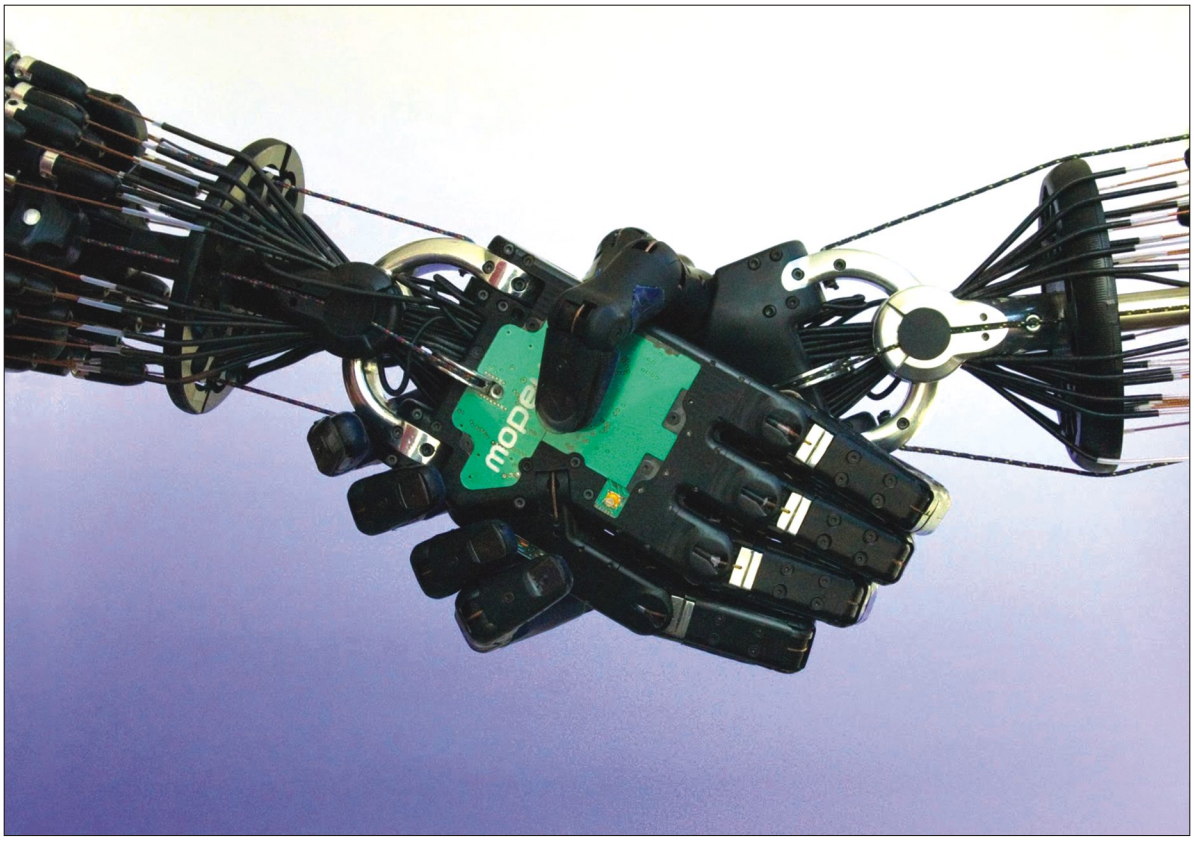

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Research Article
Impact of Information and Communication Technology Usage on Work-life Balance among Professional Women in the Construction Industry

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Abstract

Background and Objective: Women's entry into the male-dominated industry, such as the construction industry has been rather slow due to family responsibility. With that, the main objective of this study was to investigate the level and the effect of Information and Communication Technology (ICT) usage on the satisfaction of work-life balance among professional women in the construction industry. **Materials and Methods:** Questionnaires were administered to 35 professional women in the construction industry. A model linked with ICT usage to measure satisfaction of work-life balance was tested using Smart PLS M2 Version 2.0. Both measurement and structural models were tested and the results turned out to be positive. **Results:** The structural model in PLS analysis displayed a positive relationship between ICT usage and satisfaction level of work-life balance. **Conclusion:** The ICT usage increased the satisfaction of work-life balance and allowed women to get in touch with their families, apart from minimizing their burden some workload.

Key words: Work-life balance, information and communication technology, professional women, construction industry

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

The number of women in the labor force has increased in recent years[1]. However, women's entry into the construction domain appears to be very slow in comparison with men, including in other male-dominated professions, such as medicine and law[2]. In the United Kingdom (UK), the number of construction workers amongst women has remained very low[3]. As for Malaysia, women recorded 46% of participation rate in the workforce, which is lower than that of other Asian countries (World Bank)[4].

Wheatley[5] defined work-life balance, which is also called work-home or work-family, as the capability of individuals, regardless of age or gender, to combine work and household responsibilities. Tunji-Olayen *et al.*[6] argued that the major obstacle faced by women to penetrate the male-dominated industry, such as the construction industry, is the persistent inequality in family responsibilities that seems to constrain women's involvement at work. Goh *et al.*[4] reported that 65% of women left their jobs as they chose to raise their families after failing to achieve work-life balance (43%), while the others stated reasons, such as the need to care for a family member (38%), expensive childcare (35%), lack of facilities that support women (34%) and inflexible work arrangements (32%).

De Wet and Koekemoer[7] indicated that Information and Communication Technology (ICT) has been of special interest amongst researchers seeking to understand the balance between work and personal life, mainly because ICT has been linked to a fundamental shift in the transition between work and home. The ICT tools, such as mobile computing, mobile communication devices and portable gadgets, support work performance outside office space at almost any time of the day[8]. The ICT has been widely accepted to play a crucial role in work-life balance by allowing work to be performed at home and after regular office hours[6]. Collaboration and coordination can be achieved through the use of ICT. Nevertheless, when compared with other sectors, the construction industry has been slow in adopting and utilizing ICT[9].

The effective use of ICT by organizations and its diffusion in the industry must be properly managed to better prepare for the adoption of future ICT applications[8]. The construction industry focuses on issues related to use of cutting-edge ICT methodologies[10] and prioritization of ICT[11], benefits of adopting ICT[12] and the impact of ICT on productivity. The literature, nonetheless, had nil empirical construction study that delineated ICT implementation in Malaysia from the stance of work-life balance satisfaction among professional women. This study, therefore, bridges the gap of prior studies pertaining to the construction industry by meeting two objectives: (1) To find the usage level of the different types of ICT and (2) To identify ICT usage and satisfaction in attaining work-life balance.

MATERIALS AND METHODS

Sampling and data collection: A simple random sampling method was employed to provide each sampling element with an equal opportunity to be selected, hence reducing potential bias. Hoinville and Jowell[13] suggested that as a "rule of thumb", a sample size should be 10% of the total population. A total of 251 questionnaires were distributed through a registered quantity surveyor throughout Malaysia. Thirty-five positive feedbacks (14% participation rate) were obtained. The survey was conducted with an interval of two months.

Measuring instrument: Seven items were embedded into the questionnaire to capture the demographic background of the respondents, such as age, status, qualification, job tenure, position, salary and state of working. These questions were based on a tool used by Lowry and Moskos[14], which was adopted from Smith *et al.*[15]. The level of satisfaction was assessed using the 9 item scale of Overall Job Satisfaction retrieved from White[16], Saltzstein *et al.*[17], Wheatley[5] and Marks and MacDermid[18]. This scale assessed the overall affective responses provided by the organizational members on their jobs by using a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Next, the level of ICT usage to achieve work-life balance was assessed with six items adopted from Marks and MacDermid[18]. This scale assessed the overall affective responses given by the organizational members on their jobs by using a 5-point scale ranging from 1 (very low) to 5 (very high). Table 1 presented the value of Cronbach's Alpha at 0.555, signifying that all the six questions were indeed acceptable to examine the level of ICT usage among respondents.

Data analysis: In this study, statistical approaches, such as descriptive analysis and cross tabulation, t-test from SPSS version 18.0 and Smart PLS M2 version 2.0 were employed for data analyses to rank the variables based on the mean values of the responses. The ranges for each response had been as follows: 4.50-5.00 indicated a high level of satisfaction (strongly agree), 3.50-4.49 represented slightly lower than the highest level of satisfaction (agree), 2.50-3.49 showed neither agree nor disagree, 1.50-2.49 signified disagreement towards satisfaction level and >1.49 referred to strong disagreement towards satisfaction level.

RESULTS

Demographic profile of the respondents: Table 1 presented the outcomes from descriptive analysis involving 35 respondents. About 28.6% (10) of the respondents were quantity surveyors, while 25.6% (9) were company directors, 20.0% (7) were managers and the rest were project executives or contract administrators. Most of the respondents, 91.4% (32) had prior experiences of more than 10 years, while the rest had working experiences below 10 years. As for the type of company they belonged to, 48.6% (17) of the respondents worked at consulting firms, while 37.1% (13) were in the public sector and the others were with contracting firms and developers. Additionally, 62.9% (22) of the respondents worked in large enterprises (with more than 30 employees), followed by 20.0% (7) in medium-sized enterprises (11-30 employees) and 17.1% (6) in small enterprises (with less than 10 employees).

ICT usage in relation to present work and life: Table 2 revealed that the use of mobile/smart phones ranked the highest among the responses (m = 4.20, SD = 0.901), followed by telephone (m = 3.77, SD = 1.031), working software programs (e.g., Autocad, Binalink, Microsoft office, BIM and 3D Max) (m = 3.69, SD = 1.278), computing/laptop (m = 3.63, SD = 1.239), social networking sites (e.g., Facebook, Twitter, LinkedIn, Skype and email) (m = 3.43, SD = 1.220) and facsimile (m = 3.00, SD = 1.111). These outcomes indicated that many professional women in the Malaysian construction industry used smart phones and telephones to support their work and life. The use of mobile phones during work and free time seemed to reduce discomfort when under time pressure.

Relationship between ICT usage and satisfaction in work-life balance: The analysis began with the assessment of reflective measures using convergent and discriminant validity analyses. Factor loadings, composite reliability and Average Variance Extracted (AVE) were performed to assess convergence validity. Loadings for all the reflective items, except three items from ICT usage (working software, facsimile and telephone-deleted), exceeded the recommended value of 0.5. Composite reliability values (Table 3), which referred to the degree the items indicated latent construct, ranged between 0.84 and 0.92, hence exceeded the recommended value of 0.7. Meanwhile, the AVE ranged from 0.57-0.65, which exceeded the recommended value of 0.5.

Discriminant validity was conducted by comparing the square root of AVE from each construct with the correlation between the constructs. Table 4 displayed that the square roots of the AVE for usage and satisfaction were higher than the correlation among them. This finding reaffirmed the discriminant validity of the model constructs.

Table 5 portrayed that the predictor (ICT usage) had a significant influence on the criterion (satisfaction in work-life balance) ($\beta = 0.29$, $p<0.01$) (H1). This table charted the explained variance by model (R^2), standardized path coefficients (β) and t-values observed with the level of

Table 1: Profile of focus group participants

Attributes	Classification	Number of participants	Percentage
Position	Quantity surveyor	10	28.6
	director position	9	25.6
	manager position	7	20
	project executive	9	25.6
Experience	More than 10 years	32	91.4
	Less than 10 years	3	8.6
Type of company	Consulting firm	17	48.6
	Public sector	13	37.1
	Contracting firms and developer	5	14.3
Size of the company	Large enterprises	22	62.9
	Medium size enterprise	7	20
	Small enterprises	6	17.1

Table 2: Item statistics for the use of ICT among professional women

Social networking sites	N	Mean	Standard deviation	Rank
Social networking (e.g., Facebook, Twitter, LinkedIn, Skype, email)	35	3.43	1.220	5
Working software programs (e.g., Autocad, Binalink, BIM, Microsoft Office, 3DMax)	35	3.69	1.278	3
Mobile/Smart phones (e.g., Iphone, Samsung Galaxy, Blackberry)	35	4.20	0.901	1
Mobile computing (Laptop, Ipad, Samsung Tablet)	35	3.63	1.239	4
Facsimile	35	3.00	1.111	6
Telephone (Home and Office)	35	3.77	1.031	2

Table 3: Factor loading and reliability for construct

Construct	Item	Scale type	Loadings	AVE	CR
Usage	ICT1	Reflective	0.86	0.65	0.84
	ICT2		0.80		
	ICT3		0.75		
Satisfaction	SAT1	Reflective	0.87	0.57	0.92
	SAT2		0.52		
	SAT3		0.81		
	SAT4		0.79		
	SAT5		0.76		
	SAT6		0.68		
	SAT7		0.73		
	SAT8		0.87		
	SAT9		0.68		

AVE: Average variance extracted, CR: Composite reliability

Table 4: Discriminant validity assessments

Construct	Mean	SD	Usage	Satisfaction
Usage	3.62	0.85	0.80	
Satisfaction	3.70	0.59	0.29	0.75

SD: Standard deviation

Table 5: Summary of the structural model

Effects on endogenous variable	Path coefficient (β)	SE	t- value (bootstrap)
Usage≥satisfaction	0.29**	0.06	4.72

SE: Standard error, *p≤0.05, **p≤0.01

significance achieved. Based on the t-statistics, which is significant at p<0.05, H1 or the hypothesis that ICT usage has a direct effect on the satisfaction level in work-life balance, is accepted.

DISCUSSION

Communication via ICT these days is crucial, especially for professional women who work at long distances and confined within the office space. In this study, ICT allowed working women to constantly get in touch with their families and friends, apart from minimizing workload and increasing both speed and accuracy of the process and outcomes.

The descriptive statistics revealed that mobile/smart phones ranked the highest among the respondents. The result of this study seems consistent with that reported by Hasan *et al.*[8], who mentioned that use of Mobile ICT had perceived impact on construction productivity. Besides, this study determined the level of ICT usage and its impact on the satisfaction of work-life balance among professional women in the construction industry. The results showed that many respondents rated the contribution of ICT usage in their work-life balance as high. This finding is in line with that claimed by Tunji-Olayeni *et al.*[6] indicating that ICT usage annihilated the boundaries between work and free time by making work feasible anytime and anywhere.

The outcomes of the analysis emphasized on the importance of using working software programs, which is consistent with that claimed by Aguenza and Som[19] who argued that organizations use software programs to reduce the conflict between work and life, as well as to improve the quality and productivity of employees' work. Software programs are very useful, especially for professional women. One example refers to BIM and Binalink that can estimate the quantity of materials, the costs and the construction bills of quantities within a short time. Most of the respondents did not always use social networking channels, such as Facebook, Twitter, Linkedin, Skype and email. The use of social media at present time is not only limited to personal use but for work pleasure as well.

The structural model in PLS analysis exhibited a positive correlation between ICT usage and level of satisfaction towards work-life balance. The useful information gained led to exploration of ICT usage among professional women in the Malaysian construction industry. The finding is parallel with that reported by De Wet and Koekemoer[7] and Golden[20], who discovered that the overall positive effect of ICT outweighed the negative effects. This line of work was expanded by focusing on the issue that low satisfaction in work-life balance was caused by the extent of telecommuting. Malaysian professional women who telecommuted more extensively displayed increased level of satisfaction towards work-life balance. The ability to regulate the scheduling of work tasks appeared to be a right aspect in professional work, particularly amongst those who chose to use ICT.

Despite the positive relationship between predictive and criterion variables, Malaysian professional women must be aware of the negative aspects of ICT usage, such as those pointed out by De Wet and Koekemoer[7] that telecommuting

decreases face-to-face interactions and strains relationships between co-workers and managers. The limited interactivity of electronic media coupled with increased depressive symptoms[21] may outweigh the benefits of telecommuting. Additionally, Malaysian professional women must reckon that managers mostly fear losing control over their sub-ordinates and hence, are reluctant to support ICT usage. Therefore, managers hardly encourage employees to telecommute, which may increase the risk of losing control[22].

This study only had 35 respondents as its sample. This calls for a more comprehensive study based on a significant number of respondents. Since technologies exert both positive and negative impacts on productivity, future researchers need to devise innovative measures in the attempt of addressing various issues highlighted in this study, such as devising ICT tools that are able to solve health, safety and training challenges from the perspective of the end users.

CONCLUSION

This study concludes that ICT tools, such as mobile computing, portable gadgets and electronic mail, in the application of work-life balance are indeed crucial. This is because; ICT usage has high potential to enhance the satisfaction of work-life balance.

SIGNIFICANCE STATEMENT

Due to scarcity in studies related to ICT usage in the construction industry at the individual level, this study had addressed a number of limitations found in prior framework. The original contribution of this paper refers to the provision of a modelling insight on the effect of ICT technology on satisfaction towards work-life balance. Thus, future study may consider additional analysis on how professional women in industries other than the construction industry use ICT to maintain work-life balance.

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