under the influence of traumatic events with similar nature of the

pandemic in the future. The insight can also offer valuable theoretical insights from the construction industry for academia to compare the similarities and differences of the impacts of the pandemic on the professionals' job satisfaction and turnover intention across various industries. In order to address this knowledge gap, using an empirical investigation in the Chinese construction industry, this paper aimed to: (1) evaluate the levels of job satisfaction and turnover intention among professionals in the construction industry; (2) assess the influence of the underlying factors related to job satisfaction on turnover intention; (3) explore the moderating effect of demographics on the relationship between job satisfaction and turnover intention.

2. Literature review and hypotheses development

2.1 Factors influencing job satisfaction

Locke (1969) defined job satisfaction as a positive or pleasant emotional reaction to an individual's job experience. It also explains the extent to which employees like (i.e., satisfaction) or dislike (i.e., dissatisfaction) their jobs (Dodanwala and Santoso, 2022). Job satisfaction can be categorized into two types: overall satisfaction and specific satisfaction (Petty et al., 2005). Specific job satisfaction is affected by various factors, including motivation, rewards, promotion opportunities, and a feeling of happiness (Wang et al., 2020). Herzberg's (1968) motivation-hygiene theory proposed that intrinsic factors, including recognition, achievement, job itself, career development and responsibility, affect the level of job satisfaction. On the other hand, extrinsic factors such as policies, supervision, salary, interpersonal relationship, and working conditions can influence job dissatisfaction (Beyene and Gituma, 2017). Kerdngern and Thanitbenjasith (2017) identified compensation, job nature, supervision, co-worker relationship

and career development opportunities as five key influential factors of job satisfaction. Sang et al. (2020) highlighted that job satisfaction among employees in the construction industry significantly correlates with career development opportunities, work environments, human resource practices, and leadership. Building upon extensive literature review results, this study uses seven-dimensional variables to measure job satisfaction among professionals in the Chinese construction industry, which were under two main types of intrinsic and extrinsic factors (Herzberg, 1968; Sang et al., 2009).

2.1.1 Job-related Factors (JRF)

Job-related factors are those related to job characteristics such as job content, working hours, and collaborations with colleagues (Hosseini et al., 2014). Job content includes the description of work scopes and the responsibilities of the individuals or project teams that help define the work (Tyssen et al., 2014). Lim and Ling (2012) found that the job satisfaction of professionals working for contractors in Singapore is closely related to the nature of their jobs and the human resources practices in their organizations. Similarly, job attributes including workload and role conflict contribute to burnout among construction workers, which in turn influences their level of job satisfaction (Lingard, 2003). Ling and Loo (2015) identified eight job-related dimensions contributing to the overall job satisfaction for construction project managers, including job security, workplace location, and social support at workplace.

2.1.2 Training and Career Development (TCD)

Effective education and training are crucial for accumulating the knowledge, skills, and expertise required by construction professionals to effectively perform a task (Lim and Ling, 2012). The structure of learning programs is critical in influencing employees' learning processes, which can increase or decrease their job satisfaction (Shahbazi et al., 2019). The opportunities for professional training, promotion, and payment raise are positively correlated with job satisfaction in the construction industry (Nauman et al., 2021). Organizations without tailored training plans may hinder employees from developing a clear career path, leading to low levels of job satisfaction and high levels of turnover rates (Ayodele et al., 2020). Wang et al. (2020) also suggested that the provision of vocational mentoring and training is fundamental for improving employees' affective commitment, leading to elevated job satisfaction levels among construction professionals.

2.1.3 Job Salary and Benefit (JSB)

Improvement of job salary and benefits is considered the most explicit method for enterprises to attract, motivate, and retain competitive employees (Ryu and Jinnai, 2020). For example, Randeree and Chaudhry (2012) found that salary and other benefits significantly affect job satisfaction among construction professionals in the United Arab Emirates. Similarly, Ling and Loo (2015) identified salary as a critical factor affecting job satisfaction among construction project managers in Singapore. Lim and Ling (2012) highlighted that job benefits such as medical treatments and meal allowances are crucial for increasing job satisfaction among construction professionals. In contrast, if employees do not receive expected rewards compared to their efforts,

they may perceive a sense of unfairness and lack of reciprocity, leading to their turnover behaviour (Ayodele et al., 2020). Ho (2016) found that the majority of the young generation workers in Hong Kong do not view working in the construction industry as a preferred career choice due to their dissatisfaction with salary and benefits compared to the physically demanding nature of the work.

2.1.4 Interpersonal Relationship (IR)

Interpersonal relationship is widely viewed as a critical extrinsic factor influencing job satisfaction and achieving employee growth (Bulinska and Bagienska, 2021; Petty et al., 2005; She, 2022). Ling and Loo (2015) highlighted that positive interpersonal relationships among construction project managers enhance their sense of belonging in the work environment, which in turn increases their job satisfaction. Guinot et al. (2014) also found that interpersonal trust, an important element of IR, has a positive effect on job satisfaction. They further argued that excessive trust may increase the possibility of opportunistic behaviour, leading to negative consequences in job satisfaction. On the other hand, interpersonal conflict among co-workers can produce detrimental impacts on construction professionals' psychological and physical health, leading to high levels of employee turnover rates (Brockman, 2014).

2.1.5 Leadership and Management (LM)

Rezvani et al. (2016) noted that project managers' emotional intelligence, a critical part of leadership, has positive impacts on project success, job satisfaction, and trust. Similarly, Randeree and Chaudhry (2012) revealed that leadership is a determinant of job satisfaction and

organizational commitment. Phua (2012) emphasized the significance of the gap between the individual's HRM (human resource management) preferences and the actual organizational HRM practices in affecting job satisfaction in construction enterprises. Chih et al. (2018) also found that supervisors' supportive leadership is positively correlated with employees' job satisfaction, which in turn increases their retention intentions in construction organizations.

2.1.6 Work Environment (WE)

Research indicated that employees' compatibility with the work environment can significantly increase their job satisfaction (Ayodele et al., 2020; Sang et al., 2020; Wang et al., 2020). The characteristics of working in the construction industry, including long-working hours, physically demanding activities, and unsafe work, tend to result in high levels of job stress and burnout among professionals, leading to job dissatisfaction and turnover intention (Dodanwala and Santoso, 2022; Yang et al., 2017). Guinot et al. (2014) defined eustress as good stress, in which employees' knowledge and skills can cope with the work demands and pressures in the working environment, thereby facilitating their abilities to manage their physiological and psychological stresses. Nauman et al. (2021) concluded that a high level of adaptability can facilitate employees coping with high pressures in physically intensive and dynamic working environments, and in turn enhancing their career satisfaction while reducing turnover intentions in the construction industry.

Based on above literature review results, the following hypotheses are developed (see Figure 1):

H1-H6: The construction industry professionals' JRF, TCD, JSB, IR, LM, and WE are positively correlated with their job satisfaction, respectively.

2.1.7 Work-family Conflict (WFC)

Prior to data collection, a pilot survey was conducted with five professionals in the Chinese construction industry with at least five years of working experience to further validate the literature review results. The interviewees suggested that *work-family conflict* is a crucial influencing factor for job satisfaction. In fact, work-family conflict has been recognized as a vital factor affecting job satisfaction (Dodanwala and Shrestha, 2021), job stress (Zhang et al., 2023a), and turnover intention (Ayodele et al., 2020) among professionals working in the construction industry. Dodanwala and Shrestha (2021) revealed that work-family conflict arises when an employee struggles to reconcile the demands and expectations of the family due to work-related issues. This can lead to a depletion of employees' emotional resources, consequently reducing their job satisfaction. In contrast, work-family balance can mitigate the negative influences of job demands on job dissatisfaction (Ninaus et al., 2021). Hence, the following hypothesis is proposed:

H7: The construction industry professionals' work-family conflict is negatively correlated with their job satisfaction.

2.2 The relationship between job satisfaction and turnover intention

Turnover intention is defined as individuals' perceived likelihood of staying or leaving their employing organization (Nauman et al., 2021). Turnover intention is commonly used as a reliable proxy for actual turnover as it has been recognized as the most potential predictor of turnover behaviour (Chih et al., 2018; Dodanwala and Santoso, 2022).

Previous studies indicated that overall job satisfaction is a significant and negative predictor of employees' turnover intention (Ayodele et al., 2020; Chung et al., 2017). Employees with higher levels of job satisfaction tend to increase their productivity (Halkos and Bousinakis, 2010), leading to reduced turnover intention (Dodanwala and Shrestha, 2021). According to the Conservation of Resources Theory, professionals with high levels of job satisfaction are more motivated to invest and pursue abundant resources (e.g., tenure and opportunity costs) in their human capital to meet job demands, resulting in their retention within organizations; while those who experienced resource depletion or threats tend to leave the organization through seeking other potential opportunities (Chih et al., 2018). Wang et al. (2020) also found that an increase in overall job satisfaction results in a decrease in turnover intention among construction project managers in the Chinese public sectors. Hence, a hypothesis is proposed based on the above literature results:

H8: *The construction industry professionals' job satisfaction is negatively correlated with their turnover intention.*

2.3 The moderating role of Demographic Factors (DF)

Existing studies indicated that demographic factors are strongly correlated with job satisfaction and turnover intention (e.g., Dodanwala and Santoso, 2022; Kebede and Fikire, 2022; Petty et al., 2005). For instance, Wocke and Heymann (2012) found that age, gender, and level of education are significant demographic factors influencing voluntary turnover intentions in South Africa. In the construction industry, a few studies explored how demographic factors influence employees' job satisfaction and turnover intention. Among them, Beyene and Gituma (2017) found that age and working experience were significantly correlated with the job satisfaction among construction

employees in Africa. Lian and Ling (2018) explored the influence of personal characteristics on quantity surveyors' job satisfaction in Singapore, and found that married, older, and more experienced employees are more dissatisfied with their workload and working hours. Dodanwala and Santoso (2022) examined the relationship between job satisfaction and turnover intention among construction project professionals in Sri Lanka, using gender, age, education background, and years of working experience as control variables. Jiang and Li (2022) investigated the mechanisms of person-environment fit on turnover intention among construction project managers considering the different personal traits of gender, age, educational background, years of working experience and position. Xie et al. (2022) explored the influence of psychosocial safety climate on intent to stay using job satisfaction as the intermediary among construction workers with different characteristics of gender, age, marital status, type of work, education level, and years of experience. In addition, construction professionals working for contractors reported a higher level of burnout than those working for clients or consulting organizations (Yip and Rowlinson, 2009), and burnout is a strong predictor of job satisfaction and turnover intention (Lingard, 2003; Yang et al., 2017; Heidari et al., 2022). Hence, professionals working for different type of organizations might have different levels of job satisfaction and turnover intention. Drawing upon extensive literature review results, seven demographic factors were identified for investigation, namely gender, age, education background, marital status, years of working experience, type of organizations working for, and position. These factors were selected based on their significant influences on job satisfaction and turnover intention within the construction industry. As a result, the following hypothesis is developed:

H9: Demographic factors have moderating effects between construction industry professionals' job satisfaction and their turnover intention.

Figure 1 shows the hypothesis model of the relationships between job satisfaction, turnover intention, and demographic factors among professionals in the construction industry.

<Place Figure 1 here>

3. Research Methodology

Based on an extensive literature review, a questionnaire survey was used to collect empirical data for further analysis to obtain the results, including mean score analysis, correlation analysis, and structural equation modelling (SEM) using Statistical Package for Social Science (SPSS) 24.0. Mean score analysis was employed to ascertain the relative importance of each job satisfaction dimension, overall job satisfaction, and overall turnover intention among professionals in the construction industry. Spearman's rank correlation analysis was employed to explore the relationship between turnover intention, job satisfaction and demographic variables. SEM analysis was used to further determine the impact of job satisfaction on turnover intention considering the moderating effect of individual demographic factors. These techniques have been extensively adopted in the construction management domain to reveal complex relationships across diverse variables (e.g., Ling et al., 2018; Ni et al., 2020).

The questionnaire included three sections. The first section sought to collect the demographic information of the respondents, which was also used to analyze their moderating effects between job satisfaction and turnover intention. The second and third sections measured respondents' job

satisfaction (26 questions) and turnover intention (four questions), respectively, using a five-point Likert scale in which 1 = strongly disagree, 3 = neutral, and 5 = strongly agree. Based on extensive literature review results of this study, the job satisfaction of the professionals was measured using a scale with seven dimensions. The questions under each dimension was designed according to the classical Minnesota Satisfaction Questionnaire (Weiss et al., 1967), Job Satisfaction Survey (Spector, 1985), and Job Descriptive Index (Smith et al., 1989). In addition, the relevance of these questions with the construction industry was also considered. For instance, four questions were included in the job salary and benefit (JSB) dimension, and two of the sample questions are: "(1) I am satisfied with my salary level in the company", and "(2) I am satisfied with the benefits and welfare provided by the company". Similarly, five questions were included in the job-related factors (JRF) dimension, and four questions in the training and career development (TCD) dimension. For the remaining four dimensions, including interpersonal relationship (IR), leadership and management (LM), work environment (WE), and work-family conflict (WFC), each had three questions. Finally, one additional question was incorporated in the scale to measure the respondents' overall job satisfaction level. As to the evaluation of turnover intention for the professionals, the measurement scale was designed according to Hom et al. (1984). One of the sample questions is "(1) I often consider leaving my current job".

Due to the outbreak of the COVID-19 pandemic, the questionnaire survey was administered adopting both face-to-face and online methods. A non-probability sampling technique, including purposive sampling and snowball sampling methods, was employed to collect data from the professionals working in the Chinese construction industry, which has been frequently used in the construction management research field (Zhang et al., 2023b). In order to gather comprehensive

viewpoints, special attention was paid to obtain the data from different types of participants with various personal characteristics, including gender, age, education background, marital status, years of working experience, type of organizations working for, and position. Participants were identified and approached through the networks of the research team. In this process, the research team contacted different types of professionals and invited them to complete the survey. They were also suggested to forward the survey link to their colleagues in their departments to participate in the investigation. The number of potential respondents reached is not available as the investigation was primarily conducted through online medium of Questionnaire Star (*Wenjuanxing* in Chinese), which is a popular tool conducting survey investigation in China.

