

QUANTITY SURVEYORS WORKING FROM HOME DURING COVID-19 PANDEMIC: DOES PLACE MATTER?

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ABSTRACT

COVID-19 pandemic affected people in many ways. To prevent the spread of the virus, governments-imposed travel restrictions. This became the main reason for many sectors to adopt work from home (WFH) concept. Although WFH grew prominently with the COVID-19 pandemic, it was already practiced in several sectors even before the pandemic. However, there was lack of evidence regarding the quantity surveyor's practice in WFH. This research therefore attempts to investigate how the quantity surveyors WFH during COVID-19 pandemic and factors that affected the successful functioning of their job. To achieve the aim, a mixed method research approach was undertaken. Initially, a comprehensive literature review was carried out and an interview guideline was developed as the data collection instrument. Subsequently, 30 semi-structured interviews were conducted to collect data. Collected qualitative data was analysed through code-based content analysis using NVivo 10 and quantitative data was analysed by using descriptive statistical analysis. Results shows that nature of job role, personal qualities, technology, organization related factors, gender, home-work interface, and economic condition of the country affects the QS's function during WFH. Further, age, location of home, weather condition, job experience and performance of other employees were identified as factors that have a potential to affect Qs during WFH. This research findings can be used to implement WFH concept effectively to optimise quantity surveyor performance in the construction industry by controlling each factor that affects when Qs WFH.

Keywords: COVID-19; Quantity Surveyors; Sri Lanka; Work from Home (WFH).

1. INTRODUCTION

If work can be done properly, does place matter? Louis and Kumar (2020, p.2944) stated that “it's no longer necessary to be in an office full-time to be a productive member of the team”. During the COVID-19 pandemic, Work from Home (WFH) became one of the most widely used phrases in the word due to the self-isolation policy, which was adhered by many countries to restrict the spread of the virus (Cetrulo, et al., 2020). Although this concept is widely known as WFH in the present, several terms have been used in the past literature interchangeably to identify the WFH concept such as home-based work, remote work, telework and off-site work, ultimately making it difficult to state a generally

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accepted definition for WFH concept (Baker, et al., 2007; Baruch, 2001). This level of contrast in terminology arises due to the breadth and complexity of the concept (Sullivan, 2003). According to Savić, (2020), WFH concept consists of four characteristics; (a) a direct employee of an organization, (b) undertaking a task related to aforementioned organization, (c) work being executed away from the company premises, and (d) employer and employee connected via a telecommunication network.

Kale (2020) believes that office-based roles in construction industry can be performed from home, and it was evident during the COVID-19 pandemic period. However, in certain situations, it is essential for construction professionals to be physically present at site (de Wet, 2009). Adding to that, Bsisu (2020) concluded that design civil engineers are able WFH, whereas site civil engineers will not be able to WFH highlighting that not every professional in construction industry is able to WFH.

Quantity Surveying Profession is one of the key disciplines in the construction industry. Ashworth et al., (2013) briefly described the traditional role of Quantity Surveying (QS) as formulation of the measure and value system. They further emphasized that estimation of initial cost of the project, preparation of bills of quantities, taking measurements for progress reports and final reports, tender documentation, and cost planning as few other key roles of the QS. Moreover, quantity surveyors are required to adopt to the changing nature of their profession, especially as a result of the changes in Information Technology (IT) to improve the efficiency of their work (Kulasekara, et al, 2013). It cannot be stated with a considerable certainty the applicability of WFH concept to the QS profession as well as what factors affect the QS during WFH. Hence, there is a lack of studies on how the Qs perform their duties through WFH during the pandemic period. Therefore, this paper intends to investigate how Qs WFH during COVID-19 pandemic. This paper further focusses on the factors affecting QS's WFH practice during the COVID-19 pandemic. This paper starts with a literature review on WFH concept and Section 3 presents the research methodology. Section 4 presents the research findings and discussion followed by conclusions and recommendations.

