

Critical factors of construction workers' career promotion: evidence from Guangzhou city

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Abstract

Purpose – This study aims to build a framework of the influencing factors of construction workers' career promotion and identifies the critical determinants so as to propose suggestions for the government and enterprises to offer construction workers a path for career promotion.

Design/methodology/approach – In line with the theory of human resources, such as Herzberg's two-factor theory, this study constructs a theoretical framework that affects the career promotion of construction workers. Using evidence from Guangzhou city, valid data provided by 464 workers from 50 sites were collected by a questionnaire survey, and the significance test on the influencing factors of construction workers' career promotion was taken by binary logistic regression.

Findings – The overall career development of construction workers in Guangzhou is worrying. The binary logistic regression indicates that age, working years, type of work, career development awareness, legal awareness, professional mentality, vocational psychological training and career development path are critical factors that affect construction workers' career promotion.

Originality/value – This study for the first time explores the career promotion of frontline construction workers. Specifically, it identifies the critical factors that affect the career promotion of workers and thus lays a foundation for further research and the promotion and continuous and healthy development of the construction industry. Thus, this study is original and has theoretical and practical significance.

Keywords Construction workers, Career promotion, Critical factors, Binary logistic regression

Paper type Research paper

1. Introduction

For most developing countries, the construction industry is becoming a key driving force of economic growth and the pillar industry of the national economy (Tripathi and Jha, 2018). As a typical labor-intensive industry, the construction sector is highly attractive to migrant workers because of its low threshold and relatively high income (Deng *et al.*, 2013; Sun *et al.*, 2017) and currently employs approximately one-fifth of migrant workers (Wang *et al.*, 2019). These migrant workers are mainly engaged in heavy physical work on the construction site, including carpenters, masons, brick or block layers, steel benders, etc., known as frontline construction workers (Amissah *et al.*, 2019a, b). However, migrant workers entering the construction industry because of the "household registration system" reform have low cultural quality, low-skill levels and weak self-driving force (Tian and Zhou, 2013) and are



vulnerable to discrimination in the labor market, thereby resulting in insufficient promotion (Wang *et al.*, 2015). Construction workers' abnormal high mobility (Sun *et al.*, 2015) and high turnover rate (Shan *et al.*, 2017) also cause the shortage of skilled workers (Johari and Jha, 2019). With the gradual disappearance of the national demographic dividend (Cai, 2010), expanding the career development space of frontline construction workers and unblocking their promotion path so as to improve the quality of the labor force (Sun *et al.*, 2017) has become the key issue for the transformation and upgrading of the construction industry.

Career development refers to "the total constellation of psychological, sociological, educational, physical, economic, and chance factors that combine to shape the career of any given individual over the life span" (Sears, 1982) and is of great significance for individuals and organizations (Armstrong-Stassen and Ursel, 2009). Career promotion is the core feature and most common method of career development (Carmeli *et al.*, 2007) and has received wide scholarly attention (Arthur *et al.*, 2005). As the core element of objective career success (de Oliveira *et al.*, 2019; Orpen, 1995), career promotion is usually accompanied by an increase in income and social status (Gesthuizen, 2009; Gesthuizen and Dagevos, 2008) and plays an important role in promoting subjective career success, such as job satisfaction and work-family balance (Stumpf, 2014; Stumpf and Tymon, 2012). Moreover, as one of the four factors affecting career growth, career promotion can make employees find career development opportunities (Dharmaratne and Gunasekara, 2017), promote employees' organizational commitment and make them loyal and dedicated, thereby reducing employees' turnover intention (Weng and McElroy, 2012). Consequently, an investigation of career promotion is not only helpful to explore the career development of employees but also one of the ways to help industries and enterprises retain employees, a condition which has important theoretical and practical significance.

However, the current research on career promotion mainly focuses on the medical field (Desousa and Murrells, 2005; McHale *et al.*, 2019), the education industry (Connelly *et al.*, 2017; Ryazanova and McNamara, 2019) and government-related industries (Mei and Wang, 2017; Shah, 2011). No investigation has been focused on the promotion of frontline construction workers. In fact, people are very concerned about the improvement of construction workers' career promotion path (Sing *et al.*, 2017), and for construction workers, who experience extremely high job mobility and high turnover rates, promotion research is an important issue. At present, the new generation of migrant workers has gradually become the backbone of the construction industry in the Pearl River Delta and even in the entirety of China and is one of the main factors of China's rapid economic growth (Cheng, 2014). Compared with the old generation of migrant workers, the new generation has higher demand for employment security (Tian and Zhou, 2013) and is eager to take root in the city through career promotion and career development (Cheng, 2014). Moreover, with the development of industrialization and informatization (Swider, 2015), the construction industry is constantly transforming and upgrading. Obtaining and retaining more high-quality workers through unblocking their career promotion path is urgently required (Wang *et al.*, 2019). The Chinese government also attaches great importance to the issue of workers' career development (Tian and Zhou, 2013). Since 2017, policy documents, such as the "Reform Plan for the Construction of Industrial Workers in the New Period," have been issued to promote the industrialization of the construction industry and construction workers. In this context, targeted research on the career promotion of construction workers is urgently required for the needs of construction workers and the development needs of the construction industry.

Individuals compete for valuable promotion opportunities in an organization, and promotion has a long-term impact. Therefore, understanding and managing the factors that affect personal career promotion is vital for organizations and individuals (Marineau, 2017). Traditional promotion studies believe that performance is the key factor affecting career promotion (Carmeli *et al.*, 2007; Tremblay *et al.*, 2014). However, some scholars recently

pointed out that career promotion is not entirely based on employees' personal performance (Marineau, 2017; Zhang *et al.*, 2020), and exploring the influence of other personal or organizational factors on workers' promotion can provide a richer perspective for construction enterprises to expand workers' career promotion path. To explore the critical factors affecting workers' career promotion besides performance can help workers obtain better career development by improving their own ability to work (Liu and Li, 2013) and assist construction enterprises in retaining skilled workers and hiring qualified human resources to achieve project success (Detsimas *et al.*, 2016) so as to promote the sustainable and healthy development of the construction industry.

This study takes the construction workers in Guangzhou as an example, constructs a framework of factors affecting frontline construction workers' career promotion on the basis of Herzberg's two-factor theory and other human resource management theories, and identifies the critical factors that influence the promotion of workers through binary logistic regression so as to provide targeted suggestions for construction enterprises to unblock workers' career promotion path.

This paper is organized as follows. Section 2 reviews the relevant research. Section 3 presents the theoretical foundations and research hypotheses. Section 4 describes the research methods, and Section 5 illustrates the data analysis and results. Section 6 discusses the research findings and provides practical recommendations for construction enterprises to unblock the path of workers' career promotion. Finally, Section 7 summarizes the key ideas and presents the research limitation and agenda.