Following Chan et al. (2010) and Zhang et al. (2022), several strategies were used to avoid the common method bias problem. First, in terms of the survey design, the questions were placed in a random order, vague terms were removed through rigorous pilot survey process as mentioned above, and the anonymity and confidentiality of the respondents were assured. Second, to ensure methodical separation, the questionnaire survey was conducted at different times in different locations utilizing both face-to-face and online survey media. Third, the research team paid special attention to invite professionals with different backgrounds participating the survey, which is critical to obtain high-quality data from diverse sources.

Ethical issue was considered in the questionnaire survey process. The purpose of the research was articulated at the front of the questionnaire, emphasizing that the data would be used exclusively for this study. The participants were also assured that the investigation was voluntary and anonymous, and their personal information would be confidential. Finally, the

questionnaire was presented to a review committee for comment and approval before formal investigation.

The formal survey investigation was conducted from January to September in 2020. A total of 494 questionnaires were received, including 15 and 479 responses from the face-to-face investigation and the online survey, respectively. After data screening, 449 valid questionnaires were obtained which included 9 and 440 responses from the face-to-face investigation and the online survey, respectively. Table 1 shows the profile of participants' demographic information.

<Place Table 1 here>

4. Results

4.1 Data reliability and validity test

Cronbach's alpha was employed to test the reliability of the survey data. The values of Cronbach's alpha for the scales of job satisfaction and turnover intention are 0.938 and 0.913, respectively. They are above the threshold of 0.7, representing good internal consistency reliability (Hair et al., 2010). In addition, the KMO test results for job satisfaction and turnover intention are 0.947 and 0.829, respectively, exceeding the acceptable threshold of 0.5. The Bartlett's tests of sphericity result for the two variables (0.00) are lower than 0.05, meaning a good strength of relationship among the variables. These results suggest that the validity of the survey is acceptable and suitable for further analysis (Hair et al., 2010; Chen et al., 2012).

4.2 Descriptive statistical analysis

The analysis results for mean values, standard deviations (SD), and correlations among variables are shown in Table 2. It indicates the overall job satisfaction and turnover intention of the respondents are at a moderate level (3.36 and 2.75, respectively). The results demonstrate that generally, professionals in the Chinese construction industry have a slightly high level of job satisfaction, but they have a slightly low level of turnover intention in the special period of the COVID-19 pandemic outbreak. Although the pandemic had serious impacts on the Chinese construction industry during the survey period, the measures undertaken by the government in China were effective in ensuring the safety of the professionals working in the industry (Duan et al., 2023), which is helpful to improve their sense of job security and satisfaction. Research also indicated that job satisfaction and turnover intention are negatively correlated (Wang et al., 2020; Abd-Ellatif et al., 2021), hence, higher level of job satisfaction facilitates to reducing the level of turnover intention. In addition, due to the serious negative impacts of the pandemic, organizations in the construction industry also encountered difficulties such as financial problems and site shutdowns (Chih et al., 2022). This resulted in less job opportunities in the industry and decreased expectations of changing the job among the professionals, leading to relatively lower turnover intention level. Among the seven dimensions of job satisfaction, respondents are most satisfied with *interpersonal relationship* (3.93), followed by *leadership and management* (3.72), and *work-family conflict* (3.29). In contrast, *salary and benefit* (2.84) was perceived as the least satisfied factor among the professionals in the Chinese construction industry.

In order to evaluate the relationship between turnover intention and job satisfaction, a Spearman's rank correlation analysis was conducted. As shown in Table 2, there is a significantly

negative correlation between overall job satisfaction and turnover intention (-.679). Among the seven dimensions of job satisfaction, JSB ($r = -.639^{**}$, $P < 0.01$) has the most significantly negative correlation with turnover intention, followed by TCD ($r= -.610^{**}$, $p < 0.01$), IR ($r = -.542^{**}$, $p < 0.01$), LM ($r = -.538^{**}$, $p < 0.01$), WE ($r = -.482^{**}$, $p < 0.01$), WFC ($r = -.437^{**}$, $p < 0.01$), and JRF ($r =-.379^{**}$, $p < 0.01$). In addition, the seven dimensions of job satisfaction all have significantly positive correlations with overall job satisfaction.

In terms of demographic factors, the results indicate that gender and education have no significant correlation with turnover intention. In contrast, marital status (-.256, $p < 0.01$), age (-.243, $p < 0.01$), years of working experience (-.210, $p < 0.01$), and position (-.177, $p < 0.01$) are significantly negatively correlated with turnover intention. In addition, age (.161, $p < 0.01$), marital status (.134, $p < 0.01$), and years of working experience (.115, $p < 0.01$) are significantly positively correlated with job satisfaction.

<Place Table 2 here>

4.3 SEM analysis

SEM is a multivariate statistical analysis technique comprising two types of models including the measurement model for confirmatory factor analysis and the structural model for path or regression analysis (Chen et al., 2012). The measurement model examines how well observed variables evaluate latent variables and determines their validity and reliability, while the structural model develops the relationship among latent variables (Molenaar et al., 2000). Model evaluation is a systematic process of measuring the strength of the quantified model based

on the goodness-of-fit (GoF) measurement indices. Various GoF indicators and recommended thresholds can evaluate the appropriateness of a model from different aspects (Chen et al., 2012; Gadisa and Zhou, 2020). The $\chi 2/df$ (degrees of freedom) index compares the covariance matrix of the measurement model and the covariance matrix of empirical data, and it is acceptable if the value is between 1 and 3. The root-mean-squared error of approximation (RMSEA) measures the discrepancy between the hypothesized model and the actual data, the lower values the better fit (with a threshold value of 0.08) (Wang et al., 2021). In addition, the values of the normal fit index (NFI), comparative fit index (CFI), incremental fit index (IFI), and goodness-of-fit index (GFI) are between 0 and 1, where the value closing to 0 means the poorest model while closing to 1 indicates the perfect model. The commonly acceptable threshold value for these indices is 0.8 (Chen et al., 2012).

Because the model fit indices indicated that the evaluation outcome for the preliminary model was not satisfactory ($\chi 2/df = 3.224 > 3$ and GoF index $= 0.792 < 0.8$) (see Table 3), model modification was further conducted. The approach employed in this study to refine the model involved introducing causal relationships among variables, as suggested by Chen et al. (2012). Based on the modified index (MI) values in descending order, the covariant relationships between error items were determined, and the residual correlations between them were then elevated. This step was taken to improve the model's fit and accuracy in exploring the underlying data relationships. Notably, the MI value for the residual variables between e37 (JRF) and e43 (WFC) was 83.768, the highest among all residual values. Hence, the model was reconstructed by establishing correlations between these two variables. After the first modification, the $\chi 2/df$ of the structural equation model still exceeded 3, requiring further adjustments. Given the MI value for

the residual variables between e2 (JRF2) and e4 (JRF4) is 62.061, which also ranked highest among all residual values, the correlations between them were further introduced in the model. After two rounds of modification, the hypothetical model met the thresholds of GOF measurement indices as mentioned above (Molwus et al., 2017). The results of GoF measurement indices for the two-step model adjustment are shown in Table 3.

<Place Table 3 here>

The final structural model of job satisfaction and turnover intention is presented in Figure 2.

<Place Figure 2 here>

The structural model (Figure 2) and standardised path coefficients of the model produce the following hypotheses testing results:

(1) The overall job satisfaction has a significantly negative effect on turnover intention among professionals in the Chinese construction industry (path coefficient of JS → TI = -0.687, correlation is significant at 0.001 level, two-tailed), supporting H8.

(2) Among the seven dimensions of job satisfaction, six of them have significantly positive correlations with the overall job satisfaction, namely LM (path coefficient = 0.92), TCD (0.91), IR (0.88), JSB (0.84), JRF (0.74), and WFC (0.72) (all the correlations are significant at 0.001 level, two-tailed), supporting H5, H4, H3, H2, H1, and H7, respectively.

(3) The hypothesized positive relationship between WE and JS is not significant (path coefficient = 0.190), hence H6 is not supported.

(4) The hypothesized moderating effect of DF between JS and TI is not significant (path coefficient of JS → DF = 0.063, path coefficient of DF → TI = 0.004). As a result, H9 is not supported.

5. Discussion

5.1 The levels of job satisfaction and turnover intention

Table 2 reveals that the professionals working in the Chinese construction industry have a slightly high level of overall job satisfaction (mean score = 3.36). In contrast, Heidari et al. (2022) revealed that the majority of surveyed nurses (75.7%) had a low level of job satisfaction working in COVID-19 wards in Iran. But the result of this study is consistent with the job satisfaction of employees in some other industries, such as social workers and academic staff (Liu et al., 2023; Rashidin et al., 2020). For example, Rashidin et al. (2020) reported a moderate level of job satisfaction among Chinese university faculty employees. This means that although the working environments of the construction industry are tough with high levels of job stress and demanding workloads, the professionals have slightly better job satisfaction levels compared to other industries. However, these findings are in contrast with Nie et al. (2019) and Zhang et al. (2019), who claimed that Chinese employees generally have a relatively low level of job satisfaction. The reason for the job satisfaction being at a moderate level instead of a high level might be due to the outbreak of the COVID-19 pandemic, specifically the social distance policy, and the fact that professionals work in harsher working environments, and have fewer opportunities for training and career development.

Among the seven dimensions, professionals in the Chinese construction industry are most satisfied with *interpersonal relationships* and *leadership and management*. This supports that the Chinese Confucian-based work ethics of compliance, hard work, and personal networks (i.e., *guanxi* in Chinese) may help professionals adapt more easily to the work environment and foster positive relationships with their leaders (Zhang et al., 2019). On the contrary, professionals have the lowest level of satisfaction with *job salary and benefit* and *job-related factors*. In fact, the professionals in the Chinese construction industry have significantly lower levels of job salary and benefit compared to their counterparts in developed countries, although they have higher levels of job workload and longer working time. For instance, the peak hourly wage for construction laborers in China was $18, which accounted for only 21.2% of their counterparts in the US in 2019, with an hourly wage of $85 (Statista Research Department, 2023). However, Zhang et al. (2023b) revealed that majority of the designers in China worked about 70 hours per week, which is significantly longer than the construction professionals work between 51 and 55 hours per week in Australia (Lingard et al., 2012). Further analysis indicated that major job-related factors leading to lower job satisfaction among professionals in the Chinese construction industry are job content (JRF5), workload (JRF4), and job stress (JRF3). For the majority of professionals working in the industry, their job content is site-based with demanding workload and the working environments are generally harsh and stressful, such as extremely high or low temperatures, large amounts of dust, uncomfortable noise and various safety hazards (Liang et al., 2021).

The results also indicate that turnover intention is at a moderate level (mean score = 2.75), slightly below the midpoint of the five-point Likert scale. As mentioned before, due to the influence of the COVID-19 pandemic, employees have fewer job opportunities to change their job

as enterprises also experience difficulties in terms of business growth (Rokooei et al., 2022). This might explain why the surveyed professionals have a low level of turnover intention. This finding also aligns with Liu et al. (2020), who revealed that turnover intention level is 2.76 among construction workers in China. However, Mehra et al. (2024) reported that a significant proportion (43.7%) of nurses have the intention to leave the profession in India because of the fear and uncertainty of the COVID-19 pandemic. Wang et al. (2020) highlighted that there is a notable regional variation of turnover intention among project management personnel in China, as they found higher turnover intention in Shenzhen, one of the most developed cities in China, compared to other cities in the southeast areas of China.

5.2 The underlying factors influencing job satisfaction on turnover intention

In line with previous studies (e.g., Chih et al., 2018; Chung et al., 2017; Dodanwala and Santoso, 2022), the SEM analysis results indicate that overall job satisfaction is significantly negatively correlated with turnover intention among professionals in the Chinese construction industry. Dodanwala and Santoso (2021) also claimed that overall job satisfaction is a major and negative factor in predicting employees' intent to quit their jobs. In addition, Abd-Ellatif et al. (2021) revealed that fear of COVID-19 is negatively related to job satisfaction while positively associated with turnover intention, and job satisfaction is negatively correlated with turnover intention among Egyptian physicians. The underlying factors influencing job satisfaction and turnover intention are discussed below.

Among the seven job satisfaction dimensions, *leadership and management* has the most significant positive effect on job satisfaction (path coefficient = 0.919). Hence, the first critical

path affecting turnover intention from the perspective of job satisfaction can be derived: LM (leadership and management) → JS (job satisfaction) → TI (turnover intention). The finding aligns with Randeree and Chaudhry (2012), who reported that more than 50% of surveyed participants highlight the pivotal role of management leadership style in shaping job satisfaction. Leadership and management that focus on clear communication, fairness, and well-being can make professionals in the construction industry feel valued and engaged in an organisation. Chih et al. (2018) revealed that the combined effects of supportive leadership and leaders' charismatic vision can significantly enhance job satisfaction and diminish turnover intention among construction workers. Ali et al. (2020) also concluded that a shared leadership style fosters the creativity of individuals and teams in construction management, subsequently enhancing employees' trust and organizational commitment. Previous research also indicated that organizational commitment exerts a crucial role in improving job satisfaction and reducing turnover intention (Ayodele et al., 2020; Wang et al., 2020).

Interpersonal relationship also exerts a significant impact on job satisfaction (path coefficient = 0.883), meaning that interpersonal relationships are another underlying factor affecting turnover intention among professionals in the construction industry. Oladunmoye (2017) claimed that interpersonal relationship can influence employees' work-related attitudes and job satisfaction, which serves as a significant predictor of turnover intention. In fact, satisfaction in relations with superiors and subordinates creates a prominent influence on job satisfaction. When professionals in the construction industry receive prompt help from their superiors, it fosters a sense of being supported, consequently enhancing their psychological resilience to manage occupational stress (Liu et al., 2020). In addition, when subordinates are competent and are motivated to collaborate

with their colleagues, the superiors can develop a sense of accomplishment which increases their self-esteem and confidence, thereby facilitating job satisfaction (Mishra and Ghosh, 2020), which is also effective in reducing turnover intention.

The SEM analysis also reveals a significant and positive impact of *training and career development* on job satisfaction (path coefficient = 0.910), indicating another critical path affecting turnover intention through job satisfaction: TCD (training and career development)→JS (job satisfaction)→TI (turnover intention). This result is in contrast with Ling et al. (2018), who found that HRM practices such as employee training have no significant correlation with job satisfaction, while promotion opportunities are significantly related to job satisfaction. With the rapid application of digital technologies (e.g., building information modelling) in the Chinese construction industry, there is a growing demand for education and training to equip professionals with the skills required to adapt to new working environments. In this regard, younger professionals show a particular preference for organizations that offer extensive training opportunities, as it enhances their competitiveness and job security from the beginning of their careers (Dodanwala and Santoso, 2022; Turner and Lingard, 2016). However, Ling et al. (2018) highlighted that excessive and ineffective training may cause dissatisfaction among construction professionals, since this increases their accumulated tasks during their absence for training and requires overtime work to catch up with the progress after returning to their regular responsibilities.

Job salary and benefit is another predictor for turnover intention as it has a significantly positive relationship with job satisfaction (path coefficient = 0.840), which is consistent with Ling et al. (2018) and Ni et al. (2022). Within this dimension, JSB1 (salary level), JSB2 (organizational

welfare), and JSB3 (salary adjustment frequency) have the most significant influence on job satisfaction, with path coefficient values of 0.899, 0.886, and 0.876, respectively. In contrast, JSB4 (discrepancy between effort and rewards, path coefficient = 0.469) has the least influence on job satisfaction, which contrasts with existing research suggesting that construction employees are typically dissatisfied with the mismatch between the physically demanding nature of construction work and the reward they receive (Dodanwala and Santoso, 2022). Hence, to increase the job satisfaction and retention intention of professionals in the construction industry, organizations should provide generous salaries and implement incentive strategies such as rewarding with performance-based bonuses, project on-time or earlier completion bonuses, and overtime work compensation (Smith et al., 2004).

The SEM analysis results also demonstrated two more paths in which other underlying job satisfaction factors affect turnover intention, including JRF (job-related factors) → JS (job satisfaction)→TI (turnover intention) and WFC (work-family conflict)→JS (job satisfaction)→TI (turnover intention). In terms of *job-related factors*, Lim and Ling (2012) observed that construction professionals experiencing overwork often demonstrate reduced job satisfaction and organizational commitment, resulting in increased rates of absenteeism and turnover. Furthermore, Ling and Ho (2013) highlighted that extended working hours and the presence of job-related stress significantly impact the job satisfaction of young adults, which serve as substantial barriers discouraging them from pursuing careers in the construction industry. As to *work-family conflict*, professionals with greater family responsibilities may experience elevated susceptibility to work-family conflict, leading to increased stress and decreased job satisfaction (Lian and Ling, 2018).

Finally, it is unexpected that *work environment* is not a significant factor leading to turnover intention through the effect of job satisfaction. In contrast, Ni et al. (2022) indicated that poor working environments have a negative impact on job satisfaction among a new generation of construction workers in China. Existing research further revealed that a mismatch between the actual work environment and employees' subjective perceptions of the work environment can lead to job stress, ultimately resulting in decreased job satisfaction and increased turnover intention (Chen et al., 2017; Guinot et al., 2014).

5.3 The moderating effect of demographics on the relationship between job satisfaction and turnover intention

The SEM analysis results demonstrated that the moderating effect of demographic factors on job satisfaction and turnover intention is not significant. However, correlation analysis results indicated that marital status, age, years of working experience, and position all have strongly negative relationships with turnover intention, while age, marital status, and years of working experience have significantly positive relationships with job satisfaction. This means that with increasing age and years of working experience, female professionals in the Chinese construction industry tend to have a higher level of job satisfaction while a lower level of turnover intention. In fact, the effect of demographics on job satisfaction and turnover intention is not conclusive in existing research. For instance, a few studies revealed that the correlation between job satisfaction and demographic factors such as age, work experience, position, and marital status is significant in the construction industry (e.g., Beyene and Gituma, 2017; Lian and Ling, 2018). While other results indicated that demographic factors

are not significant predictors of job satisfaction (Dabke et al., 2008; Petty et al., 2005). In addition, Wocke and Heymann (2012) also found that demographic factors are significantly correlated with employees' turnover intention.

6. Conclusion

Existing research has ascertained the pivotal role of job satisfaction in shaping employees' turnover intention. However, the underlying mechanisms linking underlying factors of job satisfaction to turnover intention remain under-explored, particularly within the context of the Chinese construction industry during the outbreak of the COVID-19 pandemic. Through a survey of 449 professionals in the Chinese construction industry together with descriptive and SEM analyses, the following main findings are obtained.

First, although the COVID-19 pandemic has produced seriously difficult times for the Chinese construction industry and the employees working in the industry, the surveyed professionals generally have a slightly high level of job satisfaction while a slightly low level of turnover intention. In addition, they are most satisfied with the *interpersonal relationship* and *leadership and management*, while are most dissatisfied with *job-related factors* and *salary and benefit*. Second, job satisfaction has significantly negative influences on turnover intention, with the most critical underlying factors related to *leadership and management*, *training and career development*, and *interpersonal relationship*. This result might explain why the professionals in the Chinese construction industry in this special period have a moderate level of turnover intention even though the working environments are harsh with demanding workloads and frequent social distance requirements, as they are most satisfied with *interpersonal relationship* and *leadership*

and management. Third, although demographic factors do not exert a significant moderating effect between job satisfaction and turnover intention, professionals with different ages, marital status, and years of working experience may have significantly different levels of job satisfaction and turnover intention.

The findings reported in this paper have significantly practical implications. This research contributes to a better understanding of how turnover intention is developed through the influence of underlying job satisfaction factors among professionals working in the Chinese construction industry in the context of the COVID-19 pandemic outbreak period. To mitigate turnover intention, it is imperative to implement targeted strategies aimed at cultivating employee job satisfaction from a multifaceted perspective. Organizations and employers in the construction industry should place prior emphasis on developing appropriate and effective leadership and management strategies, articulating effective training and career development programs, and creating a climate facilitating the cultivation of positive interpersonal relationships to enhance job satisfaction. This can help reduce the turnover intention of employees more effectively to achieve sustainable development for organizations in the Chinese construction industry. In addition, to enhance the job satisfaction of professionals working in the Chinese construction industry, it is necessary to improve their job salary and benefit while reducing the negative influences of job-related factors such as demanding workloads and long working hours. Finally, organizational human resources management policies should be tailor-made considering different personal traits of professionals, specifically in terms of age, marital status, and years of working experience, to more effectively improve their job satisfaction and reduce turnover intention.

7. Limitation and future research directions

Some limitations in this study should be mentioned which also become important future research directions. First, the results cannot be generalized to the broader professional populations in the Chinese construction industry, since the empirical data was collected in Jiangsu province, which has the largest volume of added value of construction among all the provinces and is one of the most developed areas in China. Further investigation into the professionals in other areas of the Chinese construction industry is necessary to complement the results. Second, similar to other research, job satisfaction and turnover intention were mainly measured through self-report surveys, and in turn the actual situation might be different from the viewpoints collected. Other research methods (e.g., longitudinal observation, qualitative interview study) can be employed to further triangulate the research results in the future. Third, as the serious COVID-19 pandemic has disappeared globally, it is therefore valuable to conduct comparative research in two scenarios of with and without the influences of pandemic, which is critical to further determine the impact of pandemic on the job satisfaction and turnover intention among professionals in the construction industry.

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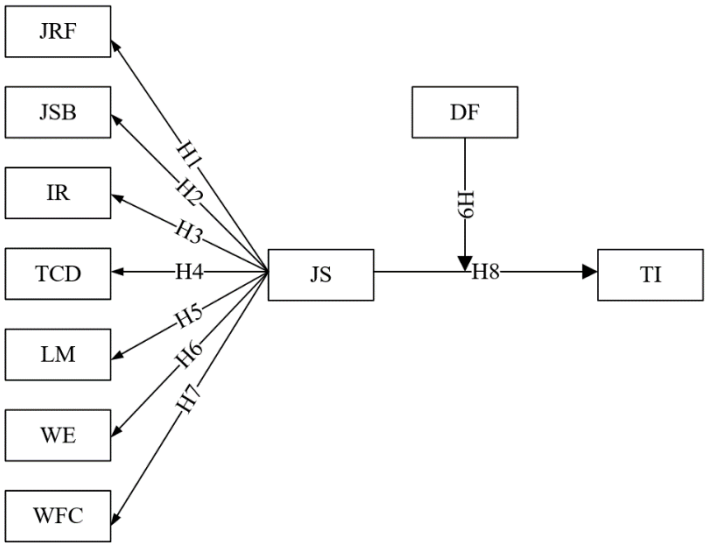

Figure 1 The hypothesis model

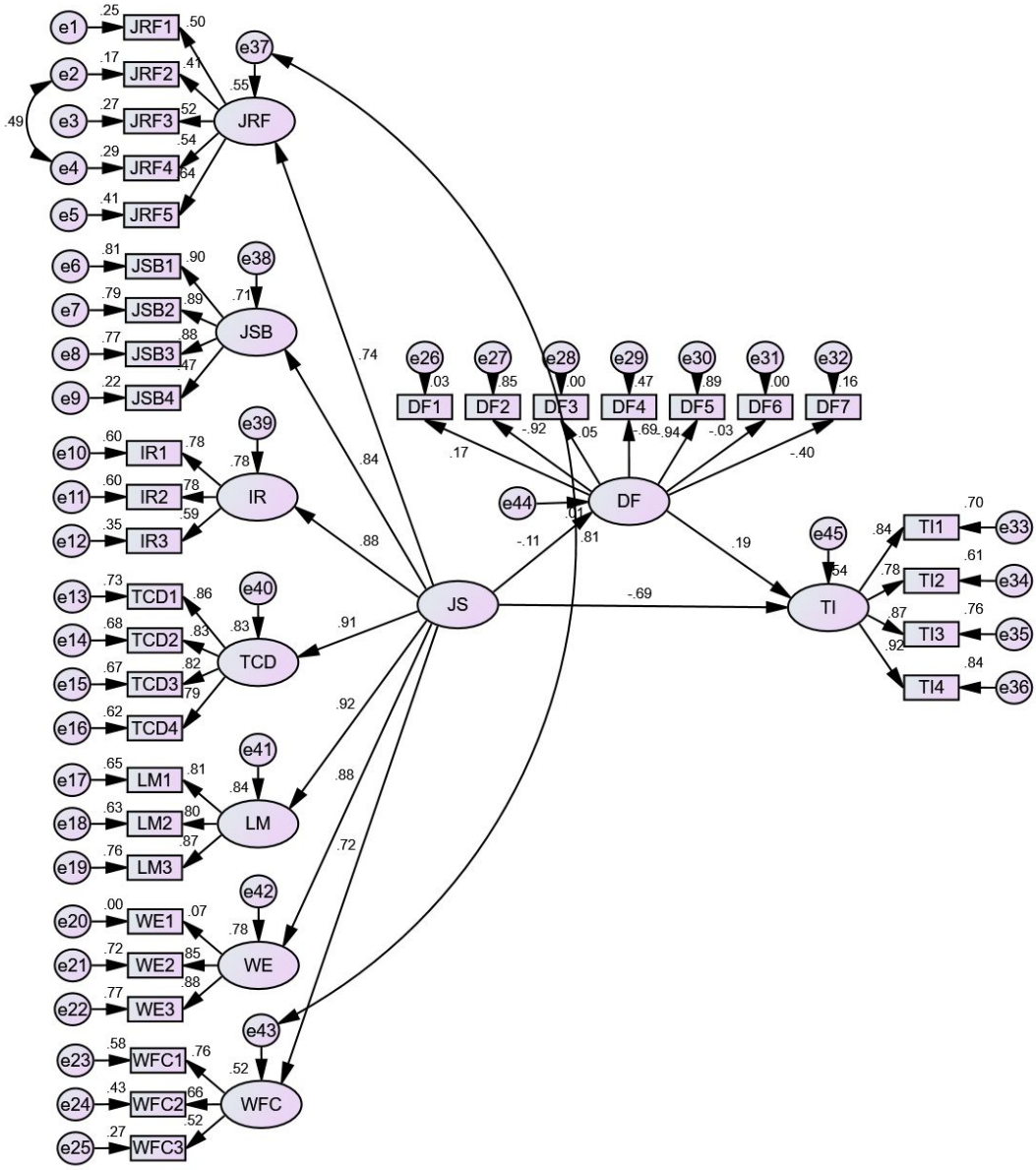

Figure 2 The final structural model of job satisfaction and turnover intention

Table 1 Demographic information of the respondents

Profile	Classification	Percentage
Gender	Male	84.41%
	Female	15.59%
Education	College degree and below	32.29%
	Bachelor's degree	59.47%
	Master's degree and above	3.79%
	Others	4.45%
Position	Non-management employees	62.58%
	Department/Professional leader	32.52%
	Top managers	2.67%
	Others	2.23%
Type of organizations working for	Client	4.23%
	Construction enterprise	63.47%
	Design company	2.23%
	Supervision company (*Jianli* in Chinese)	25.39%
	Engineering consulting firm	2.00%
	Others	2.68%
Marital status	Unmarried	33.18%
	Married	66.82%
Age	<=20 year old	0.67%
	21-30 year old	43.43%
	31-40 year old	32.52%
	41-50 year old	16.48%
	>=50 year old	6.90%
Years of working experience in the construction industry	<=5 year	34.07%
	6-10 years	24.50%
	11-15 years	14.48%
	16-20 years	12.25%
	>=20 years	14.70%

Table 2 Mean values, standard deviations, and correlations of variables

Variable	Mean values	SD	Correlation													
			Gender	Age	Education	Marital	Years	Type	Position	JRF	JSB	IR	TCD	LM	WE	WFC	JS
Gender	1.16	0.363															
Age	2.86	0.940	-.123**														
Education	1.80	0.708	.180**	-0.016													
Marital	1.67	0.471	-.206**	.622**	-0.055												
Years	2.49	1.436	-.164**	.868**	-0.055	.646**											
Type	2.65	1.124	.110*	0.05	-0.001	-0.078	0.041										
Position	1.45	0.660	-0.048	.378**	-0.009	.304**	.365**	-0.009									
JRF	2.99	0.823	.160**	0.035	0.015	-0.036	-0.025	.127**	0.028								
JSB	2.84	1.020	0.039	.105*	-0.028	.112*	0.062	-0.042	.105*	.504**							
IR	3.93	0.806	-0.072	.160**	0.031	.187**	.153**	-0.005	0.081	.412**	.533**						
TCD	3.25	1.041	-0.025	0.054	0.024	0.092	0.035	0.027	0.049	.417**	.709**	.644**					
LM	3.72	0.969	-0.049	0.084	0.021	.113*	0.032	0.066	0.024	.387**	.613**	.707**	.761**				
WE	3.12	0.870	.182**	0.014	0.048	-0.008	-0.066	-0.006	0.029	.511**	.549**	.489**	.546**	.543**			
WFC	3.29	0.9578	.130**	.197**	-0.009	0.038	.148**	.139**	0.041	.594**	.478**	.474**	.451**	.478**	.569**		
JS	3.36	1.113	-0.001	.161**	0.024	.134**	.115*	0.008	.113*	.535**	.711**	.651**	.718**	.668**	.579**	.570**	
TI	2.75	1.141	0.08	-.243**	0.037	-.256**	-.210**	.111*	-.177**	-.379**	-.639**	-.542**	-.610**	-.538**	-.482**	-.437**	-.679**

Note: ** means that the correlation is significant at 0.01 level (two-tailed); * means that correlation is significant at 0.05 level (two-tailed).

Table 3 Results of GoF measurement indices for the two-step model adjustment

Goodness-of-fit (GOF) measurement index	Recommended level of GOF measure	Preliminary model	Adjusted model	Final model
$\chi 2/df$	Recommended level from 1 to 3	3.224	3.071	2.912
RMSEA	< 0.08	0.070	0.068	0.065
NFI	0 (No fit) to 1 (Perfect fit)	0.816	0.825	0.834
CFI	0 (No fit) to 1 (Perfect fit)	0.864	0.874	0.884
IFI	0 (No fit) to 1 (Perfect fit)	0.865	0.875	0.884
GFI	0 (No fit) to 1 (Perfect fit)	0.792	0.805	0.816

Exploring the impact of job satisfaction on turnover intention among professionals in the construction industry

Purpose - Turnover intention is a critical predictor of an employee's turnover behaviour. A high level of turnover rate significantly affects the productivity and morale of an enterprise. Previous research has indicated that job satisfaction plays a critical role in influencing an employee's turnover intention, but the underlying factors related to job satisfaction remain under-explored, which impedes the development of effective strategies for reducing turnover intention. In addition, little research examined job satisfaction and turnover intention in the context of the COVID-19 pandemic, specifically in the Chinese construction industry. This study aimed to investigate the impact of job satisfaction on turnover intention among professionals in the construction industry.

Design/methodology/approach - A questionnaire survey was employed to collect viewpoints from 449 professionals in the Chinese construction industry, followed by descriptive analysis, correlation analysis and structural equation modelling analysis to derive results._–

Findings - The findings indicate that professionals in the industry generally have a slightly high level of job satisfaction while a slightly low level of turnover intention in the special period of the pandemic outbreak. *Leadership and management*, *training and career development*, and *interpersonal relationship* are critical underlying factors leading to their turnover intention. Although demographic factors have no moderating effect between job satisfaction and turnover intention, among them, *age*, *marital status*, and *years of working experience* have strongly positive relationships with job satisfaction while significantly negative relationships with turnover intention.

Originality/value - The findings provide valuable insights to fully understand the critical factors leading to turnover intention from the perspective of job satisfaction, which is helpful in developing effective measures to address the turnover problems for enterprises in the Chinese construction industry and those industries with similar characteristics in other regions.

Keywords: Job satisfaction; Turnover intention; Professional; China

1. Introduction

Employee turnover is defined as the voluntary termination of employment with an employer, which has become a significant concern in the global construction industry (Ayodele et al., 2020; Chih et al., 2016). Due to the high-risk, complex, and temporary nature of the construction industry, turnover can lead to substantial cost implications and decreased productivity for enterprises in the construction industry, as well as frustration and a lack of morale among professionals (Chih et al., 2016; Nauman et al., 2021). The Chinese construction industry is one of the largest construction markets globally, accounting for approximately 20% of all construction investment worldwide (Mordor Intelligence, 2023). In 2021, the number of employees working in the industry reached 81.8 million, ranking second among all the industries (NBS, 2022). Facilitated by the initiatives of the 14th Five-Year Plan (2021-2025), the Chinese construction industry is planned to achieve an average annual growth rate of 4.4% between 2024 and 2027, with an estimated investment exceeding $13 trillion by 2030 (Research and Markets, 2023; Mordor Intelligence, 2023). Despite its significant contribution to economic development, the Chinese construction industry is characterised by intense competition across a large number of enterprises, and it has encountered significant employee turnover problems in recent years (Sang et al., 2020). The Chinese Turnover and Compensation Survey Report showed that the turnover

rate in the real estate development sector reached 21.6% in 2021, ranking third among all the industries in China (China Daily, 2021). This might be because the construction industry has faced significant negative influences from the COVID-19 pandemic, leading to difficulties such as lockdown-induced labor shortages, construction site closures, schedule delays, and project suspensions (Wang et al., 2023). These difficulties, together with economic slowdown, elevated job stress and insecurity among professionals in the construction industry (Liang et al., 2023), which in turn reduce their job satisfaction. Nauman et al. (2021) noted that unforeseen events such as the pandemic introduce uncertainty into individuals' career development, potentially leading to turnover behavior. Notably, Liang et al. (2023) reported a substantial 95% increase in the average unemployment rate of construction workers in the United States, rising from 4.5% in 2019 to 8.7% in 2020. The relatively high turnover rate, exacerbated by the COVID-19 pandemic and subsequent organizational restructuring of enterprises in the construction industry, has led to significant talent loss and reduced productivity, hindering the sustainable development of the industry. For instance, the Gallup organization survey reported that the cost of replacing an employee can range from one-half to two times of his/her annual salary (Mcfeely and Wigert, 2019), resulting in excessive expenditures and resource wastage for enterprises. It is, therefore, imperative to investigate the antecedents leading to turnover intention (TI) among professionals in the Chinese construction industry, including designers, consultants, and construction professionals.

Job satisfaction (JS) has been widely recognized as a critical factor affecting turnover intention among professionals in the construction industry (Parker and Skitmore, 2005; Sang et al., 2009; Djastuti, 2015; Kerdngern and Thanitbenjasith, 2017; Chung et al., 2017; Wang et al., 2020).

However, existing research on the relationship between job satisfaction and turnover intention has primarily focused on overall job satisfaction, neglecting the impacts of underlying factors related to job satisfaction on turnover intention (Dodanwala and Santoso, 2022; Wang et al., 2020). Examining the influence of different job satisfaction dimensions on turnover intention contributes to a deeper understanding of the underlying causes of turnover for professionals in the construction industry, which is helpful in achieving sustainable growth for enterprises in the industry through more effective measures of turnover rate reduction. Theoretically, the findings also advance the knowledge through identifying the critical precursors of turnover intention from the perspective of job satisfaction in the domain of construction industry. Furthermore, few studies have explored the moderating effect of individual demographic factors (e.g., gender, age) on the relationship between job satisfaction and turnover intention in the construction industry. Uncovering the moderating role of demographic characteristics can help develop more targeted human resources management strategies to meet the unique needs and motivations of different types of professionals in the industry. Finally, little research has explored job satisfaction and turnover intention among professionals in the construction industries in the context of the COVID-19 pandemic. This is important as existing studies indicated that the pandemic ~~has~~ had a significant influence on the vulnerable construction industry (Duan et al., 2023), which has also resulted in a negative influence on job satisfaction and turnover intention of employees in other industries (Labrague and de los Santos, 2021). Understanding the impact of job satisfaction on turnover intention during the COVID-19 pandemic period is imperative for employers in the construction industry to develop more effective strategies in achieving talent retention and sustainable business growth under the influence of traumatic events with similar nature of the

pandemic in the future. The insight can also offer valuable theoretical insights from the construction industry for academia to compare the similarities and differences of the impacts of the pandemic on the professionals' job satisfaction and turnover intention across various industries.

In order to address this knowledge gap, using an empirical investigation in the Chinese construction industry, this paper aimed to: (1) evaluate the levels of job satisfaction and turnover intention among professionals in the construction industry; (2) assess the influence of the underlying factors related to job satisfaction on turnover intention; (3) explore the moderating effect of demographics on the relationship between job satisfaction and turnover intention.

2. Literature review and hypotheses development

2.1 Factors influencing job satisfaction

Locke (1969) defined job satisfaction as a positive or pleasant emotional reaction to an individual's job experience. It also explains the extent to which employees like (i.e., satisfaction) or dislike (i.e., dissatisfaction) their jobs (Dodanwala and Santoso, 2022). Job satisfaction can be categorized into two types: overall satisfaction and specific satisfaction (Petty et al., 2005). Specific job satisfaction is affected by various factors, including motivation, rewards, promotion opportunities, and a feeling of happiness (Wang et al., 2020). Herzberg's (1968) motivation-hygiene theory proposed that intrinsic factors, including recognition, achievement, job itself, career development and responsibility, affect the level of job satisfaction. On the other hand, extrinsic factors such as policies, supervision, salary, interpersonal relationship, and working conditions can influence job dissatisfaction (Beyene and Gituma, 2017). Kerdngern and Thanitbenjasith (2017) identified compensation, job nature, supervision, co-worker relationship

and career development opportunities as five key influential factors of job satisfaction. Sang et al. (2020) highlighted that job satisfaction among employees in the construction industry significantly correlates with career development opportunities, work environments, human resource practices, and leadership. Building upon extensive literature review results, this study uses seven-dimensional variables to measure job satisfaction among professionals in the Chinese construction industry, which were under two main types of intrinsic and extrinsic factors (Herzberg, 1968; Sang et al., 2009).

2.1.1 Job-related Factors (JRF)

Job-related factors are those related to job characteristics such as job content, working hours, and collaborations with colleagues (Hosseini et al., 2014). Job content includes the description of work scopes and the responsibilities of the individuals or project teams that help define the work (Tyssen et al., 2014). Lim and Ling (2012) found that the job satisfaction of professionals working for contractors in Singapore is closely related to the nature of their jobs and the human resources practices in their organizations. Similarly, job attributes including workload and role conflict contribute to burnout among construction workers, which in turn influences their level of job satisfaction (Lingard, 2003). Ling and Loo (2015) identified eight job-related dimensions contributing to the overall job satisfaction for construction project managers, including job security, workplace location, and social support at workplace.

2.1.2 Training and Career Development (TCD)

Effective education and training are crucial for accumulating the knowledge, skills, and expertise required by construction professionals to effectively perform a task (Lim and Ling, 2012). The structure of learning programs is critical ~~to~~ in influencing employees' learning processes, which can increase or decrease their job satisfaction (Shahbazi et al., 2019). The opportunities for professional training, promotion, and payment raise are positively correlated with job satisfaction in the construction industry (Nauman et al., 2021). Organizations without tailored training plans may hinder employees from developing a clear career path, leading to low levels of job satisfaction and high levels of turnover rates (Ayodele et al., 2020). Wang et al. (2020) also suggested that the provision of vocational mentoring and training is fundamental for improving employees' affective commitment, leading to elevated job satisfaction levels among construction professionals.

2.1.3 Job Salary and Benefit (JSB)

Improvement of job salary and benefits is considered the most explicit method for enterprises to attract, motivate, and retain competitive employees (Ryu and Jinnai, 2020). For example, Randeree and Chaudhry (2012) found that salary and other benefits significantly affect job satisfaction among construction professionals in the United Arab Emirates. Similarly, Ling and Loo (2015) identified salary as a critical factor affecting job satisfaction among construction project managers in Singapore. Lim and Ling (2012) highlighted that job benefits such as medical treatments and meal allowances are crucial for increasing job satisfaction among construction professionals. In contrast, if employees do not receive expected rewards compared to their efforts,

they may perceive a sense of unfairness and lack of reciprocity, leading to their turnover behaviour (Ayodele et al., 2020). Ho (2016) found that the majority of the young generation workers in Hong Kong do not view working in the construction industry as a preferred career choice due to their dissatisfaction with salary and benefits ~~in comparison~~compared to the physically demanding nature of the work.

2.1.4 Interpersonal Relationship (IR)

Interpersonal relationship is widely viewed as a critical extrinsic factor ~~preventing~~ influencing job satisfaction ~~while~~ and achieving employee growth (Bulinska and Bagienska, 2021; Petty et al., 2005; She, 2022). Ling and Loo (2015) highlighted that positive interpersonal relationships among construction project managers enhance their sense of belonging in the work environment, which in turn increases their job satisfaction. Guinot et al. (2014) also found that interpersonal trust, an important element of IR, has a positive effect on job satisfaction. They further argued that excessive trust may increase the possibility of opportunistic behaviour, leading to negative consequences in job satisfaction. On the other hand, interpersonal conflict among co-workers can produce detrimental impacts on construction professionals' psychological and physical health, leading to high levels of employee turnover rates (Brockman, 2014).

2.1.5 Leadership and Management (LM)

Rezvani et al. (2016) noted that project managers' emotional intelligence, a critical part of leadership, has positive impacts on project success, job satisfaction, and trust. Similarly, Randeree and Chaudhry (2012) revealed that leadership is a determinant of job satisfaction and

organizational commitment. Phua (2012) emphasized the significance of the gap between the individual's HRM (human resource management) preferences and the actual organizational HRM practices in affecting job satisfaction in construction enterprises. Chih et al. (2018) also found that supervisors' supportive leadership is positively correlated with employees' job satisfaction, which in turn increases their retention intentions in construction organizations.

2.1.6 Work Environment (WE)

Research indicated that employees' compatibility with the work environment can significantly increase their job satisfaction (Ayodele et al., 2020; Sang et al., 2020; Wang et al., 2020). The characteristics of working in the construction industry, including long-working hours, physically demanding activities, and unsafe work, tend to result in high levels of job stress and burnout among professionals, leading to job dissatisfaction and turnover intentions (Dodanwala and Santoso, 2022; Yang et al., 2017). Guinot et al. (2014) defined eustress as good stress, in which employees' knowledge and skills can cope with the work demands and pressures in the working environment, thereby facilitating their abilities to manage their physiological and psychological stresses. Nauman et al. (2021) concluded that a high level of adaptability can facilitate employees coping with high pressures in physically intensive and dynamic working environments, and in turn thereby enhancing their career satisfaction and while reducing turnover intentions in the construction sectorindustry.

Based on above literature review results, the following hypotheses are developed (see Figure 1):

H1-H6: The construction industry professionals' JRF, TCD, JSB, IR, LM, and WE are positively correlated with their job satisfaction, respectively.

2.1.7 Work-family Conflict (WFC)

Prior to data collection, a pilot survey was conducted with five professionals in the Chinese construction industry with at least five years of working experience to further validate the literature review results. The interviewees suggested that *work-family conflict* is a crucial influencing factor for job satisfaction. In fact, work-family conflict has been recognized as a vital factor affecting job satisfaction (Dodanwala and Shrestha, 2021), job stress (Zhang et al., 2023a), and turnover intention (Ayodele et al., 2020) among professionals working in the construction industry. Dodanwala and Shrestha (2021) revealed that work-family conflict arises when an employee struggles to reconcile the demands and expectations of the family due to work-related issues. This can lead to a depletion of employees' emotional resources, consequently reducing their job satisfaction. In contrast, work-family balance can mitigate the negative influences of job demands on job dissatisfaction (Ninaus et al., 2021). Hence, the following hypothesis is proposed:

H7: The construction industry professionals' work-family conflict is negatively correlated with their job satisfaction.

2.2 The relationship between job satisfaction and turnover intention

Turnover intention is defined as individuals' perceived likelihood of staying or leaving their employing organization (Nauman et al., 2021). Turnover intention is commonly used as a reliable

proxy for actual turnover as it has been recognized as the most potential predictor of turnover behaviour (Chih et al., 2018; Dodanwala and Santoso, 2022).

Previous studies indicated that overall job satisfaction is a significant and negative predictor of employees' turnover intention (Ayodele et al., 2020; Chung et al., 2017). Employees with ~~a~~ higher levels of job satisfaction tend to ~~have~~ increase their~~d~~ productivity (Halkos and Bousinakis, 2010), leading to reduced turnover intention (Dodanwala and Shrestha, 2021). According to the Conservation of Resources Theory, professionals with high levels of job satisfaction are more motivated to invest and pursue abundant resources (e.g., tenure and opportunity costs) in their human capital to meet job demands, resulting in their retention within organizations; while those who experienced resource depletion or threats tend to leave the organization through seeking other potential opportunities (Chih et al., 2018). Wang et al. (2020) also found that an increase in overall job satisfaction results in a decrease in turnover intention among construction project managers in the Chinese public sectors. Hence, a hypothesis is proposed based on the above literature results:

H8: *The construction industry professionals' job satisfaction is negatively correlated with their turnover intention.*

2.3 The moderating role of Demographic Factors (DF)

Existing studies indicated that demographic factors are strongly correlated with job satisfaction and turnover intention (e.g., Dodanwala and Santoso, 2022; Kebede and Fikire, 2022; Petty et al., 2005). For instance, Wocke and Heymann (2012) found that age, gender, and level of education are significant demographic factors influencing voluntary turnover intentions in South Africa. ~~Taylor and Earl (2016) indicated that employees aged over 55 exhibit a lower propensity for job~~

~~transitions compared to their counterparts in the 20-24 age bracket.~~ In the construction industry, a few studies explored how demographic factors influence employees' job satisfaction and turnover intention. Among them, Beyene and Gituma (2017) found that age and working experience were significantly correlated with the job satisfaction ~~African~~ among construction employees~~'~~ in Africa ~~job satisfaction~~. Lian and Ling (2018) explored the influence of personal characteristics on quantity surveyors' job satisfaction in Singapore, and found that married, older, and more experienced employees are more dissatisfied with their workload and working hours ~~in Singapore~~. Dodanwala and Santoso (2022) examined the relationship between job satisfaction and turnover intention among construction project professionals in Sri Lanka, using gender, age, education background, and years of working experience as control variables. Jiang and Li (2022) investigated the mechanisms of person-environment fit on turnover intention among construction project managers considering the different personal traits of gender, age, educational background, years of working experience and position. Xie et al. (2022) explored the influence of psychosocial safety climate on intent to stay using job satisfaction as the intermediary among construction workers with different characteristics of gender, age, marital status, type of work, education level, and years of experience. In addition, construction professionals working for contractors reported a higher level of burnout than those working for clients or consulting organizations (Yip and Rowlinson, 2009), and burnout is a strong predictor of job satisfaction and turnover intention (Lingard, 2003; Yang et al., 2017; Heidari et al., 2022). Hence, professionals working for different type of organizations might have different levels of job satisfaction and turnover intention. Drawing upon extensive literature review results, seven demographic factors were identified for investigation, namely gender, age,

education background, marital status, years of working experience, type of organizations working for, and position~~gender, education background, position, type of organization, marital status, age, and years of working experience in the construction industry~~. These factors were selected based ~~primarily~~ on their ~~proven~~ significan~~ce~~t influences on job satisfaction and turnover intention within the construction industry. As a result, the following hypothesis is developed:

H9: Demographic factors have moderating effects between construction industry professionals' job satisfaction and their turnover intention.

Figure 1 shows the hypothesis model of the relationships between job satisfaction, turnover intention, and demographic factors among professionals in the construction industry.

<Place Figure 1 here>

3. Research Methodology

Based on an extensive literature review, a questionnaire survey was used to collect empirical data for further analysis to obtain the results, including mean score analysis, correlation analysis, and structural equation modelling (SEM) using Statistical Package for Social Science (SPSS) 24.0. Mean score analysis was employed to ascertain the relative importance of each job satisfaction dimension, overall job satisfaction, and overall turnover intention among professionals in the construction industry. Spearman's rank correlation analysis was employed to explore the relationship between turnover intention, job satisfaction and demographic variables. SEM analysis was used to further determine the impact of job satisfaction on turnover intention considering the moderating effect of individual demographic factors. These techniques have been extensively

adopted in the construction management domain to reveal complex relationships across diverse variables (e.g., Ling et al., 2018; Ni et al., 2020).

The questionnaire included three sections. The first section sought to collect the demographic information of the respondents, which was also used to analyze their moderating effects between job satisfaction and turnover intention. The second and third sections measured respondents' job satisfaction (26 questions) and turnover intention (four questions~~, which were designed according to Hom et al., 1984~~), respectively, using a five-point Likert scale in which 1 = strongly disagree, 3 = neutral, and 5 = strongly agree. Based on extensive literature review results of this study, the job satisfaction of the professionals was measured using a scale with seven dimensions. The questions under each dimension was designed according to the classical Minnesota Satisfaction Questionnaire (Weiss et al., 1967), Job Satisfaction Survey (Spector, 1985), and Job Descriptive Index (Smith et al., 1989). In addition, the relevance of these questions with the construction industry was also considered. For instance, four questions were included in the job salary and benefit (JSB) dimension, and two of the sample questions are: "(1) I am satisfied with my salary level in the company", and "(2) I am satisfied with the benefits and welfare provided by the company". Similarly, five questions were included in the job-related factors (JRF) dimension, and four questions in the training and career development (TCD) dimension. For the remaining four dimensions, including interpersonal relationship (IR), leadership and management (LM), work environment (WE), and work-family conflict (WFC), each had three questions. Finally, one additional question was incorporated in the scale to measure the respondents' overall job satisfaction level. As to the evaluation of turnover intention for the professionals, the measurement

scale was designed according to Hom et al. (1984). One of the sample questions is "(1) I often consider leaving my current job".

Due to the outbreak of the COVID-19 pandemic, the questionnaire survey was administered adopting both face-to-face and online methods. A non-probability sampling technique, including purposive sampling and snowball sampling methods, was employed to collect data from the professionals working in the Chinese construction industry, which has been frequently used in the construction management research field (Zhang et al., 2023b). In order to gather comprehensive viewpoints, special attention was paid to obtain the data from different types of participants with various personal characteristics, including gender, age, education background, marital status, years of working experience, type of organizations working for, and position. Participants were identified and approached through the networks of the research team. In this process, the research team contacted different types of professionals and invited them to complete the survey. They were also suggested to forward the survey link to their colleagues in their departments to participate in the investigation. The number of potential respondents reached is not available as the investigation was primarily conducted through online medium of Questionnaire Star (*Wenjuanxing* in Chinese), which is a popular tool conducting survey investigation in China.

Following Chan et al. (2010) and Zhang et al. (2022), several strategies were used to avoid the common method bias problem. First, in terms of the survey design, the questions were placed in a random order, vague terms were removed through rigorous pilot survey process as mentioned above, and the anonymity and confidentiality of the respondents were assured. Second, to ensure methodical separation, the questionnaire survey was conducted at different times in different locations utilizing both face-to-face and online survey media.

Third, the research team paid special attention to invite professionals with different backgrounds participating the survey, which is critical to obtain high-quality data from diverse sources.

Ethical issue was considered in the questionnaire survey process. The purpose of the research was articulated at the front of the questionnaire, emphasizing that the data would be used exclusively for this study. The participants were also assured that the investigation was voluntary and anonymous, and their personal information would be confidential. Finally, the questionnaire was presented to a review committee for comment and approval before formal investigation.

The formal survey investigation was conducted from January to September in 2020. A total of 494 questionnaires were received, including 15 and 479 responses from the face-to-face investigation and the online survey, respectively. After data screening, 449 valid questionnaires were ~~received~~ obtained which included 9 and 440 responses from the face-to-face investigation and the online survey, respectively. Table 1 shows the profile of participants' demographic information.

<Place Table 1 here>

4. Results

4.1 Data reliability and validity test

Cronbach's alpha was employed to test the reliability of the survey data. The values of Cronbach's alpha for the scales of job satisfaction and turnover intention are 0.938 and 0.913, respectively.

They are above the threshold of 0.7, representing good internal consistency reliability (Hair et al., 2010). In addition, the KMO test results for job satisfaction and turnover intention are 0.947 and 0.829, respectively, exceeding the acceptable threshold of 0.5. The Bartlett's tests of sphericity result for the two variables (0.00) are lower than 0.05, meaning a good strength of relationship among the variables. These results suggest that the validity of the survey is acceptable and suitable for further analysis (Hair et al., 2010; Chen et al., 2012).

4.2 Descriptive statistical analysis

The analysis results for mean values, standard deviations (SD), and correlations among variables are shown in Table 2. It indicates the overall job satisfaction and turnover intention of the respondents are at a moderate level (3.36 and 2.75, respectively). The results demonstrate that generally, professionals in the Chinese construction industry have a slightly high level of job satisfaction, but they have a slightly low level of turnover intention in the special period of the COVID-19 pandemic outbreak. Although the pandemic had serious impacts on the Chinese construction industry during the survey period, the measures undertaken by the government in China were effective in ensuring the safety of the professionals working in the industry (Duan et al., 2023), which is helpful to improve their sense of job security and satisfaction. Research also indicated that job satisfaction and turnover intention are negatively correlated (Wang et al., 2020; Abd-Ellatif et al., 2021), hence, higher level of job satisfaction facilitates to reducing the level of turnover intention. In addition, due to the serious negative impacts of the pandemic, organizations in the construction industry also encountered difficulties such as financial problems and site shutdowns (Chih et al., 2022). This resulted in less job opportunities in the industry and decreased expectations of changing the job among the professionals, leading to relatively lower turnover intention level. Among the seven dimensions of job satisfaction, respondents are most satisfied with *interpersonal relationship* (3.93), followed by *leadership and management* (3.72), and *work-family conflict* (3.29). In contrast, *salary and benefit* (2.84) was perceived as the least satisfied factor among the professionals in the Chinese construction industry.

In order to evaluate the relationship between turnover intention and job satisfaction, ~~the~~ a Spearman's rank correlation analysis was conducted. As shown in Table 2, there is a significantly

negative correlation between overall job satisfaction and turnover intention (-.679). Among the seven dimensions of job satisfaction, JSB ($r = -.639^{**}$, $P < 0.01$) has the most significantly negative correlation with turnover intention, followed by TCD ($r= -.610^{**}$, $p < 0.01$), IR ($r = -.542^{**}$, $p < 0.01$), LM ($r = -.538^{**}$, $p < 0.01$), WE ($r = -.482^{**}$, $p < 0.01$), WFC ($r = -.437^{**}$, $p < 0.01$), and JRF ($r =-.379^{**}$, $p < 0.01$). In addition, the seven dimensions of job satisfaction all have significantly positive correlations with overall job satisfaction.

In terms of demographic factors, the results indicate that gender and education have no significant correlation with turnover intention. In contrast, marital status (-.256, $p < 0.01$), age (-.243, $p < 0.01$), years of working experience (-.210, $p < 0.01$), and position (-.177, $p < 0.01$) are significantly negatively correlated with turnover intention. In addition, age (.161, $p < 0.01$), marital status (.134, $p < 0.01$), and years of working experience (.115, $p < 0.01$) are significantly positively correlated with job satisfaction.

<Place Table 2 here>

4.3 SEM analysis

SEM is a multivariate statistical analysis technique comprising two types of models including the measurement model for confirmatory factor analysis and the structural model for path or regression analysis (Chen et al., 2012). The measurement model examines how well observed variables evaluate latent variables and determines their validity and reliability, while the structural model develops the relationship among latent variables (Molenaar et al., 2000). Model evaluation is a systematic process of measuring the strength of the quantified model based

on the goodness-of-fit (GoF) measurement indices. Various GoF indicators and recommended thresholds can evaluate the appropriateness of a model from different aspects (Chen et al., 2012; Gadisa and Zhou, 2020). The χ2/df (degrees of freedom) index compares the covariance matrix of the measurement model and the covariance matrix of empirical data, and it is acceptable if the value is between 1 and 3. The root-mean-squared error of approximation (RMSEA) measures the discrepancy between the hypothesized model and the actual data, the lower values the better fit (with a threshold value of 0.08) (Wang et al., 2021). In addition, the values of the normal fit index (NFI), comparative fit index (CFI), incremental fit index (IFI), and goodness-of-fit index (GFI) are between 0 and 1, where the value closing to 0 means the poorest model while closing to 1 indicates the perfect model. The commonly acceptable threshold value for these indices is 0.8 (Chen et al., 2012).

Because the model fit indices indicated that the evaluation outcome for the preliminary model was not satisfactory (χ2/df = 3.224 >3 and GoF index = 0.792 < 0.8) (see Table 3), model modification was further conducted. The approach employed in this study to refine the model involved introducing causal relationships among variables, as suggested by Chen et al. (2012). Based on the modified index (MI) values in descending order, the covariant relationships between error items ~~are~~ were determined, and the residual correlations between them ~~are~~ were then elevated. This step was taken to improve the model's fit and accuracy in exploring the underlying data relationships. Notably, the MI value for the residual variables between e37 (JRF) and e43 (WFC) was 83.768, the highest among all residual values. Hence, the model was reconstructed by establishing correlations between these two variables. After the first modification, the χ2/df of the structural equation model still exceeded 3, requiring further adjustments. Given the MI value for

the residual variables between e2 (JRF2) and e4 (JRF4) is 62.061, which also ranked highest among all residual values, the correlations between them were further introduced in the model. After two rounds of modification, the hypothetical model met the thresholds of GOF measurement indices as mentioned above (Molwus et al., 2017). The results of GoF measurement indices for the two-step model adjustment are shown in Table 3.

<Place Table 3 here>

The final structural model of job satisfaction and turnover intention is presented in Figure 2.

<Place Figure 2 here>

The structural model (Figure 2) and standardised path coefficients of the model produce the following hypotheses testing results:

(1) The overall job satisfaction has a significantly negative effect on turnover intention among professionals in the Chinese construction industry (path coefficient of JS → TI = -0.687, correlation is significant at 0.001 level, two-tailed), supporting H8.

(2) Among the seven dimensions of job satisfaction, six of them have significantly positive correlations with the overall job satisfaction, namely LM (path coefficient = 0.92), TCD (0.91), IR (0.88), JSB (0.84), JRF (0.74), and WFC (0.72) (all the correlations are significant at 0.001 level, two-tailed), supporting H5, H4, H3, H2, H1, and H7, respectively.

(3) The hypothesized positive relationship between WE and JS is not significant (path coefficient = 0.190), hence H6 is not supported.

(4) The hypothesized moderating effect of DF between JS and TI is not significant (path coefficient of JS → DF = 0.063, path coefficient of DF → TI = 0.004). As a result, H9 is not supported.

5. Discussion

5.1 The levels of job satisfaction and turnover intention

Table 2 reveals that the professionals working in the Chinese construction industry have a slightly high level of overall job satisfaction (mean score = 3.36). In contrast, Heidari et al. (2022) revealed that the majority of surveyed nurses (75.7%) had a low level of job satisfaction working in COVID-19 wards in Iran. But ~~This~~ the result of this study is consistent with the job satisfaction of employees in some other industries, such as social workers and academic staff (Liu et al., 2023; Rashidin et al., 2020). For example, Rashidin et al. (2020) reported a moderate level of job satisfaction among Chinese university faculty employees. This means that although the working environments of the construction industry are tough with high levels of job stress and demanding workloads, the professionals have slightly better ~~comparable~~ job satisfaction levels compared to other industries. However, these findings are in contrast with Nie et al. (2019) and Zhang et al. (2019), who claimed that Chinese employees generally have a relatively low level of job satisfaction. The reason for the job satisfaction being at a moderate level instead of a high level might be due to the outbreak of the COVID-19 pandemic, specifically the social distance policy, and the fact that professionals ~~encountered~~ work in ~~more difficult~~harsher working environments, and ~~had~~ have fewer opportunities for training and career development~~, and had worsened interpersonal relationships~~.

Among the seven dimensions, professionals in the Chinese construction industry are most satisfied with *interpersonal relationships* and *leadership and management*. This supports that the Chinese Confucian-based work ethics of compliance, hard work, and personal networks (i.e., *guanxi* in Chinese) may help professionals adapt more easily to the work environment and foster positive relationships with their leaders (Zhang et al., 2019). On the contrary, professionals have the lowest level of satisfaction with *job salary and benefit* and *job-related factors*. In fact, the professionals in the Chinese construction industry have significantly lower levels of job salary and benefit compared to their counterparts in developed countries, although they have higher levels of job workload and longer working time. For instance, the peak hourly wage for construction laborers in China was $18, which accounted for only 21.2% of their counterparts in the US in 2019, with an hourly wage of $85 (Statista Research Department, 2023). However, Zhang et al. (2023b) revealed that majority of the designers in China worked about 70 hours per week, which is significantly longer than the construction professionals work between 51 and 55 hours per week in Australia (Lingard et al., 2012). Further analysis indicated that major job-related factors leading to lower job satisfaction among professionals in the Chinese construction industry are job content (JRF5), workload (JRF4), and job stress (JRF3). For the majority of professionals working in the industry, their job content is site-based with demanding workload and the working environments are generally harsh and stressful, such as extremely high or low temperatures, large amounts of dust, uncomfortable noise and various safety hazards (Liang et al., 2021).

The results also indicate that turnover intention is at a moderate level (mean score = 2.75), slightly below the midpoint of the five-point Likert scale. As mentioned before, ~~D~~due to the influence of the COVID-19 pandemic, employees have fewer job opportunities to change their job

as enterprises also experience difficulties in terms of business growth (Rokooei et al., 2022). This might explain why the surveyed professionals have a low level of turnover intention. This finding also aligns with Liu et al. (2020), who revealed that turnover intention level is 2.76 among construction workers in China. However, Mehra et al. (2024) reported that a significant proportion (43.7%) of nurses have the intention to leave the profession in India because of the fear and uncertainty of the COVID-19 pandemic. Wang et al. (2020) highlighted that there is a notable regional variation of turnover intention among project management personnel in China, as they found higher turnover intention in Shenzhen, one of the most developed cities in China, compared to other cities in the southeast areas of China.

5.2 The underlying factors influencing job satisfaction on turnover intention

In line with previous studies (e.g., Chih et al., 2018; Chung et al., 2017; Dodanwala and Santoso, 2022), the SEM analysis results indicate that overall job satisfaction is significantly negatively correlated with turnover intention among professionals in the Chinese construction industry. Dodanwala and Santoso (2021) also claimed that overall job satisfaction is a major and negative factor in predicting employees' intent to quit their jobs. In addition, Abd-Ellatif et al. (2021) revealed that fear of COVID-19 is negatively related to job satisfaction while positively associated with turnover intention, and job satisfaction is negatively correlated with turnover intention among Egyptian physicians. The underlying factors influencing job satisfaction and turnover intention are discussed below.

Among the seven job satisfaction dimensions, *leadership and management* has the most significant positive effect on job satisfaction (path coefficient = 0.919). Hence, the first critical

path affecting turnover intention from the perspective of job satisfaction can be derived: LM (leadership and management) → JS (job satisfaction) → TI (turnover intention). The finding aligns with Randeree and Chaudhry (2012), who reported that more than 50% of surveyed participants highlighted the pivotal role of management leadership style in shaping job satisfaction. Leadership and management that focus on clear communication, fairness, and well-being can make professionals in the construction industry feel valued and engaged in an organisation. Chih et al. (2018) revealed that the combined effects of supportive leadership and leaders' charismatic vision can significantly enhance job satisfaction and diminish turnover intention among construction workers. Ali et al. (2020) also concluded that a shared leadership style fosters the creativity of individuals and teams in construction management, subsequently enhancing employees' trust and organizational commitment. Previous research also indicated that organizational commitment exerts a crucial role in improving job satisfaction and reducing turnover intention (Ayodele et al., 2020; Wang et al., 2020).

Interpersonal relationship also exerts a significant impact on job satisfaction (path coefficient = 0.883), meaning that interpersonal relationships are another underlying factor affecting turnover intention among professionals in the construction industry. Oladunmoye (2017) claimed that interpersonal relationship can influence employees' work-related attitudes and job satisfaction, which serves as a significant predictor of turnover intention. In fact, satisfaction in relations with superiors and subordinates creates a prominent influence on job satisfaction. When professionals in the construction industry receive prompt help from their superiors, it fosters a sense of being supported, consequently enhancing their psychological resilience to manage occupational stress (Liu et al., 2020). In addition, when subordinates are competent and are motivated to collaborate

with their colleagues, the superiors can develop a sense of accomplishment which increases their self-esteem and confidence, thereby facilitating job satisfaction (Mishra and Ghosh, 2020), which is also effective in reducing turnover intention.

The SEM analysis also reveals a significant and positive impact of *training and career development* on job satisfaction (path coefficient = 0.910), indicating another critical path affecting turnover intention through job satisfaction: TCD (training and career development)→JS (job satisfaction)→TI (turnover intention). This result is in contrast with Ling et al. (2018), who found that HRM practices such as employee training have no significant correlation with job satisfaction, while promotion opportunities are significantly related to job satisfaction. With the rapid application of digital technologies (e.g., building information modelling) in the Chinese construction industry, there is a growing demand for education and training to equip professionals with the skills required to adapt to new working environments. In this regard, younger professionals show a particular preference for organizations that offer extensive training opportunities, as it enhances their competitiveness and job security from the beginning of their careers (Dodanwala and Santoso, 2022; Turner and Lingard, 2016). ~~Furthermore~~However, Ling et al. (2018) highlighted that excessive and ineffective training may cause dissatisfaction among construction professionals, since this increases their accumulated tasks during their absence for training and requires ~~work~~ overtime work to catch up with the progress after returning to their regular responsibilities.

Job salary and benefit is another predictor for turnover intention as it has a significantly positive relationship with job satisfaction (path coefficient = 0.840), which is consistent with Ling et al. (2018) and Ni et al. (2022). Within this dimension, JSB1 (salary level), JSB2 (organizational

welfare), and JSB3 (salary adjustment frequency) have the most significant influence on job satisfaction, with path coefficient values of 0.899, 0.886, and 0.876, respectively. In contrast, JSB4 (discrepancy between effort and rewards, path coefficient = 0.469) has the least influence on job satisfaction, which contrasts with existing research suggesting that construction employees are typically dissatisfied with the mismatch between the physically demanding nature of construction work and the reward they receive (Dodanwala and Santoso, 2022). Hence, to increase the job satisfaction and retention intention of professionals in the construction industry, organizations should provide generous salaries and implement incentive strategies such as rewarding with performance-based bonuses, project on-time or earlier completion bonuses, and ~~working~~ overtime work compensation (Smith et al., 2004).

The SEM analysis results also demonstrated two more paths in which other underlying job satisfaction factors affect turnover intention, including JRF (job-related factors) → JS (job satisfaction)→TI (turnover intention) and WFC (work-family conflict)→JS (job satisfaction)→TI (turnover intention). In terms of *job-related factors*, Lim and Ling (2012) observed that construction professionals experiencing overwork often demonstrate reduced job satisfaction and organizational commitment, resulting in increased rates of absenteeism and turnover. Furthermore, Ling and Ho (2013) highlighted that extended working hours and the presence of job-related stress significantly impact the job satisfaction of young adults, which serve as substantial barriers discouraging them from pursuing careers in the construction industry. As to *work-family conflict*, professionals with greater family responsibilities may experience elevated susceptibility to work-family conflict, leading to increased stress and decreased job satisfaction (Lian and Ling, 2018).

Finally, it is unexpected that *work environment* is not a significant factor leading to turnover intention through the effect of job satisfaction. In contrast, Ni et al. (2022) indicated that poor working environments have a negative impact on job satisfaction among a new generation of construction workers in China. Existing research further revealed that a mismatch between the actual work environment and employees' subjective perceptions of the work environment can lead to job stress, ultimately resulting in decreased job satisfaction and increased turnover intention (Chen et al., 2017; Guinot et al., 2014).

5.3 The moderating effect of demographics on the relationship between job satisfaction and turnover intention

The SEM analysis results demonstrated that the moderating effect of demographic factors on job satisfaction and turnover intention is not significant. However, correlation analysis results indicated that marital status, age, years of working experience, and position all have strongly negative relationships with turnover intention, while age, marital status, and years of working experience have significantly positive relationships with job satisfaction. This means that with increasing age and years of working experience, female professionals in the Chinese construction industry tend to have a higher level of job satisfaction while a lower level of turnover intention. In fact, the effect of demographics on job satisfaction and turnover intention is not conclusive in existing research. For instance, a few studies revealed that the correlation between job satisfaction and demographic factors such as age, work experience, position, and marital status ~~in the construction industry~~ is significant in the construction industry (e.g., Beyene and Gituma, 2017; Lian and Ling, 2018). While other results indicated

that demographic factors are not significant predictors of job satisfaction (Dabke et al., 2008; Petty et al., 2005). In addition, Wocke and Heymann (2012) also found that demographic factors are significantly correlated with employees' turnover intention.

6. Conclusion

Existing research has ascertained the pivotal role of job satisfaction in shaping employees' turnover intention. However, the underlying mechanisms linking underlying factors of job satisfaction to turnover intention remain under-explored, particularly within the context of the Chinese construction industry during the outbreak of the COVID-19 pandemic. Through a survey of 449 professionals in the Chinese construction industry together with descriptive and SEM analyses, the following main findings are obtained.

First, although the COVID-19 pandemic has produced seriously difficult times for the Chinese construction industry and the employees working in the industry, the surveyed professionals generally have a slightly high level of job satisfaction while a slightly low level of turnover intention. In addition, they are most satisfied with the *interpersonal relationship* and *leadership and management*, while are most dissatisfied with *job-related factors* and *salary and benefit*. Second, job satisfaction has significantly negative influences on turnover intention, with the most critical underlying factors related to *leadership and management*, *training and career development*, and *interpersonal relationship*. This result might explain why the professionals in the Chinese construction industry in this special period have a moderate level of turnover intention even though the working environments are harsh with demanding workloads and frequent social distance requirements, as they are most satisfied with *interpersonal relationship* and *leadership*

and management. Third, although demographic factors do not exert a significant moderating effect between job satisfaction and turnover intention, professionals with different ages, marital status, and years of working experience may have significantly different levels of job satisfaction and turnover intention.

The findings reported in this paper have significantly practical implications. This research contributes to a better understanding of how turnover intention is developed through the influence of underlying job satisfaction factors among professionals working in the Chinese construction industry in the context of the COVID-19 pandemic outbreak period. To mitigate turnover intention, it is imperative to implement targeted strategies aimed at cultivating employee job satisfaction from a multifaceted perspective. Organizations and employers in the construction industry should place prior emphasis on developing appropriate and effective leadership and management strategies, articulating effective training and career development programs, and creating a climate facilitating the cultivation of positive interpersonal relationships to enhance job satisfaction. This can help reduce the turnover intention of employees more effectively to achieve sustainable development for organizations in the Chinese construction industry. In addition, to enhance the job satisfaction of professionals working in the Chinese construction industry, it is necessary to improve their job salary and benefit while reducing the negative influences of job-related factors such as demanding workloads and long working hours. Finally, organizational human resources management policies should be tailor-made considering different personal traits of professionals, specifically in terms of age, marital status, and years of working experience, to more effectively improve their job satisfaction and reduce turnover intention.

7. Limitation and future research directions

Some limitations in this study should be mentioned which also become important future research directions. First, the results cannot be generalized to the broader professional populations in the Chinese construction industry, since the empirical data was collected in Jiangsu province, which has the largest volume of added value of construction among all the provinces and is one of the most developed areas in China. Further investigation into the professionals in other areas of the Chinese construction industry is necessary to complement the results. ~~In addition~~Second, similar to other research, job satisfaction and turnover intention were mainly measured through self-report surveys, and in turn the actual situation might be different from the viewpoints collected. Other research methods (e.g., longitudinal observation, qualitative interview study) can be employed to further triangulate the research results in the future. Third, as the serious COVID-19 pandemic has disappeared globally, it is therefore valuable to conduct comparative research in two scenarios of with and without the influences of pandemic, which is critical to further determine the impact of pandemic on the job satisfaction and turnover intention among professionals in the construction industry.

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Response to editor and reviewers' comments

Journal: Engineering, Construction and Architectural Management
Manuscript title: Exploring the impact of job satisfaction on turnover intention among professionals in the construction industry.
Manuscript ID: ECAM-11-2023-1179

Dear Editor,

Thank you very much for the feedback on paper Ref.: ECAM-11-2023-1179 (Exploring the impact of job satisfaction on turnover intention among professionals in the construction industry). We found the reviewers' comments constructive and helpful in improving the paper further, and have made considerable efforts addressing the comments and responded carefully to each point as attached below. We have also taken the opportunity to check and edit the paper again. The revised paper with these track changes was also attached for your kind reference.

Kind regards

The authors

Response to Reviewer 1 comments

Comment	Response
Recommendation: Accept Comments: No comment	Thank you very much for your kind recommendation.
1. Originality: Does the paper contain new and significant information adequate to justify publication?: This paper identifies impacts of underlying factors related to job satisfaction on turnover intention instead of overall job satisfaction. In addition, this study explores the moderating effect of individual demographic factors (e.g., gender, age) on the relationship between job satisfaction and turnover intention in the construction industry. Furthermore, this study explores job satisfaction and turnover intention in the context of the COVID-19 pandemic as existing studies indicated that the pandemic has had a	Thank you.

significant influence on the vulnerable construction industry which has also resulted in a negative influence on job satisfaction and turnover intention of employees in other industries	
2. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: Variety and recent publication (year 2023) have been cited.	Thank you.
3. Methodology: Is the paper's argument built on an appropriate base of theory, concepts or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: A questionnaire survey was developed by literature review. However, sampling bias is observed due to limited survey respondents from limited resources and network. Survey result is analysis quantitatively to build up argument.	Thank you for your kind comment. In fact, during the investigation process, the research team has tried their best to collect survey data from different sources to obtain comprehensive viewpoints from various types of professionals, including designers, consultants, and construction professionals working for clients, construction enterprises, design companies, supervision companies, engineering consulting firms, and other types of organizations as shown in Table 1 of the paper. In responding to this comment, additional details (on pages 14-15, in section 3 Research Methodology) were added in the revised manuscript elaborating the sampling method for this study to avoid the bias for this investigation, as the following. *"……In order to gather comprehensive viewpoints, special attention was paid to obtain the data from different types of participants with various personal characteristics, including gender, age, education background, marital status, years of working experience, type of organizations working for, and position. Participants were identified and approached through the networks of the research team. In this process, the research team contacted different types of professionals and invited them to complete the survey. They were also suggested to forward the survey link to their colleagues in their departments to participate in the investigation……"*

	In addition, the strategies used to avoid the common method bias problem were also discussed in the revised manuscript (on page 15, in section 3 Research Methodology), as the following. *"Following Chan et al. (2010) and Zhang et al. (2022), several strategies were used to avoid the common method bias problem. First, in terms of the survey design, the questions were placed in a random order, vague terms were removed through rigorous pilot survey process as mentioned above, and the anonymity and confidentiality of the respondents were assured. Second, to ensure methodical separation, the questionnaire survey was conducted at different times in different locations utilizing both face-to-face and online survey media. Third, the research team paid special attention to invite professionals with different backgrounds participating the survey, which is critical to obtain high-quality data from diverse sources."*
4. Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: There is a discussion section to synthesis findings with literature. However, factors in discussion sections are in initial that readers have to cross reference to previous section resulted in difficult understanding. There is a conclusion section to summarize the findings.	Thank you for the comment. We have included the full spelling of the factors in the discussion section (on pages 24-26) when necessary to make them easily understood.
5. Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the	Thank you.

findings and conclusions of the paper?: This paper identifies research implication in terms of diversified survey respondents and other survey methodology. In the industry perspective, this study identifies critical factors leading to turnover intention from the perspective of job satisfaction, which is helpful in developing effective measures to address the turnover problems. This paper bridges the gap from theory to practice through synthesis of the survey findings.	
6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the fields and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: This paper clearly expresses its content. Majority of content is easy to understand. However, factors in discussion sections are in initial that readers have to cross reference to previous section resulted in difficult understanding.	Thank you. As mentioned in comment 4 above, we have included the full spelling of the factors in the discussion section (on pages 24-26) when necessary to make them easily understood.

Response to Reviewer 2 comments

Recommendation: Major Revision Comments: Exploring the impact of job satisfaction on turnover intention among professionals in the construction industry Dear Authors, Good day to you. The paper is well-structured and presents an interesting study. With some improvements, it has the potential to make a significant contribution to the literature on job satisfaction and turnover intention in the construction industry.	Thank you very much for your kind recommendation and comments, which are valuable to further improve the manuscript. We have responded to your comments below point by point and made revisions accordingly in the revised manuscript.
1. The study's purpose is clear, but more context	Thank you for this suggestion. More context on the

on the importance of understanding job satisfaction's impact on turnover intention, especially during the COVID-19 pandemic, would be beneficial.	importance of understanding job satisfaction's impact on turnover intention was added in the revised manuscript (on page 4, in section 1 Introduction), as the following: *"……Examining the influence of different job satisfaction dimensions on turnover intention contributes to a deeper understanding of the underlying causes of turnover for professionals in the construction industry, which is helpful in achieving sustainable growth for enterprises in the industry through more effective measures of turnover rate reduction. Theoretically, the findings also advance the knowledge through identifying the critical precursors of turnover intention from the perspective of job satisfaction in the domain of construction industry……"* In addition, a more detailed explanation of the importance of understanding job satisfaction's impact on turnover intention during the COVID-19 pandemic was added in the revised manuscript (on pages 4-5, in section 1 Introduction), as the following: *"……Understanding the impact of job satisfaction on turnover intention during the COVID-19 pandemic period is imperative for employers in the construction industry to develop more effective strategies in achieving talent retention and sustainable business growth under the influence of traumatic events with similar nature of the pandemic in the future. The insight can also offer valuable theoretical insights from the construction industry for academia to compare the similarities and differences of the impacts of the pandemic on the professionals' job satisfaction and turnover intention across various industries……"*
2. The introduction effectively emphasizes the significance of turnover in the construction industry. However, it would be helpful to explain how the COVID-19 pandemic has affected job satisfaction and turnover intention in the construction industry.	Thank you for this suggestion. A more detailed explanation was added in the revised manuscript concerning how the COVID-19 pandemic has affected job satisfaction and turnover intention in the construction industry (on pages 2-3, in section 1 Introduction), as the following:

	"……The Chinese Turnover and Compensation Survey Report showed that the turnover rate in the real estate development sector reached 21.6% in 2021, ranking third among all the industries in China (China Daily, 2021). This might be because the construction industry has faced significant negative influences from the COVID-19 pandemic, leading to difficulties such as lockdown-induced labor shortages, construction site closures, schedule delays, and project suspensions (Wang et al., 2023). These difficulties, together with economic slowdown, elevated job stress and insecurity among professionals in the construction industry (Liang et al., 2023), which in turn reduce their job satisfaction. Nauman et al. (2021) noted that unforeseen events such as the pandemic introduce uncertainty into individuals' career development, potentially leading to turnover behavior. Notably, Liang et al. (2023) reported a substantial 95% increase in the average unemployment rate of construction workers in the United States, rising from 4.5% in 2019 to 8.7% in 2020……"
3. The literature review is comprehensive, but could benefit from more recent and relevant references. Also, it would be helpful to compare your findings with other studies to highlight similarities or differences.	Thank you for your comment. We have tried to include more recent and relevant references in the literature review results. For instance, the following elaborations were added in section 2.1.7 Work-family Conflict (on page 10): *"……Dodanwala and Shrestha (2021) revealed that work-family conflict arises when an employee struggles to reconcile the demands and expectations of the family due to work-related issues. This can lead to a depletion of employees' emotional resources, consequently reducing their job satisfaction. In contrast, work-family balance can mitigate the negative influences of job demands on job dissatisfaction (Ninaus et al., 2021)."* In our previous submission, we have tried the best to compare our findings with existing studies from both the construction industry and other industries. For instance, as to the job satisfaction level, the following comparison was included in the paper:

	"*Table 2 reveals that the professionals working in the Chinese construction industry have a slightly high level of overall job satisfaction (mean score = 3.36). This is consistent with the job satisfaction of employees in other industries, such as social workers and academic staff (Liu et al., 2023; Rashidin et al., 2020). For example, Rashidin et al. (2020) reported a moderate level of job satisfaction among Chinese university faculty employees……*" As another example, the following elaboration was included to compare our findings with the investigation on turnover intention among construction workers. "*The results also indicate that turnover intention is at a moderate level (mean score = 2.75), slightly below the midpoint of the five-point Likert scale……This finding also aligns with Liu et al. (2020), who revealed that turnover intention level is 2.76 among construction workers in China……"* Notwithstanding this, following the reviewer's suggestion, we have conducted further literature review and compared our findings with other studies to highlight similarities or differences, specifically in the context of COVID-19. For instance the following citations were added to compare the job satisfaction level, turnover intention level and the relationship between job satisfaction and turnover intention with our findings, respectively: "*……In contrast, Heidari et al. (2022) revealed that the majority of surveyed nurses (75.7%) had a low level of job satisfaction working in COVID-19 wards in Iran……*" (on page 21, in section 5 Discussion) "*……However, Mehra et al. (2024) reported that a significant proportion (43.7%) of nurses had the intention to leave the profession in India because of the fear and uncertainty of the COVID-19 pandemic……*" (on page 23, in section 5 Discussion) "*……In addition, Abd-Ellatif et al. (2021) revealed that fear of COVID-19 is negatively related to job*

	satisfaction while positively associated with turnover intention, and job satisfaction is negatively correlated with turnover intention among Egyptian physicians……" (on page 23, in section 5 Discussion)
4. The paper should elaborate on why specific demographic factors were chosen and their relevance to the construction industry.	Thank you for your comment. Following your suggestion, the elaboration on why specific demographic factors were selected and their relevance to the construction industry were added and consolidated in the revised manuscript (on pages 11-12, in section 2.3 The moderating role of Demographic Factors), as follows: *"……In the construction industry, a few studies explored how demographic factors influence employees' job satisfaction and turnover intention. Among them, Beyene and Gituma (2017) found that age and working experience were significantly correlated with the job satisfaction among construction employees in Africa. Lian and Ling (2018) explored the influence of personal characteristics on quantity surveyors' job satisfaction in Singapore, and found that married, older, and more experienced employees are more dissatisfied with their workload and working hours. Dodanwala and Santoso (2022) examined the relationship between job satisfaction and turnover intention among construction project professionals in Sri Lanka, using gender, age, education background, and years of working experience as control variables. Jiang and Li (2022) investigated the mechanisms of person-environment fit on turnover intention among construction project managers considering the different personal traits of gender, age, educational background, years of working experience and position. Xie et al. (2022) explored the influence of psychosocial safety climate on intent to stay using job satisfaction as the intermediary among construction workers with different characteristics of gender, age, marital status, type of work, education level, and years of experience. In addition, construction professionals working for contractors reported a higher level of burnout*

	than those working for clients or consulting organizations (Yip and Rowlinson, 2009), and burnout is a strong predictor of job satisfaction and turnover intention (Lingard, 2003; Yang et al., 2017; Heidari et al., 2022). Hence, professionals working for different type of organizations might have different levels of job satisfaction and turnover intention. Drawing upon extensive literature review results, seven demographic factors were identified for investigation, namely gender, age, education background, marital status, years of working experience, type of organizations working for, and position. These factors were selected based on their significant influences on job satisfaction and turnover intention within the construction industry……"
5. The connection between work-family conflict and job satisfaction could be explained more explicitly.	Thank you for your suggestion. A more explicit description of the connection between work-family conflict and job satisfaction was included in the revised manuscript (on page 10, in section 2.1.7 Work-family Conflict), as the following: *"……In fact, work-family conflict has been recognized as a vital factor affecting job satisfaction (Dodanwala and Shrestha, 2021), job stress (Zhang et al., 2023a), and turnover intention (Ayodele et al., 2020) among professionals working in the construction industry. Dodanwala and Shrestha (2021) revealed that work-family conflict arises when an employee struggles to reconcile the demands and expectations of the family due to work-related issues. This can lead to a depletion of employees' emotional resources, consequently reducing their job satisfaction. In contrast, work-family balance can mitigate the negative influences of job demands on job dissatisfaction (Ninaus et al., 2021)……"*
6. The methodology section is clear but could provide more information about the sample, such as the sampling method used, and the representativeness of the sample. It would be beneficial to know the total number of	Thank you for the comment. Following your suggestion, more information about the sampling method used and the representativeness of the sample were added in the revised manuscript. However, it should be noted that the number of potential respondents reached is not available as the

respondents approached to gauge the response rate.	investigation was primarily conducted through online medium. But the total number of the responses collected through the face-to-face investigation and the online survey was added in the revised manuscript. The details of the sampling method and the responses collected are as follows, respectively: *"Due to the outbreak of the COVID-19 pandemic, the questionnaire survey was administered adopting both face-to-face and online methods. A non-probability sampling technique, including purposive sampling and snowball sampling methods, was employed to collect data from the professionals working in the Chinese construction industry, which has been frequently used in the construction management research field (Zhang et al., 2023b). In order to gather comprehensive viewpoints, special attention was paid to obtain the data from different types of participants with various personal characteristics, including gender, age, education background, marital status, years of working experience, type of organizations working for, and position. Participants were identified and approached through the networks of the research team. In this process, the research team contacted different types of professionals and invited them to complete the survey. They were also suggested to forward the survey link to their colleagues in their departments to participate in the investigation. The number of potential respondents reached is not available as the investigation was primarily conducted through online medium of Questionnaire Star (Wenjuanxing in Chinese), which is a popular tool conducting survey investigation in China."* (on pages 14-15, in section 3 Research Methodology) *"The formal survey investigation was conducted from January to September in 2020. A total of 494 questionnaires were received, including 15 and 479 responses from the face-to-face investigation and the online survey, respectively. After data screening, 449 valid questionnaires were obtained which included 9 and 440*

	responses from the face-to-face investigation and the online survey, respectively." (on page 16, in section 3 Research Methodology)
7. The methodology section should discuss common method bias and ethical standards.	Thank you for the comment. Following your suggestions, the following elaborations were added in the revised manuscript to discuss common method bias and ethical standards (on pages 15-16, in section 3 Research Methodology): *"Following Chan et al. (2010) and Zhang et al. (2022), several strategies were used to avoid the common method bias problem. First, in terms of the survey design, the questions were placed in a random order, vague terms were removed through rigorous pilot survey process as mentioned above, and the anonymity and confidentiality of the respondents were assured. Second, to ensure methodical separation, the questionnaire survey was conducted at different times in different locations utilizing both face-to-face and online survey media. Third, the research team paid special attention to invite professionals with different backgrounds participating the survey, which is critical to obtain high-quality data from diverse sources.* *Ethical issue was considered in the questionnaire survey process. The purpose of the research was articulated at the front of the questionnaire, emphasizing that the data would be used exclusively for this study. The participants were also assured that the investigation was voluntary and anonymous, and their personal information would be confidential. Finally, the questionnaire was presented to a review committee for comment and approval before formal investigation."*
8. The methodology section provides a clear description of the scale used for measuring turnover intention, citing Hom et al., 1984. However, it lacks similar details for the job satisfaction variables. It is crucial to specify the scales used for measuring each of the job satisfaction variables, including the number of	Thank you for the comment. The details for the job satisfaction variables were added in the revised manuscript (on page 14, in section 3 Research Methodology). In addition, a description was also included to specify the scales used for measuring each of the job satisfaction variables, including the number of items in each variable and the source or basis for these scales. Sample items from

items in each variable and the source or basis for these scales. Additionally, providing sample items from the questionnaire for both job satisfaction and turnover intentions would be beneficial.	the questionnaire for both job satisfaction and turnover intentions were also added, as the following. *"……Based on extensive literature review results of this study, the job satisfaction of the professionals was measured using a scale with seven dimensions. The questions under each dimension was designed according to the classical Minnesota Satisfaction Questionnaire (Weiss et al., 1967), Job Satisfaction Survey (Spector, 1985), and Job Descriptive Index (Smith et al., 1989). In addition, the relevance of these questions with the construction industry was also considered. For instance, four questions were included in the job salary and benefit (JSB) dimension, and two of the sample questions are: "(1) I am satisfied with my salary level in the company", and "(2) I am satisfied with the benefits and welfare provided by the company". Similarly, five questions were included in the job-related factors (JRF) dimension, and four questions in the training and career development (TCD) dimension. For the remaining four dimensions, including interpersonal relationship (IR), leadership and management (LM), work environment (WE), and work-family conflict (WFC), each had three questions. Finally, one additional question was incorporated in the scale to measure the respondents' overall job satisfaction level. As to the evaluation of turnover intention for the professionals, the measurement scale was designed according to Hom et al. (1984). One of the sample questions is "(1) I often consider leaving my current job"."*
9. Given that the research is examining job satisfaction and turnover intention in the context of the COVID-19 pandemic, the timing of data collection could have significant implications for the results and interpretations.	Thank you for the suggestion. The timing of data collection was added in the revised manuscript (on page 16, in section 3 Research Methodology), as follows: *"The formal survey investigation was conducted from January to September in 2020……"*
10. The details of the tools used to perform the analysis is missing.	Thank you for the comment. The tools used for data analysis in this research comprised mean score analysis, Spearman's rank correlation analysis, and structural equation modeling (SEM) using Statistical Package for

	Social Science (SPSS) 24.0. Following your suggestion, the details of these analytical tools was added in the revised manuscript (on page 13, in section 3 Research Methodology), as the following. *"Based on an extensive literature review, a questionnaire survey was used to collect empirical data for further analysis to obtain the results, including mean score analysis, correlation analysis, and structural equation modelling (SEM) using Statistical Package for Social Science (SPSS) 24.0. Mean score analysis was employed to ascertain the relative importance of each job satisfaction dimension, overall job satisfaction, and overall turnover intention among professionals in the construction industry. Spearman's rank correlation analysis was employed to explore the relationship between turnover intention, job satisfaction and demographic variables. SEM analysis was used to further determine the impact of job satisfaction on turnover intention considering the moderating effect of individual demographic factors. These techniques have been extensively adopted in the construction management domain to reveal complex relationships across diverse variables (e.g., Ling et al., 2018; Ni et al., 2020)."* A more detailed description of SEM was presented in Section 4.3 SEM analysis (on pages 18-19) of the manuscript.
11. The results section is well-organized and presents the statistics clearly. However, it would be interesting to explore further why the professionals in the Chinese construction industry have a slightly higher level of job satisfaction than turnover intention.	Thank you for your comment. The following explanations were added in the revised manuscript (on page 17, in section 4.2 Descriptive statistical analysis), to explore further why the professionals in the Chinese construction industry have a slightly higher level of job satisfaction than turnover intention. *"……Although the pandemic had serious impacts on the Chinese construction industry during the survey period, the measures undertaken by the government in China were effective in ensuring the safety of the professionals working in the industry (Duan et al., 2023),*

	which is helpful to improve their sense of job security and satisfaction. Research also indicated that job satisfaction and turnover intention are negatively correlated (Wang et al., 2020; Abd-Ellatif et al., 2021), hence, higher level of job satisfaction facilitates to reducing the level of turnover intention. In addition, due to the serious negative impacts of the pandemic, organizations in the construction industry also encountered difficulties such as financial problems and site shutdowns (Chih et al., 2022). This resulted in less job opportunities in the industry and decreased expectations of changing the job among the professionals, leading to relatively lower turnover intention level……"
12. The conclusion summarizes the main findings well. However, it could be more succinct and could also benefit from a discussion on the practical implications of the findings.	Thank you for the comment. The discussion on the practical implications was further consolidated in the revised manuscript (on page 29, in section 6. Conclusion), as the following: *"The findings reported in this paper have significantly practical implications. This research contributes to a better understanding of how turnover intention is developed through the influence of underlying job satisfaction factors among professionals working in the Chinese construction industry in the context of the COVID-19 pandemic outbreak period. To mitigate turnover intention, it is imperative to implement targeted strategies aimed at cultivating employee job satisfaction from a multifaceted perspective. Organizations and employers in the construction industry should place prior emphasis on developing appropriate and effective leadership and management strategies, articulating effective training and career development programs, and creating a climate facilitating the cultivation of positive interpersonal relationships to enhance job satisfaction. This can help reduce the turnover intention of employees more effectively to achieve sustainable development for organizations in the Chinese construction industry. In addition, to enhance the job satisfaction of professionals working in the Chinese construction industry, it is*

	necessary to improve their job salary and benefit while reducing the negative influences of job-related factors such as demanding workloads and long working hours. Finally, organizational human resources management policies should be tailor-made considering different personal traits of professionals, specifically in terms of age, marital status, and years of working experience, to more effectively improve their job satisfaction and reduce turnover intention."
13. The limitations and future directions section should be improved and need to add more future directions like conducting a qualitative study.	Thank you for your comment. Following your suggestion, we have included more future directions in the revised manuscript (on page 30, in section 7. Limitation and future research directions), as follows: *"Some limitations in this study should be mentioned which also become important future research directions. First, the results cannot be generalized to the broader professional populations in the Chinese construction industry, since the empirical data was collected in Jiangsu province, which has the largest volume of added value of construction among all the provinces and is one of the most developed areas in China. Further investigation into the professionals in other areas of the Chinese construction industry is necessary to complement the results. Second, similar to other research, job satisfaction and turnover intention were mainly measured through self-report surveys, and in turn the actual situation might be different from the viewpoints collected. Other research methods (e.g., longitudinal observation, qualitative interview study) can be employed to further triangulate the research results in the future. Third, as the serious COVID-19 pandemic has disappeared globally, it is therefore valuable to conduct comparative research in two scenarios of with and without the influences of pandemic, which is critical to further determine the impact of pandemic on the job satisfaction and turnover intention among professionals in the construction industry."*
14. Consider improving the language and	Thank you for your comment. We have thoroughly

grammatical errors to enhance the clarity and readability of the paper.	reviewed the manuscript, and have improved the language and grammatical errors to enhance the clarity and readability of the paper. Please kindly refer to the revised manuscript with track changes for details.
15. Originality: Does the paper contain new and significant information adequate to justify publication?: The introduction effectively emphasizes the significance of turnover in the construction industry. However, it would be helpful to explain how the COVID-19 pandemic has affected job satisfaction and turnover intention in the construction industry.	Thank you for this suggestion. Please refer to the response to comment 2 above.
16. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: The literature review is comprehensive, but could benefit from more recent and relevant references. Also, it would be helpful to compare your findings with other studies to highlight similarities or differences.	Thank you for this suggestion. Please refer to the response to comment 3 above.
17. Methodology: Is the paper's argument built on an appropriate base of theory, concepts or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: The methodology section is clear but could provide more information about the sample, such as the sampling method used, and the representativeness of the sample. It would be beneficial to know the total number of respondents approached to gauge the response rate.	Thank you for this suggestion. Please refer to the response to comment 6 above.
18. Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: The results section is well-organized and	Thank you for this suggestion. Please refer to the response to comment 11 above.

presents the statistics clearly. However, it would be interesting to explore further why the professionals in the Chinese construction industry have a slightly higher level of job satisfaction than turnover intention.	
19. Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: Provide this area in the manuscript	Thank you for this suggestion. Please refer to the response to comment 12 above. In addition, the implications for research and the contributions of this research were presented in section 6 Conclusion (page 28).
20. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the fields and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: Consider improving the language and grammatical errors to enhance the clarity and readability of the paper.	Thank you for your comment. We have thoroughly reviewed the manuscript and have improved the language and grammatical errors to enhance the clarity and readability of the paper. Please kindly refer to the revised manuscript with track changes for details.