2. LITERATURE REVIEW

This section reviews the WFH concept during COVID pandemic period, factors affecting WFH, WFH in construction industry and factors affecting WFH.

2.1 WFH CONCEPT DURING COVID PANDEMIC

WFH concept is first promoted in 1980's by IT companies such as Yahoo, and after three decades, employees were facilitated to maintain connection with their colleagues through the introduction of affordable devices (such as smart phones and tablet devices), Internet and World Wide Web (Messenger and Gschwind, 2016). With the COVID-19 pandemic, some industries only had two options: either stop production or take health risk and continue production. However, other industries use WFH as their third option (Bartik, et al., 2020). Various technical platforms were developed to enhance the efficiency and effectiveness of homeworkers (Jain, 2021). COVID-19 replace the traditional work practice due to the digital transformation (Savić, 2020). Mobile applications such as "Zoom" and "Video conferencing cloud" enable functions such as online meetings, training, webinars, and conference rooms (Bhavya, 2020). Now people WFH on a full-time basis whereas before the pandemic WFH on a full-time basis was considerably low (Alipour, et al., 2020).

2.2 WFH IN CONSTRUCTION INDUSTRY

WFH is relatively new phenomenon to the global construction industry and specially to the Sri Lankan construction industry which became prominent after the COVID-19 outbreak. Ogunnusi, et al. (2020) emphasized that the construction industry must adopt more technological tools to integrate virtual environment which will increase the flexibility of work. Kale (2020) and de Wet (2009) believes that some office-based roles in construction industry can be done from home but some professionals such as site engineers are necessary to be physically present at site. According to construction industry online survey study conducted using data from 143 respondent who were either pre-construction managers or project managers, suggested that pre-construction functions could be allowed to be continued through WFH after pandemic (Overturf, 2021).

2.3 FACTORS AFFECTING WFH

A number of studies have addressed the issue on ‘who can WFH?’ considering several factors, since it became a major concern with the implementation of WFH policy during COVID-19 (Delaporte and Peña, 2020). Factors affecting WFH can be identified as nature of job, personal qualities, technology, organisation, gender, economic condition of the country and home/work interface as discussed further.

2.3.1 Nature of Job

All jobs cannot be performed from home. According to Steinle (1988 as cited in Baruch, 2000), two third of jobs can be done from home. Occupations which require specialised field knowledge, managerial and executive jobs have a higher ability to WFH (Cetrulo et al., 2020).

Moreover, studies show that there are links between occupation level, wage and ability to WFH (Bailey and Kurland, 2002; Delaporte and Peña, 2020; Dingel and Neiman, 2020; Saltiel, 2020). Adding to that, Alipour et al. (2020) found that jobs which use computers frequently and are associated with “developing, researching, constructing” are more suitable to WFH by a study done through a survey sample of 17,160 employees.

Although the role of a QS is originally defined as the role of building quantification and preparation of bills of quantities, it evolved into a profession which undertakes various other roles such as facilities management, cost advising (Owusu-Manu et al., 2014). Willis and Ashworth (1987) discuss two types of QS roles, namely traditional and non-traditional (as cited in Yogeshwaran et al., 2018). QSs major job roles include preparation of bills of quantities, cost planning/estimating, cost controlling, contract administration, subcontract administration, preparation of final accounts, prepare financial feasibility studies, life cycle costing, value engineering, claims management, risk management, alternative dispute resolution (adjudication, mediation, arbitration) and providing expert witness services to name a few (Smith, 2004; Kulasekara et al., 2013; Jaafar et al., 2016; Chandramohan et al., 2020; Ilmi et al., 2021; Ashworth et al., 2013).

2.3.2 Personal Qualities

Person himself is a factor which determine the suitability of adopting WFH concept. This depends on the personality, skill level and similar qualities of a person (Baruch, 2000). Nicholas Bloom answered a question raised by Harvard Business Review regarding whether there is anyone who should not WFH by saying “Absolutely, not everybody

wants to or is disciplined enough to WFH” (Berinato, 2014, para 11) emphasizing that not every person is suitable for WFH.

2.3.3 Technology

Homeworkers depend on personal IT tools to execute their respective work (Savić, 2020). Siha and Monroe (2006) described IT as the backbone of WFH concept while Louis and Kumar (2020) identified technology as a strong factor which allows more WFH benefits to the organizations and employees. Moreover, they emphasize that many workers are able WFH due to technological tools such as email, video conferencing, screen sharing, file sharing and Virtual Private Network (VPN). Wide use of technology is seen during COVID-19 pandemic when people WFH (Chadee et al., 2021).

2.3.4 Organization

In theory, workers prioritise their work responsibilities, if they are loyal and value the organization (van der Lippe and Lippényi, 2020). Karanikas and Cauchi (2020) argued that outcome of WFH depends on the working arrangement between the employee and the organization. Characteristics such as supportiveness of organization towards the WFH concept, trust towards the teleworkers, and the management styles have impacts on WFH concept (Baruch, 2001). Savić (2020) states that, managers might need to implement different management styles to ensure the productivity of employees when WFH. Moreover, Ozcelik (2010) identified the size and the structure of the company as another vital factors. According to the author, an organization that is flexible, non-hierarchical, and technologically savvy is more likely to adopt a teleworking program successfully than one that is highly organized, and command driven.

2.3.5 Gender

WFH arrangements will differ according to the gender (Huws et al., 1997). When WFH, gender affects the job satisfaction and work-family conflicts differently (Crosbie and Moore, 2004). Although WFH gives opportunity for women to take care of family (Bailey and Kurland, 2002), van der Lippe and Lippényi (2020) state that women are subjected to more work family conflicts than men when WFH. Moreover, Collins et al. (2021) argue that women are not suitable for WFH, since household work reduce the working hours.

2.3.6 Economic Condition of the Country

Dingel and Neiman (2020), argued that economic condition of a country has a positive relationship with the share of jobs that can be done from home. Adding to that, Delaporte and Peña, (2020) stated that the level of development of the country has an impact on the ability to WFH.

2.3.7 Home-Work Interface

Kreiner et al. (2009) defines home/work interface as a “socially constructed boundary between the life domains: work and home” (p.705). Factors ranging from quality of family to the availability of physical space are covered under home/work interface (Baruch, 2001). Some considered that the availability of dedicated workspace as essential (Louis and Kumar, 2020), while some considered that it is not essential but a choice (Crosbie and Moore, 2004). However, availability of suitable working environment and having access to the infrastructures to WFH will highly affect when making the decision to WFH (Laumer and Maier, 2021).

Having identified the above factors from literature, this research investigates how those factors will affect when QSs WFH.

3. RESEARCH METHODOLOGY

The nature of this research problem, which is to investigate the factors affecting when quantity surveyor’s WFH during COVID-19 pandemic, requires an in-depth investigation. Further, opinions of respondents concerning each factor needed to be collected. This research followed a mixed method approach, since it provides informative, complete, balanced, and useful research results (Johnson et al., 2007).

The research was initiated with a comprehensive literature review on WFH concept during COVID pandemic period, WFH in construction industry and factors affecting WFH. The literature review findings were used to develop a semi-structured interview guideline that consists with both qualitative and quantitative questions. Likert scale was added into the interview guideline to rank and compare certain data. Developed interview guideline was used to conducted semi-structured interviews with 30 QSs to investigate how the aforementioned factors affected the QS practice when they WFH. The collected qualitative data were analysed through code-based content analysis using NVivo 10, whereas quantitative data were analysed by using descriptive statistical analysis.

4. RESEARCH FINDINGS AND DISCUSSION

The semi-structured interviews were conducted with 30 quantity surveyors working in Sri Lankan construction industry and the sample profile is shown in Figure 1.

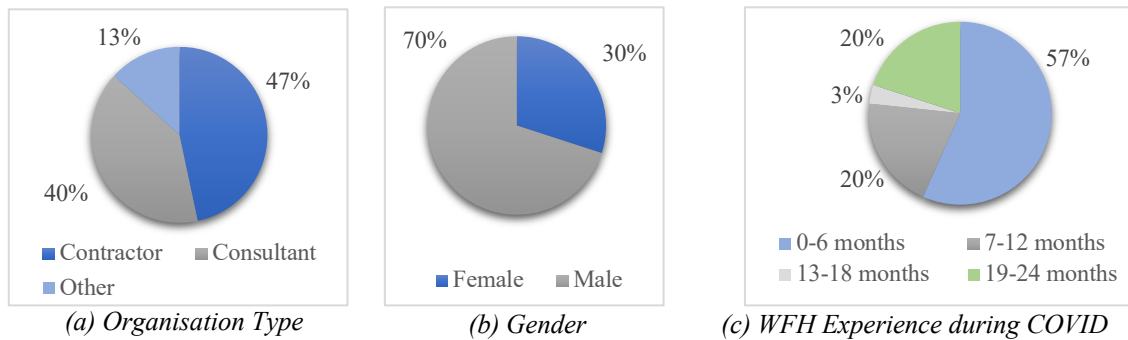


Figure 1: Profile of the respondents

The research findings under the 7 factors are discussed below.

4.1 FACTORS AFFECTED QSS PRACTICE WHEN THEY WFH

Both quantitative and qualitative data derived after the data collection are analysed and the research findings under 7 factors are discussed below. The 7 factors are nature of job, personal qualities, technology, organisation, gender, economic condition of the country and home/work interface. Finally, a discussion on findings is presented.

4.1.1 Nature of QSs Job

The first question to the respondents were ‘what QS job functions can be executed by a quantity surveyor through WFH?’. The respondents were requested to rate the extent to which they can perform the identified roles using a Likert scale from 0 to 4 (0 - Cannot

perform; 4 - Can very easily perform) and provide reason for their rating. The results are presented in Table 1.

Table 1: Job functions that can be played by quantity surveyors through WFH

Job role	Mean	Frequently given reason for respondent's rate
<i>QS job functions that can be performed very easily</i>		
Cost-benefit analysis	3.33	Depends on availability and accessibility of information
Cost modelling	3.33	Depends on availability and accessibility of information
Cost planning/Estimating	3.28	Depends on availability and accessibility of information
BIM coordination	3.26	Use virtual platform
Preparation of BOQs	3.23	Can perform using documents
<i>QS job functions that can be performed easily</i>		
Life cycle costing	3.03	Depends on availability and accessibility of information
Financial feasibility studies	2.82	Depends on availability and accessibility of information
Value Engineering	2.79	Depends on availability and accessibility of information
Expert witness	2.72	Can use virtual platforms
Contract Administration	2.60	Require site visits and in-person meetings
Cost controlling	2.52	Require site visits
Claims management	2.43	Depends on availability and accessibility of information
Risk management	2.41	Require site visits
<i>QS job functions that can be performed, but somewhat difficult</i>		
ADR - Adjudication	2.38	Can use virtual platforms
ADR - Mediation	2.34	Can use virtual platforms
ADR - Arbitration	2.34	Can use virtual platforms
Preparation of final accounts	1.90	Require site visits
Subcontract administration	1.66	Depends on sub-contractor's knowledge

According to the findings, ability to perform most QS's functions depend on factors such as the availability and accessibility to information and site visit requirements. Further, respondents emphasized that some job roles can be performed through virtual platforms.

4.1.2 Personal Qualities Required for a QS to WFH

A 1 to 5 Likert scale was given to the respondents to mark their opinion on up to what extent the personal qualities identified through the review are needed for QSs to perform WFH successfully. Response for the personal qualities were prioritised using RII analysis and presented in Table 2.

Table 2: Personal qualities required for a QS to WFH

Personal qualities	RII value	Rank
Self-discipline	0.967	1
Loyal and honest	0.933	2
Self-motivation	0.907	3
Communication skills	0.887	4
Flexibility	0.876	5
Self-confident	0.873	6
Ability to work on own (with little supervision)	0.873	7
Time-management skills	0.873	8
Organized Person	0.869	9
Tenacity	0.867	10
Initiative	0.787	11

According to the above findings, ‘self-discipline’ is identified as the most significant personal quality, which is required to perform WFH, whereas ‘initiative’ is identified as the least significant personal quality to WFH. One respondent further stated that the “lack of above-mentioned personal qualities will affect the deliverables because we are doing task-based work”. Another respondent added that “the lack of above-mentioned qualities cause inefficiencies, delays, and productivity losses”. Several respondents emphasised the importance of effective communication to minimise communication gap when WFH.

4.1.3 Information and Communication Technologies Required to Perform QSs Functions during WFH

Under the information and communication technologies (ICT) used by QSs during the pandemic, a comparison is done to identify whether there is a significant difference in the use of communication software when work from office and WFH and the findings are shown in Figure 2.

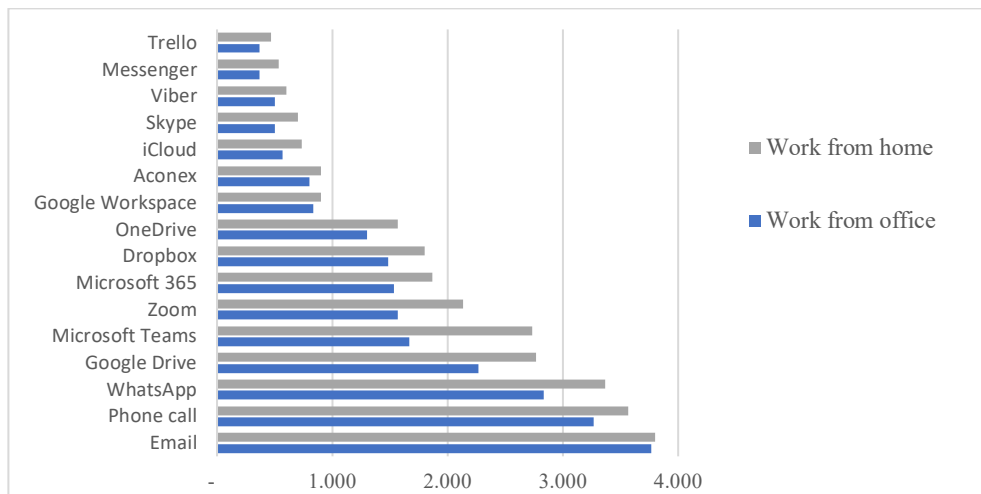


Figure 2: Comparison of technology usage in WFH and work from office

According to the comparison, it is evident that there is an increase of software usage for communication when WFH. Most significant growth can be seen in the usage of

WhatsApp, Google Drive, Zoom and Microsoft Teams software. However, still the most common method of communication for QS is Emails.

The study further extended to identify to what extent the QSs use software to deliver their work during WFH. Research findings are given in Table 3.

Table 3: Usage of QS function related software during WFH

Software	RII value	Rank
MS Excel	0.93	1
MS Word	0.86	2
AutoCAD	0.78	3
PowerPoint	0.44	4
MS Project	0.42	5
CostX	0.26	6
PlansSwift	0.26	7
Bluebeam	0.26	8
Revit Architecture	0.22	9
Primavera	0.21	10
Cubicost	0.15	11

According to the table 3, the mostly used software to deliver QS based work is MS excel, and secondly MS word. Least used software is Cubicost. According to Fanous (2012), QSs rely on simple software such as MS excel, MS word and AutoCAD, and the same is confirmed by these findings.

4.1.4 Organizational Support and Related Factors

Respondents were then requested to provide their opinion on the organization related factors and their impact on QSs WFH. For the question about their opinion on the organizational support for WFH, stated that *“company provided guidance and resources heavily affect the WFH performance”* highlighting that guidance and resources should be provided to employees when they WFH. R14 emphasized that not only physical resources and facilities but organizations should also support employees by giving *“moral and psychological support towards the mental wellbeing of the employees when WFH”*. On the contrary, PR2 highlighted that attitude of the person will affects to the performance despite the level of support by the organization. PR2 elaborated this by stating, *“Sometimes people think it is granted and does not try to perform if organization is unable to provide certain facilities”*.

Interviewees were further questioned about their opinion on the organizations’ trust toward the employees as a factor that influence WFH. All respondents agree that organizations’ trust toward employee is essential to WFH. *“If the employer does not trust employees, then employees are not motivated”* stated R18. Further, R11 highlighted that organizational trust has an impact on the performance and stated that, *“company will not let employees to bring office laptops to home if they do not trust employees”*. Additionally, R15 shared his experience stating, *“since there was no trust, the employer implemented a heavy monitoring system”*. However, R8 argued that *“if the organisation received the expected output, they do not need to monitor”*. Moreover, respondents

highlighted that distrust leads to increment of the workload. *“If organization does not trust employees, they will be given more work”*, stated R4. However, R6 stated that *“most of the time organization does not trust us. That’s why many organizations are trying to bring workers back to the office”*, emphasizing that most organizations do not trust employees who WFH. Moreover, most of the respondents agreed that competent management is required for better performance when WFH. R13 stated, *“You cannot manage WFH in the same way that you manage physically in the office. You have to follow different strategies to get the work done”*.

4.1.5 Gender and Marital Status

Respondents stated that gender itself has no impact on the WFH performance except in several extreme conditions. On the contrary, marital status and having children have an effect on QSs WFH. *“If married, there could be traditional house chores, negatively affect female QS performance”* stated R15. R4 shared her experience stating, *“When there is a need for my baby, it is me who take care. Not my husband. So, gender affects specially in Sri Lankan culture”*. Further, *“In my office, female employees with children complains that it is hard to WFH. In COVID situation, servants have stopped coming to work and they had to do both office and housework”* said R6. However, R2 emphasized that this issue is not limited to the female employees, *“It may affect to married men with children as well. Because children may disturb the work or meetings”*. In contrast, R12 stated that the aforementioned issues depend on the personal qualities and self-discipline.

4.1.6 Economic Condition of the Country

It is evident that economic condition of the country affects the availability of facilities to WFH. *“Our electricity system is not well developed. In that case there are frequent power failures. Moreover, a developed country has unlimited internet but here we don’t have that facility. Available internet packages are very expensive”* stated R4 emphasizing frequent power failures and expensive internet connection as factors that impact negatively to QSs WFH performance in Sri Lanka. Further, respondents stated that due to economic downturn, there are less construction projects. *“Sometimes, due to this pandemic situation, projects are less. There is salary reduction. Sometimes we may not get our bonus, allowances, etc. This affects more when WFH”* commented R9. Both R4 and R9 accept that the economic condition of the country as a factor that affects to QSs WFH practice. On the contrary, *“If there is no salary deduction, then I don’t think there is an impact”*, R8 highlighted emphasizing economic condition of the country is not a factor that affects QSs WFH.

4.1.7 Home-Work Interface

Interviewees were questioned on how the identified home-work interface related factors will affect to the quantity surveyors’ practice when they WFH. They were specifically questioned regarding the impact of quality of family on WFH. According to the respondents, understanding of the family is very important in WFH. *“Family needs to understand that we are not on a holiday, we are working. So, they should not interfere with work”* remarked R3. Further, respondents emphasized a peaceful family is required for the success of WFH concept. Moreover, respondents emphasized not only understanding but also support from the family is required for the success of WFH concept. Further, few respondents highlighted that increased performance due to the job satisfaction as an added advantage because they can spend quality time with their family. Subsequently, the respondents were questioned whether the availability of dedicated

workspace has an impact on the QS's performance. Most respondents believed that availability of a dedicated workspace is required. They emphasized that it would help to reduce interruptions, help to create an office environment at home as well as it helps to organized documents. However, some respondents stated that it is not mandatory as some may find it hard to arrange workspace in home environment. Further, according to respondents, having access to infrastructure such as electricity and internet connection is of utmost importance for the performance of a QSs WFH. However, according to PR2, *"In Sri Lanka, WFH is difficult because some locations does not have the necessary infrastructure"*. However, R12 stated that not only the access to infrastructure is required but also should have self-discipline.

4.1.8 Other Factors when QSs WFH

Respondents were asked for their opinion on any other factors that affect the WFH performance. According to the respondents, location of the home affects the WFH concept. Respondents stated that if they are living in a congested area or in a noisy neighbourhood, it will be hard to WFH. Further, respondents stated that age as a factor that affects WFH and highlighted *"Less technological familiarity and resistance towards change when getting older (R15)"*. However, respondents like R12 emphasized that the benefit of WFH is to the elderly employees saying *"when you are old it is better to WFH. Because you don't have to travel"*. Moreover, respondents (R1 and R22) highlighted that performance of other professionals will affect the WFH performance of a QS since it is a teamwork. Moreover, respondents identified weather condition, job experience, the attitude of the society toward the WFH employee, size or complexity of the construction project, economic condition of the employee, health condition and culture as some other factors that affect the WFH performance.

4.2 DISCUSSION

According to the results, nature of QSs job, personal qualities required for a QS to WFH, ICT requirements to perform QSs functions in WFH, organisational support, gender and marital status, economic condition of the country and home/work interface factors had major impacts on QS performance when WFH. Results shows that all the factors that were identified from the literature affected QSs when WFH. Further, the research has identified QS job roles that can be performed from home. Cost-benefit analysis, cost modelling, cost planning and estimating, BIM coordination and preparation of BOQs are identified as functions that can be done easily. However, ability to perform most of the QSs functions depend on factors such as the availability and accessibility to information and site visits requirements. Self-discipline is identified as the most essential personal quality for QS's to WFH. Being loyal and honest ranked second and being self-motivated ranked third. According to the respondents, lack of above-mentioned qualities cause inefficiencies, delays, and productivity losses.

According to the research findings, increase in technology usage in QS practice can be seen with WFH. Though, technologies used in WFH has not much difference from the general QS practice. Hence, it can be said that existing technology is sufficient for QS's to WFH. However, frequent power failures, signal issues caused inefficiencies when QS WFH. According to the respondents, this is due to the economic condition of the country.

Further respondents believe that organizations must play a key role when QSs WFH. Accordingly, organization support is required for QS in WFH. *"Every employee might*

not have the required facilities to WFH. Organization should provide those” stated R23. Moreover, respondents highlighted that organization’s trust toward the employees is required to WFH. “Need trust as you are let to work alone” said by respondent. Further, respondents emphasized requirement of competent management stating “several problems emerged when we shift to the WFH. Organization should be able to manage that. If they are unable to manage, staff will suffer”.

Respondents highlighted that gender has no impact on QSs WFH. However, due to the marital status, presence of children and culture can be considered as factors that affect to the WFH. *“If married, there could be traditional house chores effecting negatively on female QSs”* stated R15. Respondents agreed on that home-work interface related factors such as quality of family, availability of dedicated workspace and having access to the infrastructure affects QS’s WFH. *“If there is lot of problems at home, employee might not prefer to WFH”* commented by R11. Other than the aforementioned factors respondents commented location of the home, age and performance of other professionals affects QS’s function when they WFH.

5. CONCLUSIONS AND RECOMMENDATIONS

WFH became a well-known phrase in the world with the lockdowns implemented by governments to restrict the spread of COVID-19 virus. With the lockdowns, various industries adopted WFH concept and construction industry has no exception. Quantity surveying is one such profession that adopt WFH concept during pandemic period. Hence, this research aimed to investigate the factors affecting quantity surveyors WFH performance during COVID-19 pandemic.

The research identified nature of QS job, personal qualities of a QS, ICT facilities available, organisational support, gender and marital status, economic condition of the country and home/work interface as the factors mainly affect quantity surveyors WFH performance. Moreover, there was an increase in usage of ICT such as Zoom and MS Teams to communicate during WFH. The findings further revealed that QSs mostly conduct their work using MS Excel, MS Word, AutoCAD. These were used prior to COVID-19 as well. Hence, there are no significant difference in the software used to conduct QS functions. Respondents stated that gender itself has no impact on the WFH performance, but under various extreme conditions, gender may affect the performance of a QS. The research reveals that home-work interface related factors such as quality of family, availability of dedicated workspace, accessibility to infrastructure, organization support, organization’s trust toward employees and competent management, have an impact on the QSs WFH. The study further identified few factors that affect WFH concept due to the social and cultural aspect of Sri Lanka. The construction industry practitioners can use this research findings to develop strategies to optimise the QS performance when WFH.

6. REFERENCES

- Alipour, J.V., Falck, O. and Schüller, S., 2020. *Germany’s Capacity to Work from Home*, CESifo Working Paper No. 8227. [Online] Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3578262.
- Ashworth, A., Hogg, K. and Higgs, C., 2013. *Willis’s Practice and Procedure for the Quantity Surveyor*. 13th ed. West Sussex: John Wiley & Sons, Ltd.

- Bailey, D.E. and Kurland, N.B., 2002. A review of telework research: Findings, new directions, and lessons for the study of modern work. *Journal of Organizational Behavior*, 23(4), pp. 383-400.
- Baker, E., Avery, G.C. and Crawford, J., 2007. Satisfaction and perceived productivity when professionals work from home. *Research and Practice in Human Resource Management*, 15(1), pp. 37-62.
- Bartik, A.W., Cullen, Z.B., Glaeser, E.L., Luca, M. and Stanton, C.T., 2020. *What jobs are being done at home during the COVID-19 crisis? Evidence from firm-level surveys* (No. w27422). National Bureau of Economic Research.
- Baruch, Y., 2000. Teleworking: Benefits and pitfalls as perceived by professionals and managers. *New Technology, Work and Employment*, 15(1), pp. 34-49.
- Baruch, Y., 2001. The status of research on teleworking and an agenda for future research. *International Journal of Management Reviews*, 3(2), pp. 113-129.
- Berinato, S., 2014. To raise productivity, let more employees work from home. *Harvard Business Review*, p. 12.
- Bhavya, R., 2020. Role of mobile communication with emerging technology in COVID'19. *International Journal of Advanced Trends in Computer Science and Engineering*, 9(3), pp. 3338-3344.
- Bsisu, K.A.D., 2020. The impact of COVID-19 pandemic on Jordanian civil engineers and construction industry. *International Journal of Engineering Research and Technology*, 13(5), p. 828.
- Cetrulo, A., Guarascio, D. and Virgillito, M.E., 2020. The privilege of working from home at the time of social distancing. *Intereconomics*, 55(3), pp. 142-147.
- Chadee, D., Ren, S. and Tang, G., 2021. Is digital technology the magic bullet for performing work at home? Lessons learned for post COVID-19 recovery in hospitality management, *International Journal of Hospitality Management*, 92(October 2020), p. 102718.
- Chandramohan, A., Perera, B.A.K.S., and Dewagoda, K.G. 2020. Diversification of professional quantity surveyors' roles in the construction industry: The skills and competencies required. *International Journal of Construction Management*, pp. 1-8 (In-Print).
- Collins, C., Landivar, L.C., Ruppanner, L. and Scarborough, W.J., 2021. COVID-19 and the gender gap in work hours. *Gender, Work & