

THE ROLE OF AFTER-HOURS, WORK-RELATED CONTACT IN WORK-TO-FAMILY CONFLICT AND SLEEP PROBLEMS EXPERIENCED BY CONSTRUCTION PROFESSIONALS

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Advances in communication technology have resulted in boundaries between work and family becoming increasingly blurred, resulting in increased after-hours work contact. Little is known about the relationship between work contact and the work-to-family conflict and sleep problems experienced by construction professionals. Using a survey of 630 architects, engineers, quantity surveyors, and project and construction managers, a conceptual model of work-to-family conflict and sleep problems was proposed and tested using SEM. Demographic characteristics, work experience, job autonomy and control, job pressures, and work contact were hypothesized to explain work-to-family conflict and sleep problems. A tested model was found to be an excellent fit to the data. The results indicate that 1) gender, employment status, work experience, and job pressure are determinants of levels of work contact; 2) work-to-family conflict is predicted by job autonomy and control, job pressure, and work contact, and 3) sleep problems are determined by job pressure, work contact, and work-to-family conflict. Firms and construction professionals need to improved boundary control to limit excessive work contact and/or mitigate its effects on work pressure and work-to family conflict. Intervention strategies by firms should address work contact and employers need to monitor job pressure, and promote job autonomy and control.

Keywords: work-to-family conflict, sleep problems, professional, South Africa.

INTRODUCTION

Work contact is defined as: ‘the frequency with which workers receive and send work-related communications (e.g. emails, phone calls, text messages) outside of regular working hours’ (Schieman and Young 2013: 244). This definition references and emphasizes the increased role of modern mobile communication technology such as cellphones, laptops and tablets. Madden and Jones (2008) found that 45% of ‘networked workers’ reported working in the evenings and at weekends using such mobile devices, while Boswell and Olson-Buchanan (2007) indicate that such technology-driven contact

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has a profound impact on the nature and character of work; including how, when and where it is carried out; as well as changing the boundaries between work-life and family-life (Derks and Bakker 2014; Ferguson *et al.*, 2016).

After-hours work contact, generally considered a boundary spanning demand, weakens the physical and psychological barriers that separate work and non-work (i.e., beyond work) environments (Voydanoff 2005). Lingard and Francis (2009) found that boundary permeability could influence the presence and extent of work-to-family conflict when the role demands for each of the work and family domains become incompatible. Work-to-family conflict (WFC) is defined as ‘a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible in some respect’ (Greenhaus and Beutell 1985: 77). Piszczek (2107) found that boundary control is linked to emotional exhaustion and that after-hours, work-related electronic communication expectations can compel technology-use despite individual preferences in that regard.

WFC has detrimental effects on work capacity and effectiveness (Voydanoff 2005) and is associated with dissatisfaction with family life, impaired domestic partner relationships, and increased family distress (Lingard and Sublet 2002) as well as increased experience of sleep problems and fatigue (Maume *et al.*, 2009). Walsh and Lindblom (2000) suggest that sleep must be sufficiently continuous for it to be restorative. Sleep loss and sleep disturbance lead to increased errors, reductions in performance, fatigue, mood swings, and work injuries (Rogers *et al.*, 2001; Uehli *et al.*, 2013). Sleep problems are under-examined in construction, with the limited literature pertaining to artisans and labourers. For example, Powell and Copping (2010, 2016), utilizing an objective measure of sleep in the form of an actigraph, examined sleep deprivation and its consequences for construction workers, but not for construction professionals. They reported high levels of sleep deprivation and a positive link between inadequate sleep and the risk of accidents.

No previous studies have proposed an integrated explanatory model for the predictive relationship between WFC and sleep problems, and antecedent demographic characteristics, job resources (job autonomy and control), and job demands (work contact and job pressures). The current research proposes such an explanatory model in the context of the South African construction industry, focusing specifically on construction professionals.

THEORETICAL FRAMEWORK

Boundary theory (Nippert-Eng 1996) and the job demands-resources (JD-R) model of workplace stress (Bakker and Demerouti 2007) provide a guiding framework to examine how the work contact experiences of construction professionals relate to WFC and work-related sleep problems (hereinafter termed ‘sleep problems’).

According to Nippert-Eng (1996) people vary in terms of how (and how much) they separate their work and family roles. The boundaries are socially-constructed demarcations between work and family roles, and people vary in the ways and extent to which they individually observe, negotiate, and transition between them in an attempt to achieve some form of balance (Allen *et al.*, 2014). While the two domains are described as ‘work’ and ‘family’, it is important to note that the latter also embraces a person’s social life beyond work and outside of the immediate family environment.

The Bakker and Demerouti (2007) JD-R model of workplace stress provides a useful perspective of the relationship between job demands/resources, and various personal, social and organizational outcomes. In the JD-R model, workplace stress arises from an imbalance between the job demands experienced by a person and the resources available

to deal with them. Such demands may generate work pressure for the person (Schieman and Young 2013) and, if unaddressed, lead *inter alia* to burnout, exhaustion, and sleep problems (Hakanen *et al.*, 2008).

A Conceptual Framework and Model

The conceptual framework and hypothesised model for this research is depicted in Figure 1. Work experience, gender, domestic situation (relationship status and number of children), and employment position level (hereinafter termed ‘employment position’) are proposed to explain work-related aspects such as job autonomy and control, job pressure, and work contact. Job autonomy and control, job pressure and work contact are theorised to covary and each is hypothesized to predict work-to-family conflict. Finally, work-to-family conflict is hypothesized to explain sleep problems.

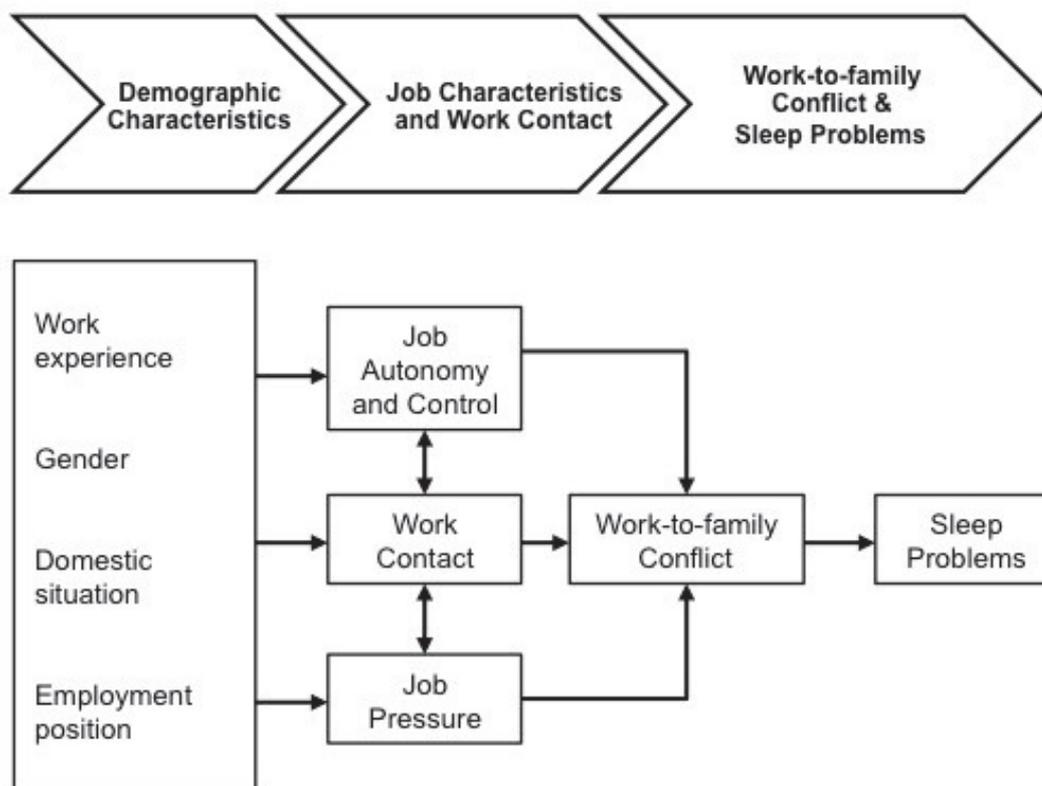


Figure 1: Conceptual framework for work contact, and work-to-family conflict and sleep problems

RESEARCH METHOD

Primary data collection

The sample frame comprised architects, engineers, quantity surveyors, and project and construction managers in South Africa registered with their statutory councils. As professional registration is mandatory for these disciplines, registration lists represent full populations. Registered professionals in each discipline were emailed by their respective statutory bodies, requested to participate in the survey, and given a URL for online access.

A 9% ($n=942$) response rate was achieved, leaving a final data set of 630 after the removal of cases with missing values. Missing data analysis indicated that none of the variables of interest had more than 5% missing values. To facilitate the use of

modification indices in the confirmatory factor analysis (CFA) and path analysis, cases with missing values on any of the analysis variables were deleted. The distribution of discipline and gender characteristics in the final dataset was acceptably close to the total population of construction professionals in South Africa, although females are slightly over-represented in all discipline groups.

Questionnaire items and scale development

The Schieman and Young telephonic national labour survey (2013) formed the main basis for the questionnaire items. Where necessary, questions were modified for online administration, and were supplemented with questions drawn from Lingard and Francis (2002). Table 1 indicates the relevant items for work contact, WFC, and sleep problems and the scale measures developed for modelling purposes. The variable set was subjected to a confirmatory factor analysis (CFA) using structural equation modelling. Four critical fit indices (see Kline 2011) were applied to determine the degree of fit of the CFA and path models as follows: χ^2/df ratio; Comparative Fit Index (CFI); Root Mean Square Error of Approximation (RMSEA); and Hoelter critical N).

No correlated errors were specified in this initial measurement model and the output indices indicated an adequate fit to the data (χ^2 /df ratio=2.881; CFI=0.969; RMSEA=0.055; and Hoelter (95%) =274). Factor loadings in this model were all statistically significant ($p<0.001$) and all exceeded 0.50. However, the modification indices indicated the need for correlated error between WFC1 (*insufficient time for family*) and WFC2 (*insufficient energy for family*). With this path specified, the resultant model presented an excellent fit to the data (χ^2 /df ratio=2.547; CFI=0.975; RMSEA=0.050; and Hoelter (95%) =310). Factor loadings in this final measurement model were all statistically significant ($p<0.001$) and all loadings exceeded 0.50. Alpha values for individual scales ranged between 0.75 and 0.91, indicating good to excellent internal consistency (see Table 1). Scale scores were created by summing individual item scores (reversed where appropriate) and higher scale scores reflect greater levels of the variable of interest. Additionally, the survey gathered information on respondent demographics, hours worked per week, hours worked at home, desired work-hours, and quality of partner relationship.

Table 1: Questionnaire items, scale measures and Cronbach’s alpha scores (n=630)

Items and scale measures	Metric	α
1. Demographic variables		
Gender	Male=1; Female=2	-
Relationship status	Divorced, separated, widowed or never married=1; Married or living with a partner=2	-
Children under 18 years residing at home	None=1; 1 Child=2; 2 Children=3; 3 Children=4; 4 Children=5; 5 Children=6; 6 Children=7; 7 Children=8; Exceeding 7 Children=9	-
Experience in the construction industry	1-5 years=1; 6-10 years=2; 11-15 years=3; 16-20 years=4; Exc. 20 years=5	-
Employment position	Salaried employee=1; Associate=2; Director or Partner=3	-
2. Quality of partner relationship (Scale score range: 3-12)		
PR1. I feel very close to my partner [D6a]	Strongly disagree=1; Somewhat disagree=2; Somewhat agree=3; Strongly agree=4	0.85
PR2. My partner takes the time to talk over my problems with me [D6b]		
PR3. I know that my partner will always be there for me [D6c]		

3. Interaction variable (Scale score range: 1-18)			
Domestic situation (DS)=Relationship status x Number of children under 18 years residing at home			-
4. Job Autonomy and Control (JAC) (Scale score range: 3-12)			0.83
JAC1. You have the freedom to decide what you do on your job? [C18a]	Strongly disagree=1; Somewhat disagree=2;		
JAC2. It is your own responsibility to decide how your job gets done? [C18c]	Somewhat agree=3; Strongly agree=4		
JAC3. You have a lot to say about what happens on your job? [C18d]			
5. Job pressure (JP) (Scale score range: 3-15)			0.91
In the last 3 months, how often did (were):			
JP1. You feel overwhelmed by how much you had to do at work? [C19a]	Never=1; Rarely=2; Sometimes=3; Often=4;		
JP2. You have to work on too many tasks at the same time? [C19b]	Very often=5		
JP3. The demands of your work exceed the time you have to do the work? [C19c]			
6. Work contact (WC) (Scale score range: 3-15)			0.84
In the past 3 months:			
WC1. How often were you called about work matters outside of normal office hours? [C20a]	Never=1; Rarely=2; Sometimes=3; Often=4;		
WC2. How often did you receive job-related emails or text messages out of normal office hours? [C20b]	Very often=5		
WC3. How often did you contact people about work matters outside of normal office hours? [C20c]			
7. Work-to-family conflict (WFC) (Scale score range: 4-20)			0.91
In the past 3 months:			
WFC1. How often did you not have sufficient time for important people in your life because of your job? [C21a]	Never=1; Rarely=2; Sometimes=3; Often=4;		
WFC2. How often did you not have sufficient energy to do things with important people in your life because of your job? [C21b]	Very often=5		
WFC3. How often did your work keep you from doing as good a job at home as you could? [C21c]			
WFC4. How often did your job keep you from concentrating on important things in your family or personal life? [C21d]			
8. Sleep problems (SP) (Scale score range: 3-15)			0.75
In the past month how often have you:			
SP1. Had trouble falling or staying asleep? [B6a]	None of the time=1; A little of the time=2;		
SP2. Woke up before you wanted to? [B6b]	Some of the time=3; Most of the time=4; All of the time=5		
SP3. Woke up feeling refreshed? (<i>Reverse coded</i>) [B6c]			

Multiple regression analysis (MRA) (not reported here) was used to inform the specification of the path analysis. The variables, applied additively in the MRA, identified significant predictors of job autonomy and control, job pressure, work contact, work-to-family conflict, and sleep problems. The selection of variables entered into the regression models was based on the literature. A path model was then specified and tested to determine the antecedents of work-to-family conflict and sleep problems.

RESULTS

Demographic characteristics

The mean and median ages of participants were 45-49 years (range: <25 years to >60 years). Participants were predominantly male (82%), and either married or living with a partner (88%). Just under half (49%) reported children under 18 years old living at home.

Experience in the construction industry yielded a mean of 16-20 years, and a median value of greater than 20 years. Just over half (58%) of respondents were partners or directors in the organisation; 10% were associates; and 32% salaried employees.

Working more than 50 hours per week was reported by 32% of respondents, and 16% reported working 56 hours or more per week. One quarter (26%) reported working more than 10 hours (on average) on job-related work at home on weekdays and weekends, and 8% reported working in excess of 30 hours a week at home outside normal working times. Working fewer hours per week was desired by 57% of respondents, whilst 38% preferred their *status quo* and 5% would rather work more hours per week. Two thirds (67%) reported to be very close to their spouse / partner, and 72% were convinced that their partner would always be there for them. Statistics for the quality of partner relationship scale score were: $M=10.31$, $SD=2.01$ (range 3-12).

Bivariate analysis

Hours worked per week was significantly related to respondents' desire to work more, less, or unchanged hours per week, $\chi^2(12, 630)=104.14$, $p<0.001$, with professionals reporting higher workloads per week desiring to work fewer hours significantly more than did colleagues with lighter loads. Quality of partner relationship was significantly inversely related to hours worked per week ($r=-0.11$, $p<0.01$), job pressure ($r=-0.093$, $p<0.05$), work contact ($r=-0.11$, $p<0.01$), WFC ($r=-0.21$, $p<0.001$), and sleep problems ($r=-0.18$, $p<0.001$). Specifically, poorer quality partner relationships were associated with more hours worked per week and higher levels of job pressure, work contact, WFC, and sleep problems.

Path analysis

Based on the hypothesised conceptual model derived from the literature (see Figure 1) and the multiple regression analyses, a path model specifying the antecedents of sleep problems was specified and tested (Figure 2). The model was an excellent fit to the data (χ^2/df ratio=1.439, $p=0.119$, CFI=0.994, RMSEA=0.026, and Hoelter (95%) =729. All paths were significant at $p<0.01$ or more. Model outputs revealed no need for addition of further paths.

Respondents with higher levels of work experience were more likely to experience greater levels of job autonomy and control ($\beta=0.22$, $p<0.001$), but also more extensive work contact ($\beta=0.11$, $p<0.01$). Gender was significant in predicting levels of job pressure ($\beta=0.12$, $p<0.01$) and work contact ($\beta=-0.11$, $p<0.01$), with females reporting higher levels of job pressure than males but lower levels of work contact. Domestic situation was also significant in that greater family requirements result in greater levels of job pressure ($\beta=0.16$, $p<0.001$). Respondents experiencing lower levels of job autonomy and control reported experiencing higher levels of job pressure ($\beta=-0.13$, $p<0.01$), while those reporting greater levels of job pressure were also more likely to experience higher levels of work contact ($\beta=0.45$, $p<0.001$).

Employment position significantly predicted job autonomy and control in that respondents with greater seniority were more likely to enjoy greater levels of job autonomy ($\beta=0.43$, $p<0.001$) but also more extensive work contact ($\beta=0.16$, $p<0.001$).

Higher levels of job autonomy and control were associated with significantly lower levels of WFC ($\beta=-0.11$, $p<0.001$), while greater levels of WFC were associated with higher levels of job pressure ($\beta=0.50$, $p<0.001$) and more work contact ($\beta=0.22$, $p<0.001$). Sleep problems were determined by job pressure ($\beta=0.16$, $p<0.001$), WFC ($\beta=0.28$,

$p < 0.001$), and work contact ($\beta = 0.09$, $p < 0.050$). Respondents with higher levels of job pressure, more extensive WFC, and higher levels of work contact were more likely to experience greater levels of sleep problems.

DISCUSSION

In general, it can be said that, for construction professionals, higher levels of job pressure are likely to lead to increased after-hours work contact. Such contact diminishes or distorts resources and shifts them towards the work domain and away from family life. The resulting imbalance leads to greater WFC. This, along with the job pressure, increases the likelihood of sleep problems for the professional (and possibly for partners). These findings resonate with those of Lingard and Francis (2009) in respect of the construction industry and Schieman and Young (2013) in relation to the general population.

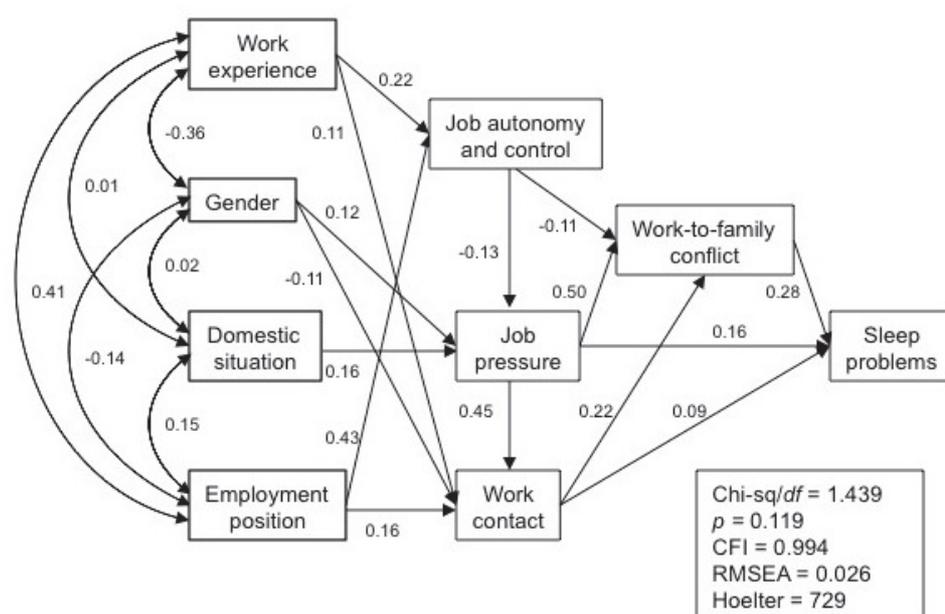


Figure 2: Path diagram of predictors of sleep problems

Previous research (Bellavia and Frone 2005) has pointed to a relationship between employment position and higher levels of work-family interference. This study has reinforced that finding, with more senior professionals reporting more extensive work contact than those of more junior status. Similarly, the findings support the contention that more senior professionals typically enjoy greater job autonomy and control. Job autonomy and control reduces both job pressure and WFC, by virtue of greater flexibility in scheduling work hours. Comparative results drawn from other studies of construction professionals (predominantly working within professional practices) are not available. Work experience, like employment position, proved a determinant of job autonomy and control and work contact - for much the same reasons as outlined above.

Job pressure, WFC, and work contact were found to have the greatest influence on sleep problems experienced by construction professionals. This is not surprising as the stress associated with tight deadlines and heavy workloads is likely to be associated with disturbed and less restorative sleep. Similarly, WFC is associated with psychological distress arising from strained family relationships and resultant sleep problems. These findings resonate strongly with previous research; see, for example, Jacobsen *et al.*, (2014) and Aazami *et al.*, (2016). Work contact, itself a possible source of job pressure

(particularly if initiated by demanding clients and professional team colleagues), may exacerbate the problem.

Research indicates that that long work hours are negatively related to family participation and positively linked to divorce rate (Lingard and Francis 2009; Kravina *et al.*, 2014). Our finding that poorer quality partner relationships are positively associated with more hours worked per week and higher levels of job pressure, work contact, work-to-family conflict, and sleep problems, supports this. Professionals working long hours reported a desire to work fewer hours. How can this be achieved? On the one hand the firm is unlikely to promote stricter boundary control if this negatively impacts productivity. Organisations increasingly push their employees to work harder and longer to remain successful in a globally competitive market (Fry and Cohen 2009). On the other hand, forcing their employees to compromise family relationships and quality of life may lead to increased staff turnover. The dynamic is further complicated by up-and-coming professionals' desire to progress through the ranks of the organisation (to the possible detriment of their families).

More extensive use of home-based approaches to work (working from home) has been advocated (Lingard and Francis 2009) for achieving greater work-family balance. This is *conceivable* within a construction professional context (with the exception of construction managers) provided the necessary computer infrastructure (access to the firm's LAN and proprietary software) is accessible and provided the firm is focused on output delivery rather than (unmonitored) physical hours at work and possible distractions at home (family-work interference). Whether firms enthusiastically embrace this suggestion is doubtful. In many instances, increased WFC and sleep problems may be conditions largely seen as employees' problems rather than organisational issues.

There are limitations to our study. Sleep quality was measured subjectively by self-reporting rather than objectively (see Landry *et al.*, 2015). The existence of more objective measures of sleep quality (e.g. actigraphy) is acknowledged (see Powell and Copping 2010). The survey instrument did not explore the status of the children in terms of the relationship between the parents e.g. situations where separated parents might share housing responsibility for their children. Subtle variations in family situations were thus not explored. Survey bias may exist due to the self-selection online administration process used. Finally, the industry-specific context of the study limits any generalisation of the findings to other sectors and to the general population.

CONCLUSIONS

There is a significant relationship between the amount of work contact and levels of WFC experienced by construction professionals and reported sleep problems. Our *a priori* hypothesis is therefore upheld. Greater job autonomy and control reduces the impact of increased work contact on work-to-family conflict, but greater job pressure exacerbates it.

There is clearly a need to create greater awareness amongst professionals of the importance of restorative sleep and the relationships between job pressures, work contact, WFC and sleep problems. The inverse relationship between job autonomy and control and job pressure needs to be exploited to potentially reduce levels of work contact and work-to-family conflict and thus help to reduce sleep problems. Trying to manage job pressure more effectively is clearly difficult, but a possible clue may lie in staff empowerment and support, especially for female construction professionals. Professional practices could explore the possible implementation of alternative work arrangements such as flexitime, permanent part-time work, compressed work weeks, job sharing,

‘employee choice’ rostering, child care support, reduced working hours, and annualised hours (see Lingard and Francis 2009). Given the positive influence of supportive partners, canvassing the attitudes of partners regarding the work organisation and employee job demands would be a useful way of gaining insight into the impact of work contact on employees and families. It could also provide insight into issues such as employee commitment to the organisation and staff turnover intentions.

Work contact effectively extends the working day into time that would typically be devoted to family, social or other activities. Adverse consequences for any of these may be inevitable. However, total exclusion or avoidance of such contact is almost impossible in today’s ‘connected’ world. Inter-generational differences also suggest that younger generations would not even contemplate such drastic solutions. More careful (and disciplined) boundary setting between work and family domains may be the only practical way to address the dilemma, but this cannot be a unilateral approach. Employers (however reluctant) and employees should each play their part. The construction industry, through all its stakeholders and participants, must make appropriate and acceptable work/life plans and sustainably build upon them in terms of human capital.

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