2. Literature review

2.1 Career success

Career has always been the foremost concern of workers (Beitz, 1993). It is important for individuals and organizations to succeed in their personal careers (Hall, 2002). Since Thorndike *et al.* (1934) proposed the concept of career success, scholars in various disciplines have conducted research on career success from different perspectives. Career success is defined as the sum of the positive work-related and psychological outcomes obtained from external verification or the internal perception by employees from their work experience (e.g. Arthur *et al.*, 2005; Jiang *et al.*, 2021), which is usually divided into objective and subjective dimensions (Arthur *et al.*, 2005; Hirschi *et al.*, 2018). Objective career success refers to tangible and observable aspects, such as salary level, career promotion and functional level (Guan *et al.*, 2019; Judge and Hurst, 2008). Subjective career success refers to an individual's perception of one's own career, usually measured by job satisfaction, career satisfaction and work-family balance (Dai and Song, 2016; Zhou *et al.*, 2013). Researchers have extensively explored the antecedents of career success from the perspectives of the individual (Ng *et al.*, 2005), family (Schneer and Reitman, 1993), organization (Allen *et al.*, 2004) and society (Wellman and Wortley, 1990). However, career success studies are mostly limited to business, healthcare and blue-collar occupations (de Oliveira *et al.*, 2019). It is necessary to broaden the research scope of career success and conduct career success-related surveys with different groups of employees (Dries *et al.*, 2008; Shen *et al.*, 2015).

Among the indicators of career success, material-based achievement, such as career promotion, is the most traditional and common one (de Oliveira *et al.*, 2019) and has been recognized as the best external indicator of career success (Orpen, 1995). Many studies have indicated that career promotion has a significant impact on salary growth (Gesthuizen, 2009; Gesthuizen and Dagevos, 2008). Furthermore, social comparative theory (Festinger, 1954) suggests that promotion relative to others may increase employees' self-perception of success, thereby resulting in greater career satisfaction. Previous research also confirmed that promotion plays an important role in encouraging subjective career success (Stumpf, 2014; Stumpf and Tymon, 2012). Scholars generally advocate the exploration of career

success from the combination of objective and subjective perspectives (Arthur *et al.*, 2005), especially in the construction industry with its numerous employees. Subjective career success factors, such as job satisfaction and work–family balance, have been widely studied in the field of construction (Maloney and McFillen, 1985; Rowings *et al.*, 1996; Shan *et al.*, 2017), but the research on career promotion as an important part of objective career success factors is rare. Therefore, the promotion research in the field of construction can not only compensate for the scarcity of objective career success research but also has great significance for promoting the research on workers' salary and job satisfaction.

2.2 Career promotion

Career promotion is an important aspect of career development (Weng and Hu, 2009) and is usually defined as the change of workers' position in the organizational level and the corresponding increase of salary level (Valsecchi, 2000). Career promotion is not only an important part of objective career success factors (Seibert *et al.*, 2001b) but also one of the four factors constituting career growth and is of great significance to promote the professional development and progress of employees (Weng *et al.*, 2010). Furthermore, according to the person–environment (P–E) fit theory (Su *et al.*, 2015), employees match their skill levels with their working environment and conditions through promotion (Privalko, 2019), which can realize effective personnel flow in the organization and improve the person–post matching efficiency in the enterprise. Thus, the understanding, research and management of career promotion are very important for employees and their organizations (Marineau, 2017).

Career promotion has received close attention in academic circles. Many scholars have conducted theoretical and empirical research on the issue, primarily on the fields of medical care (Desousa and Murrells, 2005; McHale *et al.*, 2019), the education industry (Connelly *et al.*, 2017; Pienaar and Zhao, 2017; Ryazanova and McNamara, 2019) and relevant government industries (Mei and Wang, 2017; Shah, 2011). As a highly mobile sector (Sun *et al.*, 2015), the human resource development in a construction organization is a worthy research field (Nkomo *et al.*, 2018), and the promotion of the construction industry deserves attention. However, few studies are available on the career promotion of construction industry, and their research objects are all construction professionals with higher education (Rosa *et al.*, 2017; Simmons *et al.*, 2018). Furthermore, no research is available on the career promotion of frontline construction workers who constitute the largest segment of the construction industry. In Mainland China, construction workers' career promotion is generally divided into technical and management channels. The technical channel adopts the five skill levels of workers stipulated by the Ministry of Human Resources and Social Security of China, including primary workers, intermediate workers, senior workers and the senior and junior technicians, which correspond to the national vocational qualification levels of five, four, three, two and one (Feng, 2016). A few workers with high education level and management potential may develop in the direction of management, thereby becoming team leaders and foremen and even join construction management and be completely separated from the frontline labor force (Wang, 2018). The construction industry has absorbed approximately one-fifth of the migrant workers in China (Wang *et al.*, 2019). Thus, expanding the research object of career promotion to this large group is of great theoretical significance for enriching the research on career development in the field of construction.

Many people are prejudiced against the occupation of construction workers and think that the latter are engaged in low social-economic status work (Sing *et al.*, 2017). The abnormal occupational mobility of construction workers is also very serious (Sun *et al.*, 2015), and the space for career promotion is small (Wang *et al.*, 2015), thereby resulting in a severe brain drain in the construction industry and causing the construction enterprises to lack skilled workers for a long time (Barbosa *et al.*, 2017), a situation which is not conducive to the efficient and healthy development of the said industry. Weng and McElroy (2012) revealed that

according to the expectation theory (Porter and Steers, 1973), career promotion, as one of the four factors affecting career growth, can make employees find career development opportunities (Dharmaratne and Gunasekara, 2017), promote employees' organizational commitment, make them more loyal and dedicated, and reduce employees' turnover intention. Therefore, providing promotion opportunities for construction workers can improve their engagement and help construction enterprises retain skilled workers. In addition, in the traditional concept of Chinese construction workers, promotion means more generous pay and higher social status, which is the goal pursued by workers. In recent years, after the proposal of the strategy of "balancing urban and rural development" (Tian and Zhou, 2013), the new generation of migrant workers has gradually become the backbone of the construction industry in the Pearl River Delta and even throughout China (Cheng, 2014). Compared with the previous generation of migrant workers, the new generation has more urgent employment security (Tian and Zhou, 2013) and career development needs (Liu and Li, 2013), is eager to get promotions to receive better treatment and can take root in the city (Cheng, 2014). Moreover, with the development of industrialization and informatization (Swider, 2015), China's economic growth mode has changed from high-speed to high-quality development, and its demand for high-quality construction workers is increasing. The Chinese government has also made efforts to solve the problems of small career development space for migrant workers through the introduction of policies (Tian and Zhou, 2013). Whether for the needs of workers themselves or the development of the industry, studying the promotion of construction workers is urgently needed and has important practical significance to address the issues of high turnover rate, the shortage of skilled workers, and the small space for workers' career development.

Career promotion has a direct impact on employees' career development and organizational career management, so understanding the key determinants of promotion can promote effective personnel development within organizations (Lockamy and Service, 2011). Other industries have rich research on the influencing factors of career promotion, including demographic characteristics (Kirchmeyer, 1998; Zhang *et al.*, 2020), human capital (Claussen *et al.*, 2014) and social capital (Seibert *et al.*, 2001b; Tremblay *et al.*, 2014), a feature which can provide sufficient reference for the investigation on the influencing factors of construction workers' career promotion. To explore the influencing factors as the starting point of construction workers' career promotion research can provide a basis for the workers, the construction enterprises and the government as regards taking measures to encourage the promotion and the healthy and high-quality development of the construction industry.

3. Theoretical background and hypothesis development

Previous studies on the influencing factors of career promotion have confirmed the decisive role of performance as an objective factor. Carmeli *et al.* (2007) proved that the job performance of employees was the most important predictor of their promotion prospects. Through human capital theory, Tremblay *et al.* (2014) further established that individual performance had an important impact on objective career success, such as career promotion. However, some scholars have recently proposed that career promotion is not entirely in line with employees' personal performance (Marineau, 2017; Zhang *et al.*, 2020), and other factors such as leadership relationship, work-family conflict and demographic differences are also vital (Feldman and Ng, 2007; Marineau, 2017). Moreover, compared with the rigid condition of personal performance, whether other personal factors or organizational factors can play a key role in the promotion of workers is of greater research significance because it will provide a richer perspective for construction enterprises to expand the path of workers' career promotion. Previous promotion studies also often explore the factors influencing the promotion decision from the perspective of managers (Carmeli *et al.*, 2007; Lockamy and Service, 2011), but research from the perspective of workers is lacking. This work explores factors aside from

performance, such as personal characteristics, consciousness or organizational security, from the perspective of frontline construction workers that can generate additional opportunities for construction workers to promote their careers.

Demographic characteristics (such as age, education level and working years) are generally considered to be the objective factors influencing employees' career promotion (Zhang *et al.*, 2020). To avoid studying promotion only through demographic variables (Carmeli *et al.*, 2007; Lawrence, 1997), comprehensively considering the perspective of employees' professional qualifications and industry security factors is vital. Inspired by Herzberg's two-factor theory (Herzberg, 2017) and the investigation of determinants in addition to demographic factors, this work divides the influencing factors of construction workers' career promotion into motivation and hygiene factors. Motivation factors refer to the feeling of workers in work (Bassett-Jones and Lloyd, 2005), that is, their professional qualifications, and provide workers with the source of promotion. If the motivation factors are improved, then the workers will have the internal motivation for career promotion so as to hold senior positions and corresponding higher salaries. By contrast, hygiene factors refer to the external factors such as environments and conditions brought about by the construction industry or enterprises (Bassett-Jones and Lloyd, 2005) and are summarized as industry security factors. Those factors provide basic guarantee for workers' career promotion. If the healthcare factors are insufficient, then workers' promotion will not obtain basic material guarantee, a situation which will also exert a negative impact on their promotion opportunities. The demographic characteristics, professional qualifications and industry security factors are subdivided and expanded according to the personal and working characteristics of construction workers.

3.1 Demographic characteristics

As an important objective factor affecting career promotion, demographic characteristics have been widely valued by academic circles (e.g. Carmeli *et al.*, 2007; Jiang *et al.*, 2019; Zhang *et al.*, 2020). Many scholars have conducted in-depth theoretical and practical research on different organizations and industries (Landau, 1995; Zhang *et al.*, 2018). However, the research on the construction workers' group has paid insufficient attention to the influence of demographic variables on their mobility. This study can make up for this gap. For employees in many countries, gender is considered an important factor, and many investigations focus on the promotion differences between male and female employees (Månsson *et al.*, 2013; Schweitzer *et al.*, 2011). Nevertheless, the proportion of women in the construction workers group is very small at only about one-tenth, so gender is not included among the demographic factors.

Workers of different ages are in different career stages. They have varying views on their current work and career prospects, career planning and career promotion (Van der Heijden *et al.*, 2009). Therefore, age should be regarded as one of the factors influencing workers' career promotion. With the accumulation of workers' working hours in the current organization, their work experience and social capital will also increase accordingly, and they will be more capable of creating benefits for the enterprise so as to obtain more promotion space (Zhang *et al.*, 2020). Therefore, working years is also one of the influencing factors. Construction workers generally have short education years and low education levels (Liu and Li, 2013; Zhang and Li, 2016). However, differences in education levels will lead to divergent personal needs of workers (Hayek *et al.*, 2016), a situation which will also be reflected in their promotion needs (Zhang *et al.*, 2020). Education level is therefore also a factor that must be considered.

The type of work performed by workers in the current organization also affects their promotion. Frontline workers on the construction site are mainly divided into unskilled workers, skilled workers and managers. The promotion needs and promotion opportunities of workers in different types of work vary. For example, managers are often considered to have better promotion opportunities (Rynes, 1987; Tremblay *et al.*, 2002). Moreover, in

different work units, such as general contractors and labor service subcontractors, workers will obtain different promotion opportunities because of the divergent promotion mechanisms and promotion paths.

According to the above analysis, the following hypotheses are proposed:

- H1. Age has a significant effect on construction workers' career promotion.
- H2. Working years have a significant effect on construction workers' career promotion.
- H3. Education level has a significant effect on construction workers' career promotion.
- H4. Type of work has a significant effect on construction workers' career promotion.
- H5. Affiliated unit has a significant effect on construction workers' career promotion.

3.2 Professional qualifications

As an incentive factor that can provide motivation for workers' promotion, professional qualifications can also be understood as the cognitive ability of workers and can exert a positive effect on personal promotion (Borteyrou *et al.*, 2015). Originating from Bandura's social cognitive theory (Bandura, 1999), social cognitive career theory plays an increasingly important role in career development research. Social cognitive career theory emphasizes the notion that three variables play an important role in career development, namely, self-efficacy, outcome expectations and personal goals (Lent *et al.*, 1994). Self-efficacy refers to an individual's personal beliefs about his or her capabilities to perform particular behaviors or courses of action (Jiang, 2016). Outcome expectations refer to beliefs about the consequences or outcomes of performing particular behaviors. Personal goals may be defined as one's intentions to engage in a particular activity or to attain a certain level of performance (Lent *et al.*, 2002).

Inspired by social cognitive career theory, workers' personal professional quality can be divided into the following aspects. First, at the level of self-efficacy, workers must have awareness of career development and understand the conditions and ways of career promotion to motivate them to strive for promotion. Moreover, as most of the construction workers are migrant workers with low education levels (Wang *et al.*, 2019) and many of them are temporarily employed or even have no signed labor contracts, their awareness of law and rights protection is weak (Swider, 2015), a circumstance which is extremely unfavorable for the promotion of workers. Therefore, workers' career development awareness and legal awareness are the source of their belief about earning promotions. Second, the level of outcome expectations mainly depends on the workers' professional mentality and whether they have confidence in their future career development and promotion path. The role of professional mentality has been explored in previous studies (Lockamy and Service, 2011) and is particularly important for construction workers with low occupational stability. Finally, at the level of personal goals, the career anchor theory posits that workers with different career development goals have varying priorities in their work, a circumstance which has a certain impact on their promotion results (Spilerman, 1977; Stumpf, 2014). For example, the working direction of workers whose career development goal is to become professional technicians differs from that of workers who turn to the direction of construction management.

According to the above analysis, the following hypotheses are proposed:

- H6. Career development awareness has a significant effect on construction workers' career promotion.
- H7. Legal awareness has a significant effect on construction workers' career promotion.

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- H8. Professional mentality has a significant effect on construction workers' career promotion.
- H9. Career development goals have a significant effect on construction workers' career promotion.

3.3 Industry security factors

The guarantee provided by the construction industry or enterprise for workers can provide organizational support for the latter, a feature which is related to the promotion opportunities of workers (Frenkel and Bednall, 2016). The key aspect lies in the career development needs of workers. The most famous demand theory was proposed by Maslow in "A Theory of Human Motivation" in 1943. He divided human needs from low to high into five levels: physiological needs, safety needs, belongingness and love, esteem and self-actualization (Maslow, 1943). Inspired by Maslow's hierarchical theory of needs, this research divides the industry security factors into five aspects.

The first aspect involves physiological needs, and the most basic is the wage level provided by construction enterprises for workers. The current wage level is too low to guarantee the basic livelihood of workers, let alone encourage professional promotion. The second is safety needs. Considering the low work stability of construction workers (Sing *et al.*, 2017), many migrant workers in the construction industry are temporarily employed, do not have signed labor contracts and seriously lack employment security (Wells, 2007), and these situations are extremely unfavorable for their promotion path. Thus, the contract signing of construction workers is also one of the factors affecting their promotion, along with belongingness and love. Long-term and high-intensity physical labor and poor working conditions at construction sites have seriously damaged the physical and mental health of workers (Evanoff *et al.*, 2020). The physical safety of workers has been fully valued, but their mental health has received insufficient attention. Consequently, vocational psychological training can improve the increasingly serious mental health problems of workers and provide for their emotional and other social needs, thereby influencing the promotion of career development and of workers. A need for esteem also exists. If workers want to gain self-esteem and respect from others, then they need to make themselves more capable and creative. For workers with low education levels, vocational skill training is very important. Only when they have enough professional skills can they get enough promotion space (Sing *et al.*, 2017; Tian and Zhou, 2013). Finally, there is a need for self-actualization. For construction workers, their organizations must provide a reasonable career development path so that they can realize their value professionally; moreover, the important aspect of value realization is to get a promotion (Tremblay *et al.*, 2014).

According to the above analysis, the following hypotheses are proposed:

- H10. Wage level has a significant effect on construction workers' career promotion.
- H11. Contract signing has a significant effect on construction workers' career promotion.
- H12. Vocational psychological training has a significant effect on construction workers' career promotion.
- H13. Vocational skill training has a significant effect on construction workers' career promotion.
- H14. Career development path has a significant effect on construction workers' career promotion.

The theoretical background and hypothesis development are shown in Figure 1.

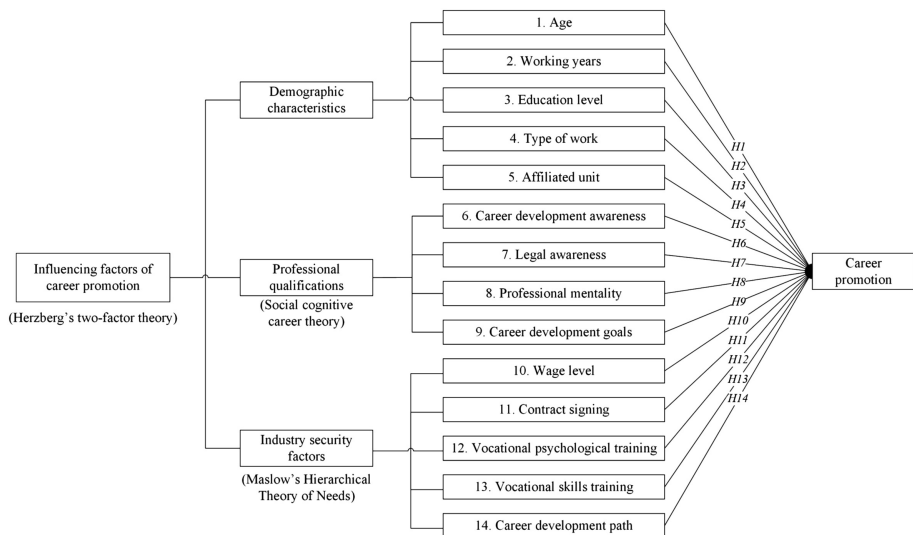


Figure 1. Conceptual framework

4. Research method

4.1 Measures and questionnaire design

According to previous studies, career promotion is measured by a self-reported reply as to “whether you have got a formal career promotion in the past 12 months” (Seibert *et al.*, 2001a). Therefore, this study also used the binary variable “promotion or not” to measure the career promotion of the explained variable. Considering the general lack of promotion for construction workers, the time frame for promotion was extended to the last 24 months, after agreement with experts with more than 20 years of employment experience. The participants should answer the question “Have you ever been promoted in the past 24 months?” with “yes” or “no.” A quantitative research was used in this study, and considering the simplicity of the questionnaire design (Kothari, 2004), the other 14 dependent variables used self-reported questions for workers, such as “Do you sign a labor contract with your current work unit?”

The initial questionnaire was designed through extensive literature review combined with the actual work characteristics of construction workers. Given the low educational level of construction workers, the items of the questionnaire were described as plainly as possible. After the completion of the initial questionnaire, six experts in China and abroad were invited to review the questionnaire, and six senior construction managers with more than 15 years of work experience were asked to evaluate the feasibility of the questionnaire. The structure arrangement, item setting and language expression of the questionnaire were modified according to the opinions of experts and construction managers to form the final questionnaire.

The references of questionnaire design are shown in Table 1:

4.2 Sample selection and data sources

As the capital and central city of Guangdong province, Guangzhou has a large economy and has an important influence in South China and even in the entire country (Hu *et al.*, 2010). In the past five years, Guangzhou’s construction industry has shown rapid development. The scale of enterprises has achieved a blowout growth, the total assets have doubled and the

Table 1. Key references of influencing factors of construction workers' career promotion

Category	Influencing factors	References
Demographic characteristics	1. Age	Van der Heijden <i>et al.</i> (2009), Zhang <i>et al.</i> (2020)
	2. Working years	Lockamy and Service (2011), Van der Heijden <i>et al.</i> (2009)
	3. Education level	Han <i>et al.</i> (2019), Lockamy and Service (2011), Zhang <i>et al.</i> (2020)
	4. Type of work	Rynes (1987), Tremblay <i>et al.</i> (2002)
	5. Affiliated unit	Lockamy and Service (2011), Marineau (2017), Privalko (2019)
Professional qualifications	6. Career development awareness	Borteyrou <i>et al.</i> (2015), Claussen <i>et al.</i> (2014)
	7. Legal awareness	Claussen <i>et al.</i> (2014), Wang <i>et al.</i> (2019)
	8. Professional mentality	Lockamy and Service (2011), Peltokorpi (2017), Verbruggen (2012)
Industry security factors	9. Career development goals	Tremblay <i>et al.</i> (2014), Weng <i>et al.</i> (2010)
	10. Wage level	Carmeli <i>et al.</i> (2007), Miklós-Thal and Ullrich (2016), Weng <i>et al.</i> (2010)
	11. Contract signing	Miklós-Thal and Ullrich (2016), Wang <i>et al.</i> (2019)
	12. Vocational psychological training	Peltokorpi (2017), Tijani <i>et al.</i> (2020)
	13. Vocational skills training	Frenkel and Bednall (2016), Hyden <i>et al.</i> (2015), Sun <i>et al.</i> (2017), Tian and Zhou (2013)
	14. Career development path	Tremblay <i>et al.</i> (2002, 2014)

construction team and operating revenue have increased significantly (*Bulletin of the Fourth National Economic Census of Guangzhou (No.4)*, n.d.). In 2019, the annual revenue of Guangzhou's construction industry 541.891 bn yuan, with an added value of 77.363 bn yuan, for an increase of 12.4% over the last year (*Statistical Bulletin of National Economic and Social Development of Guangzhou in 2019*, n.d.). In addition, Guangzhou accommodates construction workers from all over the country, and their career development status is representative of the overall situation for Chinese workers (Cheng, 2014). Therefore, this paper presents a case study in Guangzhou with its construction workers as the research object.

With the support of the Guangzhou Municipal Housing and Urban–Rural Development Bureau, this work randomly selected 50 projects in each district of Guangzhou from the project database for field investigation and randomly chose 10–13 workers in each project for the questionnaire survey. Considering the low educational level of construction workers, this study provided sufficient guidance for workers to complete the questionnaires. After the researchers arrived at the construction site, they organized 10–13 workers of the project to hold a small meeting at the project department to briefly introduce the contents of the questionnaire and provide necessary guidance when workers fill in the questionnaires. For workers who could not understand the contents of the questionnaire (such as older workers or workers with low word cognition level), researchers dictated the questions to ensure accurate answers. A total of 501 questionnaires were distributed, and 464 questionnaires were returned (the response rate was 92.61%).

5. Data analysis and results

5.1 Demographic characteristics

First, the demographic characteristics of the sample were identified (Table 2).

		Percentage				Percentage	
		Numbers	(%)			Numbers	(%)
Gender	Male	422	90.9	Marriage	Unmarried	79	17.0
	Female	42	9.1		Married	385	83.0
Age	Under 25	46	9.9	Education level	Haven't studied	6	1.3
	25–34	98	21.1		Primary school	58	12.5
	35–44	103	22.2		Junior high school	241	51.9
	45–54	185	39.9		Senior high school	93	20.0
	Over 55	32	6.9		Technical secondary school	36	7.8
Place of origin	Guangdong	90	19.4	Years of experience	College or above	30	6.5
	Sichuan	84	18.1		Less than 1 year	28	6.0
	Hunan	70	15.1		1–3 years	83	17.9
	Chongqing	34	7.3		4–6 years	84	18.1
	Hubei	29	6.3		Over 6 years	269	58.0
	Other provinces	157	33.8				

Table 2.
Demographic characteristics of construction workers in Guangzhou

The demographic characteristics of the construction workers in Guangzhou are as follows: **(1) The aging of construction workers was serious.** Construction workers aged 45–54 predominated, accounting for 39.9%. Only 9.9% of the respondents were under 25. According to the division of the International Labour Organization of the United Nations, the labor force aged 45 and above is the elderly labor force. The results indicated serious aging of the construction workers and that the occupation of construction worker was unattractive to young people. **(2) Construction workers from other provinces constitute the main segment of Guangzhou construction workers.** Construction workers from other provinces accounted for 80.6%, with the proportion of registered Guangdong residents at only 19.4%. **(3) The overall educational level of construction workers was low.** A total of 65.7% of the construction workers had a junior high school education or below, and only 6.5% of the construction workers had a college education or above. **(4) The construction workers in Guangzhou had rich experience, but new entrants were scarce.** A total of 58.0% of construction workers had been in the industry for more than six years, and only 6% had been in the industry for less than one year. Construction work is thus less attractive to young people.

5.2 Binary logistic regression

In the machine learning binary classification algorithm, logistic regression is simple and easy to understand, and the interpretability of the model is very satisfactory. The influence of different features on the final result can be found according to their weights (Allison, 2012). Moreover, logistic regression is common in the study of construction workers (Zhang et al., 2015; Zong et al., 2017). In this work, the dependent variable “career promotion” is a dichotomous variable, and 14 independent variables are continuous variables or classified variables. Moreover, the observation values are independent of each other, and the sample size is sufficient; thus, binary logistic regression is suitable for the significance test (Allison, 2012).

5.2.1 *Variable setting and assignment.* The factors that affect the career promotion of construction workers are summarized as the following 14 explanatory variables: age, working years, education level, type of work, affiliated unit, career development awareness, legal awareness, professional mentality, career development goals, wage level, contract signing, vocational psychological training, vocational skills training and career development path. The explained variable is set to 0 if a career promotion exists and 1 otherwise. The meanings and assignments of specific variables are shown in Table 3.

5.2.2 *Model analysis.*

(1) Multiple collinearity test

The linear correlation between explanatory variables is called multicollinearity (Farrar and Glauber, 1967). To avoid the influence of high multicollinearity among explanatory variables on the regression results, a multicollinearity test was first conducted for each explanatory variable. SPSS 22 was used for the collinearity diagnosis. The results are shown in Table 4.

Tolerance and the variance inflation factor (VIF) are reciprocal. The VIF value exceeds 1, and the closer the VIF is to 1, the weaker the multicollinearity between explanatory variables. When the VIF is greater than or equal to 10, a strong multicollinearity occurs between the focal explanatory variable and the other explanatory variables. Table 4 indicates that the VIF

	Variable meaning	Assignment content
<i>Explanatory variables</i>		
Demographic characteristics	X1: Age	Under 25 = 1, 25–34 years old = 2, 35–44 years old = 3, 45–54 years old = 4 and over 55 years old = 5
	X2: Working years	Less than 1 year = 1, 1–3 years = 2, 3–6 years = 3 and over 6 years = 4
	X3: Education level	Have not attended school = 1, primary school = 2, junior high school = 3, senior high school = 4, technical secondary school = 5 and college and above = 6
	X4: Type of work	Manager = 0, skilled worker = 1 and unskilled worker = 2
	X5: Affiliated units	Other units = 0, general contracting unit = 1 and labor subcontract = 2
Professional qualifications	X6: Career development awareness	No awareness = 1, a little awareness = 2 and strong awareness = 3
	X7: Legal awareness	No awareness = 1, a little awareness = 2 and strong awareness = 3
	X8: Professional mentality	No confidence = 1, a little confidence = 2 and full of confidence = 3
Industry security factors	X9: Career development goals	Other goals = 0, become a professional and technical worker = 1 and join management = 2
	X10: Wage level	Less than 3,000 yuan = 1, 3,000–4,500 yuan = 2, 4,500–6,000 yuan = 3 and over 6,000 = 4
	X11: Contract signing	No = 1 and yes = 2
	X12: Vocational psychological training	Regularly = 0, never = 1, occasionally = 2 and often = 3
	X13: Vocational skills training	Yes = 1 and no = 2
	X14: Career development path	Yes = 1 and no = 2
<i>Explained variable</i>	Y: Career promotion	Yes = 0 and no = 1

Table 3. Meaning and assignment of related variables

Table 4.
Multicollinearity test
for explanatory
variables

Model	Collinearity statistics		Model	Collinearity statistics	
	Tolerance	VIF		Tolerance	VIF
<i>(Constants)</i>			<i>(Constants)</i>		
X1: Age	0.666	1.501	X8: Legal awareness	0.796	1.257
X2: Education level	0.745	1.342	X9: Professional mentality	0.923	1.083
X3: Working years	0.810	1.234	X10: Wage level	0.865	1.156
X4: Type of work	0.805	1.242	X11: Contract signing	0.849	1.178
X5: Affiliated units	0.940	1.064	X12: Vocational skills training	0.883	1.132
X6: Career development goals	0.855	1.170	X13: Vocational psychological training	0.697	1.435
X7: Career development awareness	0.767	1.303	X14: Career development path	0.787	1.271

of each explanatory variable is close to 1, so we conclude that the multicollinearity of the explanatory variables is weak.

(2) Model analysis

The binary logistic regression of SPSS 22 was used to analyze the questionnaire data. Among the 14 explanatory variables, eight of them (the type of work, affiliated unit, working years, career development goals, contract signing, vocational skills training, vocational psychological training and career development path) involved classified data. The remaining six explanatory variables were set as quantitative data, including age, education level, career development awareness, legal awareness, professional mentality and wage level. The output model analysis is shown in Table 5.

Table 5 shows that the chi-square value of the model is 124.927, a relatively small value which suggests that the fitting degree of the model is satisfactory. The degree of freedom is 21, and the corresponding *p*-value is 0.000. Thus, the overall significance of the model is high.

Table 6 shows a $-2 \log$ likelihood function value of 513.745, which is relatively large, and the model's fitting degree is not very satisfactory. The range of Nagelkerke *R* square is [0, 1]. The closer the range is to 0, the lower the interpretation of the equation. Table 7 shows that the overall prediction accuracy of the model is 71.8%, a value which is low theoretically, thereby indicating that the model does not fit well. In view of the low fitting degree of the model, the model should be modified, including through data merging or data deletion.

Table 5.
Omnibus tests of model
coefficients

	Chi-square	df	Sig.
Step	124.927	21	0.000
Block	124.927	21	0.000
Model	124.927	21	0.000

Table 6.
Model summary

$-2 \log$ likelihood	Cox and snell <i>R</i> square	Nagelkerke <i>R</i> square
513.745 ^a	0.236	0.316

Note(s): ^a Estimation terminated at the fourth iteration because the parameter estimates changed by less than 0.001

However, the purpose of this binary logistic regression is only to ascertain the significant factors that affect the construction workers' career promotion, so optimizing the model is unnecessary.

5.2.3 Hypothesis testing. After the establishment of the logistic binary regression model, the hypothesis put forward by theoretical analysis was verified by a significance test. The results are shown in [Table 8](#).

As shown in [Table 8](#), eight explanatory variables passed the significance test at the significance level of 10%. These variables include age, working years (more than 6 years and 1–3 years), type of work (manager), career development awareness, legal awareness, professional mentality, professional psychological training (never and occasionally) and career development path. Therefore, [H1](#), [H2](#), [H4](#), [H6](#), [H7](#), [H8](#), [H12](#) and [H14](#) are supported. Among them, the *p*-values of working years (more than 6 years and 1–3 years), career development awareness, professional mentality, vocational psychological training (occasionally) and career development path were all less than 0.05 with a high level of significance. Thus, in terms of demographic characteristics, the first factor affecting the career promotion of construction workers is their working years. In terms of professional qualifications, career development awareness and professional mentality are the primary factors affecting construction workers' career promotion. In terms of industry security factors, the primary reasons for construction workers' career promotion are professional psychological training and career development path. Six factors that failed the significance test include education level, affiliated units, career development goals, wage level, contract signing and vocational skills training. As a result, [H3](#), [H5](#), [H9](#), [H10](#), [H11](#) and [H13](#) are not supported.

6. Discussion and implications

6.1 Discussion

This work has been the first study that focused on the career promotion of construction workers. Eight critical factors influencing construction workers' career promotion were ascertained by binary logistic regression. Demographic characteristics, professional qualifications and industry security factors can affect construction workers' career promotion, and each feature is analyzed and discussed below.

In terms of demographic characteristics, age, working years and type of work passed the significance test. The explanatory variable of working years has the highest level of significance (*p*-value<0.05), thereby establishing that working years is the primary factor in the dimension of demographic characteristics. The regression coefficient of age is negative. Thus, the older the workers are, the worse their career promotion is. This outcome is inconsistent with those of other studies, which indicate that workers can get more promotion space with the increase of age, length of service and work experience ([Van der Heijden et al., 2009](#); [Zhang et al., 2020](#)). Therefore, in the construction industry, young workers pay more attention to their career and promotion relative to elder workers ([Maqsoom et al., 2018](#)). With

Measured		Forecast		Correct percentage
		Y: Career promotion Yes	No	
Y: Career promotion	Yes	199	56	78.0
	No	75	134	64.1
Total percentage				71.8

Note(s): Demarcation value is 0.500

Table 7.
Model fit

	<i>B</i>	SE	Wald	df	Sig.	Exp (B)
X1: Age	-0.198	0.120	2.742	1	0.098*	0.820
X2: Working years			8.889	3	0.031**	
Over 6 years						
X2: Working years (1)	-0.878	0.547	2.574	1	0.109	0.416
Less than 1 year						
X2: Working years (2)	-0.927	0.328	7.973	1	0.005**	0.396
1-3 years						
X2: Working years (3)	-0.351	0.309	1.291	1	0.256	0.704
3-6 years						
X3: Education level	-0.035	0.119	0.089	1	0.765	0.965
X4: Type of work			3.486	2	0.175	
Unskilled worker						
X4: Type of work (1)	0.701	0.376	3.475	1	0.062*	2.015
Manager						
X4: Type of work (2)	0.428	0.338	1.607	1	0.205	1.534
Skilled worker						
X5: Affiliated unit			0.828	2	0.661	
Labor subcontract						
X5: Affiliated unit (1)	0.211	0.327	0.418	1	0.518	1.235
Other units						
X5: Affiliated unit (2)	-0.114	0.253	0.201	1	0.654	0.893
General contracting unit						
X6: Career development awareness	0.477	0.186	6.551	1	0.010**	1.610
X7: Legal awareness	0.355	0.214	2.760	1	0.097*	1.426
X8: Professional mentality	0.562	0.237	5.604	1	0.018**	1.753
X9: Career development goals			2.319	2	0.314	
Join management						
X9: Career development goals (1)	-0.636	0.485	1.723	1	0.189	0.529
Other goals						
X9: Career development goals (2)	-0.308	0.255	1.456	1	0.228	0.735
Professional						
X10: Wage level	0.092	0.137	0.450	1	0.502	1.096
X11: Contract signing (1)	-0.047	0.250	0.035	1	0.851	0.954
No						
X12: Vocational psychological training			4.733	3	0.192	
Regularly						
X12: Vocational psychological training (1)	-0.739	0.421	3.077	1	0.079*	0.478
Never						
X12: Vocational psychological training (2)	-0.835	0.421	3.938	1	0.047**	0.434
Occasionally						
X12: Vocational psychological training (3)	-0.341	0.503	0.458	1	0.498	0.711
Often						
X13: Vocational skills training (1)	0.280	0.411	0.465	1	0.495	1.323
No						
X14: Career development path (1)	1.133	0.233	23.634	1	0.000**	3.104
Yes						
Constants	-3.143	1.233	6.499	1	0.011	0.043

Table 8.
Estimated regression
parameters and
significance test results

the aging of the construction industry, attracting more young people into the construction industry is an urgent problem that must be addressed (Shahbazi *et al.*, 2019). Additionally, managers are more likely to be promoted compared with unskilled workers, and this finding is consistent with the test results of Tremblay *et al.* (2002) among Canadian engineers. This outcome also suggests that promoting the professional promotion of ordinary workers toward the direction of construction management personnel is an effective technique.

However, the education level and affiliated units did not pass the significance test. This may be related to the low educational level of construction workers (65.7% of them have junior high school education or below). In addition, in the construction field, the organizations have a weak level of workers' culture and team building, the communication between workers and management is very weak (Han *et al.*, 2019) and there is no significant difference in the promotion of workers between different units.

In terms of professional qualifications, career development awareness, legal awareness and professional mentality passed the significance test. According to social cognitive career theory (Lent *et al.*, 2002), workers' self-efficacy is a strong driving force for their career development. Only workers with career development awareness can have the motivation to strive for career promotion in the organization. Moreover, enhancing the legal awareness of migrant workers in the construction industry through training and education is vital so as to reduce the industry discrimination against migrant workers and safeguard their legitimate rights and interests (Wang *et al.*, 2015). In addition, Peltokorpi (2017) revealed that employees' different perceived pressures in the organization lead to different professional mentalities, a feature which is closely related to employees' career promotion. Thus, workers with good professional mentality have better promotion status than their counterparts. Construction enterprises should therefore pay more attention to the psychological status of workers. The career development goal does not pass the significance test, which may be due to the low level of education. Most construction workers have no clear career development goals (Liu and Li, 2013), so it is imperative to strengthen worker training.

In terms of industry security factors, vocational psychological training and career development path passed the significance test. Note that the construction industry is one of the most dangerous sectors (Khoshnava *et al.*, 2020). Long-term high-intensity physical labor and long-term exposure to adverse weather conditions have seriously damaged the physical and mental health of workers (Evanoff *et al.*, 2020). Aside from considering the physical safety of workers, enterprises and the government must pay greater attention to the mental health of construction workers and strengthen the psychological quality of workers through regular and appropriate psychological training, which also helps to improve the career development of workers. Furthermore, some studies confirmed that many construction workers are reluctant to participate in skill training, and the training effect is poor (Sun *et al.*, 2017), a situation which also explains why vocational skill training has not become a critical factor that affects promotion. To improve the effect of skill training for workers, the government must lead construction enterprises to establish a better career development path (Detsimas *et al.*, 2016) and encourage workers to promote career development and promotion by improving their skills so as to obtain higher income and social status. Different from other research results, the salary does not pass the significance test. This is because the salary level of construction workers is too low compared with those in other industries and not enough to play a sufficient incentive role (Liu and Li, 2013; Swider, 2015). In addition, the legal awareness of construction workers is weak. Many workers who have signed contracts do not really understand the significance of labor contracts and employment agreements (Wells, 2007). The effective signing rate is very low, and the labor contracts do not play a due role in protecting their rights and interests (Wang *et al.*, 2019).

Building a sound career development path and improving the promotion stability of construction workers can promote workers' job satisfaction and career satisfaction and enhance workers' organizational commitment (Dharmaratne and Gunasekara, 2017). Therefore, career promotion can be regarded as one of the ways to help construction enterprises retain workers and solve the severe problems of high turnover rate and lack of skilled workers in the construction industry (Weng and McElroy, 2012). Through theoretical analysis, this study constructs a theoretical framework for influencing the career promotion of construction workers and lays a theoretical foundation for the research on that promotion.

This paper creatively introduces Herzberg's two-factor theory, a very typical incentive theory (Herzberg, 2017), into the research of career promotion. In addition, this research proves the theoretical framework through an empirical test, thereby expanding the application of Herzberg's two-factor theory in career research. In its analysis of the motivation factors and hygiene factors, this work was guided by social cognitive career theory (Lent *et al.*, 2002) and Maslow's hierarchical theory of needs (Maslow, 1943), an approach which brings more theoretical value to the study of workers' career promotion.

Although career development is vital for construction workers, the research on the construction industry is still in its infancy. The research object of the existing literature mainly involves construction professionals in the Western developed countries (Simmons *et al.*, 2018), and the research content primarily explores the challenges faced by women's career development in the construction industry (Nkomo *et al.*, 2018; Rosa *et al.*, 2017). This approach pays slight attention to the frontline construction workers in developing countries. Thus, this work first expands the research on the promotion of the profession to the frontline construction workers group and then selects the key factors that affect the promotion of workers, enriches the research on the construction industry and also makes up for the gap in the research on the promotion of construction workers in developing countries. The research conclusion provides guidance for the government and the enterprises to unblock the path of the workers' career development and reflects the important theoretical and practical value of this study.

6.2 Practical implications

This study constructs a framework of the influencing factors of construction workers' career promotion through theoretical analysis and selects eight key factors through an empirical test. After the empirical test results are obtained, combined with the interview results with several senior managers, this paper summarizes the following targeted suggestions to help the government and construction enterprises unblock the path of workers' career development, as shown in Table 9.

7. Conclusions

As a typical labor-intensive industry, the construction sector attracts numerous migrant workers because of its low threshold and relatively high income. However, the cultural quality of migrant workers in the construction industry is low, their skills are low and their self-driving force for career development is weak. Those workers are easily discriminated against by the labor market, thereby leading to insufficient promotion. Under the background of the government advocating the transformation and upgrading of the construction industry, this paper creatively introduces a research study on the career promotion of frontline construction workers. This work tests the significance of the influencing factors of career promotion through a questionnaire survey of 464 construction workers in Guangzhou and enriches the career development literature in the construction field.

The survey data shows that the overall career development of construction workers in Guangzhou is worrying. The binary logistic regression confirms that the framework of influencing factors of construction workers' career promotion constructed by human resource-related theories, such as Herzberg's two-factor theory, is reasonable. Moreover, demographic characteristics, professional qualifications and industry security factors have a direct impact on construction workers' career promotion. Age, working years, type of work, career development awareness, legal awareness, professional mentality, vocational psychological training and career development path passed the significance test and are established as critical factors that affect construction workers' career promotion. Finally, through the discussion and analysis of the research results, this study provides some

Evidence	Good practices
<p>E1. The older the construction workers, the worse the promotion</p> <p>E2. Compared with the construction workers with more than 6 years of working experience, the construction workers with 1–3 years of working experience have better career promotion status</p>	<p><i>P1. Enhance the professional development needs of the elder employees in the construction industry</i></p> <p>Compared with the old generation of migrant workers, the new generation has higher employment security (Tian and Zhou, 2013) and career development needs (Liu and Li, 2013) and is more eager to gain promotion in the organization. However, in the aging construction industry, the elderly labor force over 45 years old accounts for a large proportion (Wu et al., 2012), so improving the career development needs of the elder employees in the construction industry and unblock their career development channels is important. According to Herzberg's two-factor theory, the key approach is to provide appropriate incentive policies and safeguard measures for the elder employees in the construction industry (Herzberg, 2017). For example, in the interview, some managers proposed to link the wages of construction workers with their work qualifications and performance, so as to encourage workers who work long hours in the current organization to work harder. Moreover, providing legal protection for construction workers by signing labor contracts on time is necessary so that the elder employees with heavy family burdens can work at ease</p>
<p>E3. Construction workers with career development awareness have better career promotion status</p> <p>E4. Construction workers with legal awareness have better career promotion status</p>	<p><i>P2. Improve the construction workers' awareness of career planning</i></p> <p>To improve workers' awareness of career planning, enhancing the workers' education level (Han et al., 2019; Tian and Zhou, 2013), career development awareness and legal awareness is necessary (Claussen et al., 2014; Wang et al., 2019). A manager pointed out that at present, the promotion path of the construction workers industry is not clear enough, and the promotion rating has not formed a complete system. The government should lead the construction workers to build a career planning system, introduce programs and policies to guide construction enterprises to carry out needed vocational training for workers and improve the education level and skills of workers. Moreover, in the daily management of construction enterprises, theoretical knowledge should be combined with the daily work of construction workers so as to provide workers with clear and practical career development goals, promote individuals to better play to their potential and bring long-term benefits for enterprises (continued)</p>

Table 9. Targeted measures

<p>E5. Construction workers with better professional mentality have better career promotion status</p> <p>E6. Construction workers who have participated in professional psychological training have better career promotion</p>	<p><i>P3. Pay more attention to the mental health of construction workers</i></p> <p>Due to the irregular working hours, high work intensity and high risk involved, construction workers are faced with considerable psychological pressure, a situation which is very unfavorable for their work performance (Bodner <i>et al.</i>, 2014). However, in the process of investigation and interview, it is found that few construction enterprises can provide necessary psychological counseling for workers, and workers' mental health problems has been seriously ignored. Construction enterprises should pay more attention to the mental health of their workers. First, they should establish a sound prevention and management mechanism of psychological hazards, reduce the work pressure of workers and avoid damage to their mental health (Tijani <i>et al.</i>, 2020). Second, an effective communication mechanism between workers and managers and between workers and workers should be established to ease the work pressure of workers (Peltokorpi, 2017). Furthermore, enterprises should provide necessary psychological training and assistance for workers so as to enhance their ability to cope with setbacks, address problems and overcome difficulties</p>
<p>E7. Only with career development path can career promotion be possible</p> <p>E8. Compared with unskilled workers, managers are more likely to be promoted</p>	<p><i>P4. Speed up the development of construction industry workers</i></p> <p>The construction and improvement of career development path is vital for worker promotion and enterprise stability (Tremblay <i>et al.</i>, 2002). To solve this problem, the key is to respond to the policy, hasten the development of construction industry workers and provide workers with a clear career development path and employment security (Tian and Zhou, 2013). First, labor service enterprises with certain organizational and management capabilities must be encouraged to transform into general contracting and professional enterprises by introducing talents and equipment. In addition, the relevant government departments should take the lead to establish a multi-collaborative vocational training mode for construction workers so as to improve the quality and efficiency of construction workers' training. More importantly, the government should take the lead in establishing a standard system for construction workers as the fundamental guarantee for the training and identification of construction workers in order to speed up the industrialization of construction workers</p>

suggestions for the government and construction enterprises to unblock the career promotion path of workers.

China is a big country in infrastructure construction. Starting from the Chinese context, this study can provide theoretical and practical reference for the career promotion of construction workers all over the world, especially in developing countries. At present, there is no academic research on the career promotion of frontline workers. This paper discusses the significance of career promotion for construction workers. Moreover, as a pioneer research, this paper provides a theoretical framework for the research of construction workers' career promotion, which is one of the ways to retain workers in the construction industry. In addition, this research has a relatively large sample size and wide coverage of frontline workers, thus having practical significance.

However, the research objects are limited to Guangzhou, which has geographical limitations. This empirical study is also a cross-sectional study, and a comparative study on the time dimension is lacking. Future research can extend the research object to include workers in East China or North China. In addition, the cultural background and welfare security of workers in different countries are different, and the research on workers' career promotion can be enriched by comparison. Moreover, future researchers can design longitudinal studies, which not only minimize common method bias commonly observed in cross-sectional study but also facilitate exploring casual relationships. For example, a longitudinal design helps to track the promotion status of workers in different periods and explore the influence mechanism of critical factors on the career promotion of construction workers.

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