Work–Life Balance for Construction Manual Workers

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Abstract: The construction industry is facing an acute labor shortage around the globe, which has caused an escalation in construction costs and project delays. Work–life imbalance is identified as a major detrimental factor in attracting young people to join the industry. Previous research on work–life balance (WLB) has focused on shift workers, females, and managerial and professional individuals. There is still a paucity of literature on WLB for manual workers, in particular, manual workers in the construction industry. This paper aims to investigate how workers perceive their WLB and identify the factors that affect WLB in the construction industry. Based on interviews with the chief executives and senior officers from key trade unions, a questionnaire survey was conducted covering all types of construction manual workers including building, civil engineering, and electrical and mechanical (E&M) workers. A total of 970 valid answers were analyzed through structural equation modeling (SEM). The findings identified workplace support as the most critical area of concern. Additionally, work–life balance was found to have significant effects on the perceived health and safety of workers. The sample size of this study is so far the largest of its kind. This study helps us make informed suggestions for improving work–life balance in the construction industry, and hence its attractiveness to the younger generation to solve the labor aging and shortage problems. **DOI: 10.1061/(ASCE)CO.1943-7862.0001800.**

Author keywords: Work–life balance; Construction workers; Electrical and mechanical workers; Labor shortage; Health and safety.

Introduction

The construction industry is facing acute labor aging and shortage worldwide. The difficulty of recruiting new workers aggravates the problem (Wong et al. 2019). Hong Kong has been facing difficulties in recruiting young people into the industry. Young people in Hong Kong, as in other countries around the globe, have become better educated and are offered wider choices of training opportunities than the generations before them. They can afford to be selective in making their career choice decisions. We need to understand what they want other than money. What we have found contributes to a better understanding of the work–life balance (WLB) of the construction industry, among young people in particular. This can lead to the formulation of effective strategies and policies to attract them into the industry, in Hong Kong as well as other economies facing similar problems.

The industry has not been able to recruit enough labor, with the consequences of not only project delays but escalating construction costs as well. In Hong Kong, for instance, construction costs ranked the second highest in the world in 2017 (Arcadis 2017). Poor WLB is considered a critical problem that has made young people reluctant to join the industry. Tao et al. (2017) revealed that the younger generation in Hong Kong places more importance on their freedom. In addition, they may not be as ready as older generations to pursue career goals at the expense of their personal life. They were very concerned with the perceived lack of WLB. In an international survey that assessed the working attitudes and economic awareness of college students, Dunay et al. (2015) found that health, family, and friends are the paramount factors in the general system of values of the sampled students. Long work hours is a crucial disincentive to choosing a job or career, while the opportunity to pursue a personal life is a decisive motivator. The enhancement of social image and WLB have generally been argued as principal measures to attract manual workers to join the industry.

To attract the younger generation to join the industry, there is a call for a study in manual workers in this particular area of WLB. Previous research on WLB has focused on shift workers, women, and managerial and professional workers. Recent studies have turned their interests more broadly to other populations such as males and professionals that may not necessarily be involved in shift work (Bahadur 2015; Raiden and Räisänen 2013). Lingard et al. (2012) studied the WLB of all employees, including white-collar and blue-collar workers, in the construction industry in Australia. There is, however, still a paucity of literature on WLB for manual workers, particularly in the construction industry. Not even the report of the Construction Industry Review Committee (2001) mentioned anything specifically on WLB in general and working hours in particular in their comprehensive review of the Hong Kong construction industry. Furthermore, Fagan et al. (2012)

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highlighted in a report from the International Labour Organization (ILO) that, for the managerial and professional level, there might be more control and resources in dealing with work–life conflict (WLC). However, manual workers may not have such resources to offset the negative impact of WLC. Therefore, there exists an urgent need for research in this area.

The objective of present study is to examine (1) how manual workers perceive their WLB; and (2) the factors that affect WLB in the construction industry. This study will find if the factors identified in the literature are applicable to manual workers as well, and reveals those factors that may be unique to construction workers in particular. A questionnaire survey was conducted covering all types of construction manual workers including building, civil engineering, and electrical and mechanical (E&M) workers, based on the results from interviews with the chief executives and senior officers from key trade unions. It followed up with an examination of the issues of WLB as perceived by construction workers themselves. A total of 970 valid questionnaires were analyzed through structural equation modeling (SEM).

Literature Review

Terminology of Work–Family Balance

Different terms referring to work–life balance have been used in previous literature, e.g., work–family balance, work–family conflict, and work–life enrichment. In a report from the International Labor Office, Fagan et al. (2012) suggested that the most appropriate term is work–personal life integration. There are different terminologies of WLB, resulting from the different definitions of fit between work and life. The meaning of fit may differ among different people. WLB can be regarded as "how one perceives whether it is balance between his/her work and life" (Greenhaus and Allen 2011). Lingard and Francis (2004) revealed that site workers suffered from a higher level of work-to-life conflict than office staff in the construction industry. The different availability of resources can also cause large differences. The emphasis on different aspects of WLB has also changed over the years. Research used to focus on work–family conflict rather than personal life outside the home (Byron 2005; Carlson et al. 2000). Today, more attention is paid to personal life than to family life. In our study, the life in WLB is defined as all the personal life outside the workplace, including social life and leisure time, in addition to family life. This research therefore studied the integration and interaction between work and personal life of construction workers.

Changing Demands through Life

There are studies dealing with the issue of how demand changes as one goes through different life passages and assumes different social roles. In the 1970s, Atchley (1975) considered age an important variable "that cuts across all areas of social life" through the three "social mechanisms": "the life course, the system of age grading, and age-linked demands for decision making." Sheehy (1976), in her bestseller *Passages*, charted what she described as the "universal and inevitable passages" that we all experience in our twenties, thirties, forties, and beyond. The book depicts the internal and external forces acting on all of us, leading to the different demands we would exert through different stages of life. Perrone and Civiletto (2004) called the importance a person places on a work or family role the "role salience," which determines their behavior in both work and family domains. Cinamon and Rich (2002) suggested that those placing the work and family roles as equally important tend to be younger and invest many hours in both roles. They would regard their success in life as one that is defined by both work and family outcomes. People are aware of the potential conflict between work and family life. Young people especially want to reduce the conflict and plan their lives accordingly. Spieler et al. (2018) also concluded that there are age differences in workers' perceptions of their job satisfaction and hence their demand of work–life balance, based on a sample of employees of a German bank.

In the construction industry in particular, Siu et al. (2003) found that older workers were more satisfied with their jobs. They attributed this satisfaction to the recognition of fewer job opportunities available for older workers, causing them to be more committed to work and compliance with safety rules. The demands on work–life balance are thus different among the older and younger generations. Francis et al. (2006) conducted a qualitative study of work–life experiences in the public and private sectors of the Australian construction industry. They found that organizational policies need to be tailored to suit "the life stages of employers" because "employees of different ages and generations experience different problems in balancing work and non-work life and have different preferences for organizational work–life balance initiatives." Idrees et al. (2017) studied psychological factors that affect construction workers' perception of safety for two different age groups in Pakistan, one up to 35 years old and the other older than 35 years. They identified different demands among different age groups. Gyllered and Malmberg (2018) found that, in Sweden, "Generation Y perceives non-financial rewards more important than financial rewards."

Work–Life Balance and the Construction Industry

A balanced work–family life is particularly imperative in the construction sector, where poor and deteriorating health, job stress, anxiety, and burnout are rampant (Francis and Lingard 2004). In Canada, employees working on weekends and on nonstandard work shifts reported higher "emotional exhaustion, job stress and psychosomatic health problems" (Jamal 2004). Similarly, in Australia, the construction workforce, who experience long working hours, suffer from stress and have enormously high suicide mortality rates, which are approximately 75% higher than the overall average for male workers (Siusan MacKenzie Equilibrium Worklife Solutions 2008). Lee et al. (2017) demonstrated that long hours are significantly related to stress. Poor WLB is not only associated with adverse health effects, such as stress, anxiety, and even depression, but is also related to fatigue (Fagan et al. 2012; Pisarski and Barbour 2014). WLC is identified as one predictor for fatigue, though overtime by itself does not predict concurrent fatigue in shift workers (Pisarski and Barbour 2014). On the contrary, a positive work–family balance may benefit not only employees but companies as well. Edmans (2012) identified a relationship between job satisfaction and value to the firm. For the period between 1984 and 2011, the annual stock returns of the firms listed in the *Fortune* 100 Best Companies to Work for in America were 2.3%–3.8% higher than the average (Edmans 2012). The increase in firm value comes from employees' increase in productivity and satisfaction. Allen (2001) indicated that less WLC was associated with less job dissatisfaction, increased organizational commitment, and reduction in turnover intention. Moreover, a report from Health Canada highlighted that a healthy WLB can help to improve productivity and reduce the financial cost of health care related to WLC (Higgins et al. 2008). However, the relationship between WLB, work hour arrangement, health effects, and safety still needs to be investigated further to reveal their interaction, in particular, for the manual workers in the construction sector.

Income and Its Inequality

Salaried and casual workers are paid monthly and daily wages, respectively, in the construction industry. In addition, workers in various trades are paid differently. Moreover, people could be paid differently by different contractors. This variety of incomes may be attributed to the different levels of labor shortage and various physical demands in different trades. Income is a dimension of work rewards, which can be associated with job satisfaction. Otherwise, as in the case of Nigeria, the low level of payments and lack of standard salary scales in skilled workers were identified as two of the most critical causes for poor performance in the construction industry (Alhaji Ali et al. 2017).

Method of payment, i.e., paid monthly or daily, reflects job security. Job insecurity and uncertainty about career prospects are perceived as a concern for people to join or stay in the construction industry. Chiang et al. (2015) conducted focus group meetings on construction personnel comprising casual workers, temporary casual workers, and salaried workers. Casual workers often resort to their networking with contractors or subcontractors to get jobs from time to time. That leads to the uncertainty of job continuity. Such job insecurity could reduce work performance and present anxiety as well as work strain (Darvishmotevali et al. 2017). Lewis and Sloggett (1998) illustrated that unemployment and job insecurity increase the risk of suicide. Ma et al. (2014) found that the link between job insecurity and job satisfaction could be partially mediated by work–family conflict. Perceived job insecurity could aggravate work–family conflict, which in turn could lead to more job dissatisfaction.

Thus, we included income as a variable in the study, and formulated the following hypothesis:

H1: Salaried work, in contrast to waged work, positively impacts WLB.

Long Work Hours and Weekend Work

Working long hours and on weekends are critical factors affecting the level of WLB. Long hours, insufficient time with family, and excessive workload were identified as the most crucial stressors felt by Australian construction managers (Haynes and Love 2004). Moreover, the prevailing culture of long hours of work, and the consequent work–family conflict were identified as barriers to women's success in the construction industry (Watts 2009). Long working hours have been perceived as a major barrier to achieving WLB (Turner et al. 2009). As Townsend et al. (2012) commented, "extended working hours and the difficulty of balancing home and work are problematic for many employees" and "the number of hours an employee works is a centrally important part of the work–life balance (WLB) rhetoric." Wharton and Blair-Loy (2006) also reported that there is a clear inversely proportional relationship between working hours and WLB. Additionally, a close link was found between long, atypical, and Saturday working hours and "family disintegration" (Relationships Forum Australia 2007). In Victoria, Australia, Saturday work is "the biggest work and life balance problem" (Siusan MacKenzie Equilibrium Worklife Solutions 2008). Thus, the average work hours per day and Saturday work were included as variables in our study.

H2: Long work hours negatively impact WLB.

Organizational Support

Organizational support is identified as a facilitator that enhances WLB (Kumarasamy et al. 2015). Likewise, organizational policy, culture, and management support were perceived as positive factors of WLB (Julien et al. 2011; Krishnakumar and Choudhury 2014; Lester 2015). Results from Allen (2001) indicated that "family-supportive organization perceptions" (FSOPs) could mediate the relationship between work–family conflict and organizational benefits such as job satisfaction and organizational commitment, and decrease employees' intention to quit. Employees who perceived firm policy, welfare, and culture as more family supportive would experience less work–family conflict. A supportive work environment can help to increase WLB. Grandey et al. (2007) investigated the family–supportive work environment on blue-collar people (in manufactory) and found that organizational support help to ease the level of WLC in long-hour work.

The size of an organization may also affect WLB. Robak et al. (2016) examined WLB factors in small- and medium-sized enterprises (SMEs) and found that many features of SMEs may restrict the resources for WLB support. This factor is particularly pertinent to the building industry because it is dominated by small and medium contractors. In addition, Francis and Lingard (2004) found that employees in the private construction sector experienced significantly higher levels of WLC than in the public sector. They also confirmed that staff in the private sector suffered from longer work hours and less work-related flexibility compared to those in the public sector. Employees in the public sector showed higher work commitment and a lower turnover intention than those in the private sector. Masuda et al. (2012) highlighted the cultural context and the improvement in WLB that could be made through organizational support. Work arrangement is another important aspect of the organizational factor. Work arrangements include work time arrangement and workplace arrangement (Masuda et al. 2012). Duxbury and Higgins (2009) suggested that employers could introduce flexible working arrangements to increase employees' WLB. Likewise, it is reported that staff with perceived job flexibility had better WLB under the same workload (Hill et al. 2001). ILO conducted research on working time and WLB. The report concluded that seven variables, including age, gender, job strain, household composition, work location, social class, and infrastructures, might affect the link between work time arrangements and WLB (Fagan et al. 2012). These are important factors for the construction industry to improve WLB.

H3: Perceived workplace support (WPS) positively impact WLB.

Poor Safety

Construction work is highly risky and the industry is infamous for its dismal safety records. The construction industry accounts for 30%–40% of the world's fatal incidents, but only around 7% of the world's employment (Murie 2007). It ranks as the top killer among industries globally. In 2015, construction had the largest number of fatal injuries among all industries in the United States, Japan, Singapore, and Hong Kong (JISHA 2017; Ministry of Manpower 2016; Occupational Safety and Health Administration 2017; Labour Dept. 2016). Thus, site works demand high attention and extreme focus. However, working long hours with high focus is stressful and could cause emotional exhaustion, which would further aggravate WLC. Wei et al. (2016) concluded that drivers' safety awareness could be jeopardized by strain-based work-to-family conflict. Moreover, perceived poor safety has become a barrier to recruiting new workers in the industry (Chiang et al. 2015). Similar to Canada (Alberta Government 2007), monetary incentives are being offered in Hong Kong to attract young people to undergo construction training courses without much success. Instead, a safer site is regarded as a more effective means to attract new recruits. Thus, perceived safety was included as a variable in our research, and two hypotheses were formulated:

H4: WLB positively impacts perceived workplace safety.

H5: WLB positively impacts the perceived health status of the worker.

Methodology

Participants and Surveys

Interviews with the chief executives and senior officers from different workers' unions and associations were conducted to seek their opinions and to establish connections for subsequent data collection from construction workers. Consequently, the four most representative organizations were identified, which were the Hong Kong Federation of Electrical and Mechanical Contractors (HKFEMC), the Federation of Hong Kong Electrical & Mechanical Industries Trade Unions (EMF), the Hong Kong Construction Industry Employees General Union (under the Hong Kong Federation of Trade Unions), and the Construction Site Workers General Union [under the Hong Kong Confederation of Trade Unions (HKCTU)]. In addition, the Nepalese Construction Workers Association in Hong Kong was contacted. Local Chinese construction site workers mostly join one or more of the first four unions, while the fifth is for Nepalese workers, of whom most are locals and the remaining imported labor. In this paper, the EMF workers are referred to as electrical and mechanical workers, while all others are general workers.

Pilot studies were conducted after interviews with the workers' unions and associations to validate the questionnaire. The questionnaires were then revised according to the suggestions from the interviews and pilot studies. Data were collected between September 1, 2017, and November 30, 2017. Questionnaires were distributed to workers during various gatherings such as continuing professional development (CPD) programs, green card courses, and annual gatherings. Questionnaires were also sent by post to members of HKFEMC. Before distribution of questionnaires at each gathering, the participants were briefed with the aims and details of the survey to solicit their support in completing the questionnaires. Additionally, detailed explanations for each section of questions were provided during each of the survey sessions to ensure the full understanding for each question from participants. The questionnaires were presented in English, Chinese, and Nepalese to suit the needs of each participating audience. In terms of Nepalese participants, professional interpreters and industrial helpers assisted with the explanations and communication during surveying.

Measures

WLB, perceived WPS, perceived health, and perceived safety were each assessed with a 3-item measure designed for this study. The 3-item measure was used for simplicity because the questionnaire was translated into different languages and the target audience was manual workers, of whom most were educated up to high school level or below. Haar (2013) also used a 3-item measure for similar studies on WLB. In the present study, WLB was assessed based on questions such as "my personal life was affected by my work," "it was hard for me to deal with work and family," and iIt was hard for me to focus on my work due to distraction from my personal life." Perceived WPS was assessed with questions such as "my employer cares about my welfare," "I get adequate information, assistance and tools for carrying out my work at my workplace," and "I am treated fairly by my employer(s)." In addition, the study employed stress, tiredness, and muscle pain to evaluate the status of participants' psychosomatic health. Perceived safety was assessed using questions such as "it is safe working in my workplace," "employer is committed to safety on site," and "health and safety are good in my work environment." Table 1 gives the questions employed in the survey. At last, a total of 12 constructs were equally included in the four constructs of the final SEM model. Each item under WLB, WPS, and perceived safety was assessed using a 5-point Linkert scale, where 1 = strongly disagree and 5 = strongly agree for positively worded questions and vice versa for negatively worded questions. Each item under perceived health was also assessed with a 5-point Linkert scale, where 1 = no, 2 = slight, 3 = moderate, 4 = need medical treatment, and 5 = unbearable. The respondents' perceptions were assessed based on their experience in the last 6 months.

Analysis

After data collection, exploratory factor analysis (EFA) was performed to identify the characteristics of the variables (Hair et al. 2006). A listwise method was employed to exclude the cases with missing data. Principal component analysis was performed to extract factors and reduce the dimension of the data. The result of Bartlett's test is 0.946, indicating a good fit of factor analysis for the assessed variables (Hair et al. 2006). A confirmatory factor analysis (CFA) was then performed to further assess the interrelationship between variables and factors. After further adjustments for the CFA, "my personal life was affected by my work," "it was hard for me to deal with work and family," and "it was hard for me to focus on my work due to distraction from my personal life" were identified to measure WLB. "My employer cares about my welfare," "I get adequate information, assistance, and tools for carrying out my work at my workplace," and "I am treated fairly by my employer(s)" assess the perceived WPS. "It is safe working in my workplace," "employer is committed to safety on site," and "health and safety are good in my work environment" were identified to assess the perceived safety. Stress, tiredness, and muscle pain were identified to evaluate the status of participants' psychosomatic health.

SEM seeks to explain relationships between multiple variables (Hair et al. 2006). In order to explore the relationships between different variables, SEM and multiple regression analysis can be adopted. The assessed variables may also affect each other, e.g., between latent variables and/or between independent variables. Though regression analysis can be utilized to identify the causal relationship between variables, it cannot show the relationships between latent variables and independent variables, and the relationship between different independent variables at a same analysis. Hence, SEM was adopted in this study because it can test the relationship between observed variables and latent variables. It also estimates a series of separate and interdependent equations simultaneously through a structural model specified by the researcher but derived from theory (Hair et al. 2006). It works as a combination of regression analysis, factor analysis, and path analysis. It can explore and analyze the relationships between both observed variables and latent variables, and between observed variables at the same time. Thus, the present study employed SEM to analyze the data to explore the comprehensive relationships between assessed variables. The model was developed using three data sets: one for the electrical and mechanical workers, one for the general workers, and one that combined both the electrical and mechanical workers as well as the general workers.

Measurement Model

The measurement model specifies the relationship between the constructs (defined variables that cannot be directly measured) and their corresponding indicators (observed variables used to

Table 1. Survey questions

Item	Construct	Survey question	Corresponding variable in model
1	Work–life balance	My personal life was affected by my work.	Q4
2	Work–life balance	It was hard for me to deal with work and family.	Q5
3	Work–life balance	I had enough time for my personal life.	—[a]
4	Work–life balance	It was hard for me to focus on my work due to distraction from my personal life.	Q6
5	Work–life balance	My personal life provided me motivation and incentive for working hard on sites.	—[a]
6	Workplace support	I am treated fairly by my employer(s).	Q3
7	Workplace support	I get adequate information, assistance, and tools for carrying out my work at my workplace.	Q2
8	Workplace support	My employer(s) care for our welfare.	Q1
9	Safety	It is safe working in construction sites.	Q7
10	Safety	Employer is committed to safety on site.	Q8
11	Safety	Health and safety are good in my work environment.	Q9
12	Job demand	I need to be highly focused and careful at work.	—[a]
13	Job demand	I have too much work to do.	—[a]
14	Job demand	Working on site is physically demanding.	—[a]
15	Job demand	During the last 6 months, I have often worked more to catch-up with the schedule.	—[a]
16	Job demand	During the last 6 months, I have worked too long hours.	—[a]
17	Family demand	I have a lot of responsibilities in my family.	—[a]
18	Rewards from work	During the last 6 months, I have been well paid.	—[a]
19	Rewards from work	During the last 6 months, the welfare of my job was good.	—[a]
20	Rewards from work	During the last 6 months, I have had a good career development.	—[a]
21	Health	Do you have insomnia?	—[a]
22	Health	Do you have stress?	Q10
23	Health	Do you have anxiety?	—[a]
24	Health	Do you have muscle pain?	Q11
25	Health	Do you have tiredness?	Q12
26	Health	Do you have burnout?	—[a]

[a]Variables excluded after confirmatory factor analysis and formulation of structural equation model.

measure each construct). In this study, the four constructs WPS, WLB, safety, and health were measured using three questionnaire items each.

Despite the widespread use of SEM, there is still no consensus with regards to which model fit indexes are acceptable as well as their respective cutoffs (Hooper et al. 2007). After a thorough review of best practices, Hooper et al. (2007) suggested that, among others, the chi-squared statistics (χ^2) and its corresponding discount factor (df), root-mean-square error of approximation (RMSEA), and comparative fit index (CFI), as well as one parsimony fit index such as the parsimonious comparative fit index (PCFI), should be reported. In line with this suggestion, this study reported χ^2, df, normed chi-square (χ^2/df), RMSEA, CFI, and PCFI. Hair et al. (2006) and Iacobucci (2010) suggested a lower limit of 1 and an upper limit of 3 for the χ^2/df, though Hooper et al. (2007) suggested as high as 5. Hair et al. (2006) and Hooper et al. (2007) agreed that CFI should be 0.90 or higher and RMSEA should be less than 0.10, although a value between 0.05 and 0.08 is better. However, both Hair et al. (2006) and Hooper et al. (2007) cautioned that a strict cutoff should not be applied to SEMs. Indeed, Iacobucci (2010) asked researchers "not be overly critical if the CFI is not quite 0.95, or the SRMR not quite 0.09." Rather, simpler models should have higher cutoffs, while the cutoffs can be relaxed for more complicated models. PCFI, on the other hand, does not have a cutoff; the higher the value the better the model.

Results

General Data

A total of 970 valid questionnaires were collected during the period. The sample size is much larger than suggested by Iacobucci (2010), which recommends "a sample size of at least 50." Out of this, 547 were electrical and mechanical workers, while 423 were general workers. Of the general workers, 28% were salaried compared with 51% for electrical and mechanical workers. Also, the level of education for electrical and mechanical workers was relatively higher with 14% of the respondents having an associate degree and above, compared to 9% for general workers. The general workers reported longer average working hours per day (Fig. 1). In addition, 88% of general workers had worked on Saturdays, comparing with 85% of electrical and mechanical workers. Despite working longer, the general workers earned just as much as their electrical and mechanical counterparts. About 19% of both earned HKD 30,000 and more.

Structural Model

A reliability test using Cronbach's alpha was conducted for each construct and all were greater than 0.75 (Table 2), signifying good reliability. The structural model is presented in Fig. 2, where the rectangular boxes are for variables that could be measured directly, while ellipses are for variables that were measured by a series of other measured variables. In this case they were each measured by 3-item Likert scale questions.

The result of the model fit indexes for the measurement model as presented in Table 3 indicates that all three models have an acceptable fit, though the χ^2/df for electrical and mechanical workers is slightly below the threshold. The standardized regression estimates (Table 4) also reveal that the three indicators for each construct are statistically significant.

The structural model measures the relationship between the constructs. It specifies which variables influence the others in the model both directly and indirectly. Therefore, it is used to test

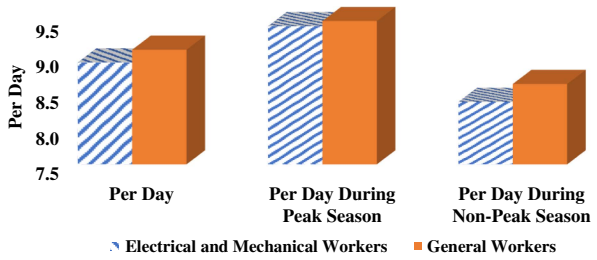

Fig. 1. Average work hours of electrical and mechanical versus general workers.

Table 2. Reliability test using Cronbach's alpha

Construct	Alpha
Safety	0.81
Workplace support	0.77
Work–life balance	0.75
Health	0.83

the underlying hypothesis. The structural model was evaluated using the same model fit measures used in evaluating the measurement models. The results revealed that the models using the data set for all workers and the data set for electrical and mechanical workers have acceptable fit because all model fit indexes reported are within the acceptable level (Table 5). On the other hand, the model using the data set for the general workers has a CFI of 0.88, which is marginally below the suggested level of 0.90. However, the other model fit indexes are within the acceptable threshold. It is plausible to believe that most of the general workers receive daily wages rather than monthly salary and are therefore not very concerned about WLB. Rather, they place more emphasis on income, so they tend to work longer. Hence the model fit based on general workers is marginally not as good as that based on electrical and mechanical workers and all workers.

The stated hypotheses were tested using the structural model and the results are presented in Table 6. The regression coefficients for H1 are statistically insignificant for the three data sets. Hence, the method of payment (salary or wages) has no significant effect on WLB in this study. H2 for general workers and all workers is statistically significant. The relationship between work hours per day and perceived WLB is negative, signifying that the longer these sets of workers work, the worse their perceived WLB. However, for electrical and mechanical workers, H2 is not statistically significant. The regression coefficients for H3 are positive and statistically significant for all workers and electrical and mechanical workers, while they are statistically insignificant for the general workers. The regression coefficients for H4 and H5 are positive and significant for the three data sets.

Views of Union Representatives

A brief report of the initial interviews conducted with the representatives of the various unions is presented in Table 7. The findings from the surveys of the workers are expectedly in line with what their representatives have said.

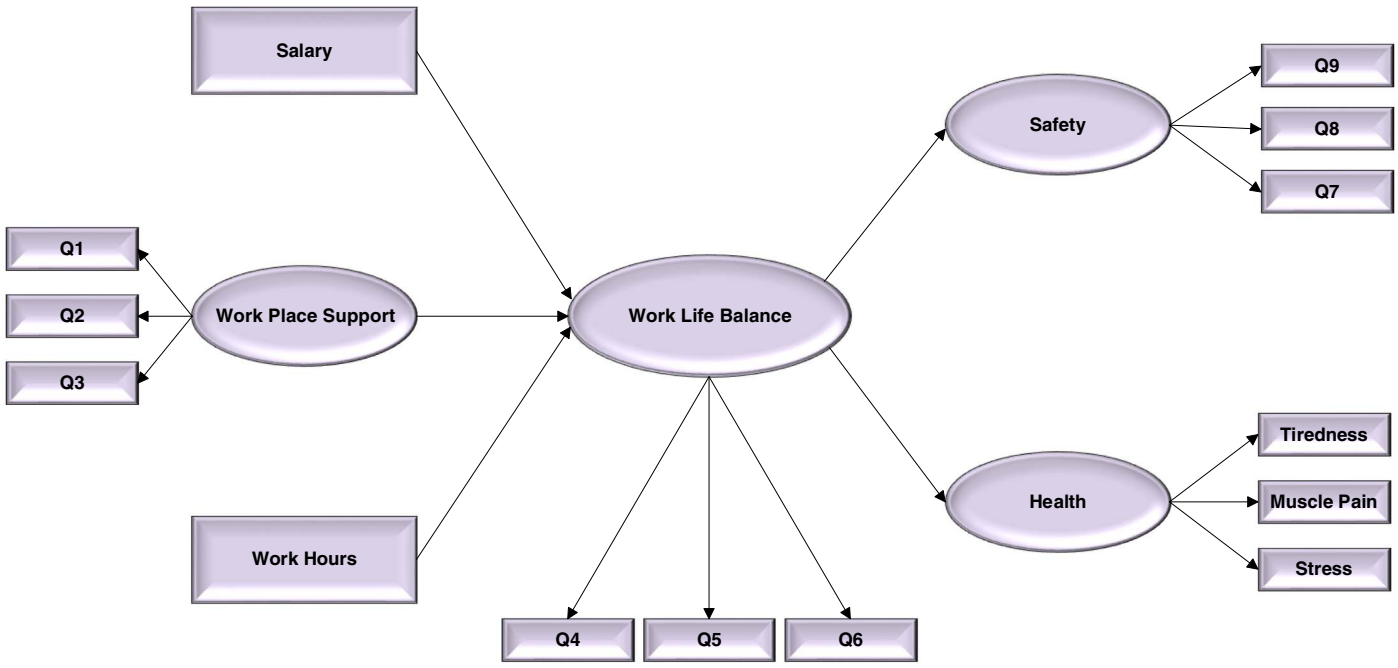

Fig. 2. Structural model.

Table 3. Model fit indexes for measurement model

Data set	Model fit indexes					
	χ^2	df	χ^2/df	CFI	RMSEA	PCFI
All workers	56.89	48	1.18	0.99	0.01	0.61
General workers	74.85	48	1.60	0.98	0.04	0.60
Electrical and mechanical workers	37.92	48	0.80	1.00	0.00	0.62
Acceptance level	N/A	N/A	$\geq 1 \leq 5$	≥ 0.90	≤ 0.10	N/A

Table 4. Estimates of measurement model

Indicator	Standardized estimate		
	All workers	Electrical and mechanical workers	General workers
Workplace support			
Q1	0.72***	0.72***	0.76***
Q2	0.30***	0.32***	0.28***
Q3	0.39***	0.34***	0.69***
Work–life balance			
Q4	0.74***	0.83***	0.64***
Q5	0.86***	0.82***	0.89***
Q6	0.56***	0.52***	0.60***
Safety			
Q7	0.41***	0.31***	0.69***
Q8	0.81***	0.80***	0.81***
Q9	0.80***	0.83***	0.79***
Health			
Q10	0.68***	0.66***	0.70***
Q11	0.84***	0.79***	0.89***
Q12	0.89***	0.88***	0.89***

Note: All values are significant at $***p < 0.001$.

Table 5. Model fit indexes for structural model

Data set	Model fit indexes					
	χ^2	df	χ^2/df	CFI	RMSEA	PCFI
All workers	327.20	74	4.42	0.91	0.04	0.64
General workers	253.82	74	3.43	0.88	0.08	0.62
Electrical and mechanical workers	183.62	74	2.48	0.93	0.03	0.65
Acceptance level	N/A	N/A	$\geq 1 \leq 5$	≥ 0.90	≤ 0.10	N/A

Discussion

The results of regression coefficients for H1 indicate that the method of payment (salary or wages) has no significant effect on WLB. Alhaji Ali et al. (2017) found that level of wage may be one indicator of performance. The present study assessed the stability rather than the magnitude of payment. This may indicate that further research should look at the relationship between level of wage and WLB.

Regarding H2 for general workers and all workers, the relationship is significantly negative. It indicates that for all general workers, long work hours are associated with poor work–life balance, whereas for the electrical and mechanical workers only, the negative relationship is not statistically significant. Electrical and mechanical workers tend to work fewer hours per day. Hence, work hours have no significant effect on perceived WLB. Additionally, about 47% of the electrical and mechanical workers in our analysis were more than 50 years old, compared with 39% for general workers. We can therefore conclude that they were already used to working long hours; hence, there was no effect on their perceived WLB. Twenge et al. (2010) also found that older generations are more used to working long hours and are thus less likely to pursue leisure.

Table 6. Test of hypothesis

Hypothesized path	Standardized estimate		
	All workers	Electrical and mechanical workers	General workers
H1: Salary on WLB Salaried work, in contrast to waged work, positively impacts WLB	0.06	−0.03	0.06
H2: Work hours per day on WLB Long work hours negatively impact WLB	−0.03*	−0.00	−0.05**
H3: Perceived WPS on WLB Perceived WPS positively impact WLB	0.26**	0.37**	0.08
H4: WLB on perceived safety WLB positively impact perceived workplace safety	0.31**	0.31**	0.26**
H5: WLB on perceived health WLB positively impacts the perceived health status of the worker	0.33**	0.30**	0.34**

Note: $*p < 0.010$; and $**p < 0.001$.

The results for H3 indicate that WPS has a significant effect on WLB in the cases of all workers and only electrical and mechanical workers. General workers tend to place less value on workplace support compared with their electrical and mechanical counterparts. This is not unexpected because the majority of general workers earn daily wages and they have to be prepared to switch between employers. They do not have the luxury of staying with one employer for long. Otherwise, when the workers contemplate a longer relationship with their employers, they do expect to have some WPS to enhance their WLB. Previous studies (Banu 2016; Jang 2009) also found that perceived WPS has a positive effect on WLB. Hence, to improve WLB of construction workers, emphasis should be placed on WPS, and organizations should put policies in place that would cultivate workers' trust in their employer. Also, policies that would encourage teamwork and increase workers' sense of belonging should be promoted. This could be done even if the employer–employee relationship is ad hoc and temporary. As the following paragraph shows, even for general workers, WLB leads to both perceived safety and good health.

The regression coefficients for H4 and H5 are significant for all data sets. This signifies that WLB has positive effects on perceived workplace safety and perceived good health. Safety and health are reported to be the main issues to be considered when addressing Hong Kong's construction industry skill shortage (Ho 2016). The result of this study reinforces this. It shows that when workers are better able to manage work and life responsibilities, they are also better able to manage their health and stay safe at work; at least, this is what they think.

Similar to the survey findings, results from the interviews reveal that general workers work longer than electrical and mechanical workers. General workers work overtime mainly to earn more, while electrical and mechanical workers do so mainly because

Table 7. Initial interview report

Interview question	Hong Kong Construction Industry Employees General Union	EMF	HKFEMC	HKCTU
Work hours	Believe that work hours are reasonable; average of 10 h per day	Believe that work hours are long; average of 9 h per day and sometimes overnight work	Believe that work hours are long; average of 8.5 h per day	Believe that work hours are long; average of 10 h per day
Why workers work more hours	To earn more	Due to job demand	Due to job demand and to earn more	To earn more
Pay of workers	The pay is reasonable	The pay is relatively low but still not unreasonable; workers are paid monthly salaries and their jobs are relatively secure with welfare entitlements such as holidays	The pay is reasonable but job security is a problem	The pay is reasonable but job security is a problem
Social status of construction workers (1–10, 10 being the highest)	6	5	5	5
Factors obstructing young people from joining the industry	Job insecurity Hard work Parental disapproval	Hard work Poor safety performance Job insecurity Low social status	Bad industry image Poor working conditions Low social status	Lack of career development Long working hours
Recommendations to attract young people to the construction industry	Long-term employment Improve technology, adopt good practice and procedures Improve facilities in the workplace	Incorporation of practical skills into the education system Increase job stability Enlighten high school students about the construction industry so as to cultivate their interest in the industry Increase safety measures Improve facilities in the workplace	Enlighten high school students about the construction industry so as to cultivate their interest in the industry	Long-term employment Increase job security

of the nature of their job. They all agreed that the pay is reasonable and that the image of the construction industry is fair (it was ranked an average of 5.25 on a scale of 1–10). Poor work environment, long work hours, poor safety performance, and job insecurity as well as the low social status of construction industry jobs are the main factors identified as discouraging the younger generation from joining the construction industry. Suggestions for attracting the younger generation are mainly about WPS such as increased training, increased job stability, increased use of technology, improved workplace facilities, and increased safety measures. Other suggestions relate to policy changes such as incorporation of practical skills needed in the construction industry into the training system as well as enlightening high school students about the construction industry.

Limitation and Future Research

One limitation of the study is that the data are self-reported. In addition, the data are skewed toward workers that are older than 50 years of age, the dominant age group in the industry. However, it is the perceptions we aimed at measuring, and in reality, the workforce is aging. Future studies may target students, apprentices, and young workers in particular to understand their perceptions of WLB. As previously mentioned, there are demand changes through life. The variables age and number of children were tested in a preliminary SEM to assess if people of different ages and with different numbers of children to raise have different perceptions on work–life balance. It is identified that age and number of children impact perceived work–life balance. However, the two variables were excluded from the final CFA and SEM process because of poor model fit, suggesting that there is not enough statistical significance for the overall model. Furthermore, these two variables were not the prime objective of this study. Thus, such issues should be revisited in future studies when there is a larger data set to control for individual differences. Moreover, future research should look at different occupations of manual workers from different regions to examine the effects of WLB.

Conclusion

This study examined the issues of WLB as perceived by construction workers themselves. Method of payment was found not to significantly affect WLB. Contrarily, work hours significantly affect WLB in the cases of both all workers and general workers. Alternatively, WPS was found to significantly affect on WLB when all workers and only electrical and mechanical workers are considered. WLB positively affects perceived workplace safety and perceived good health for all workers. Hence, to improve WLB of construction workers, emphasis should be placed on WPS. Organizations should ensure that workers feel safe and comfortable at work and that their employers are caring enough. Also, policies that would encourage teamwork and increase workers' sense of belonging should be formulated and implemented. A great WLB would ensure that workers are better able to manage their health and stay safe at work. Furthermore, the results would help give us a clearer picture of the needs of the younger generation so that policies can be formulated to attract them to the construction industry.

Data Availability Statement

Data generated or analyzed during the study are available from the corresponding author by request. Information about the *Journal*'s

data-sharing policy can be found here: http://ascelibrary.org/doi/10.1061/(ASCE)CO.1943-7862.0001263.

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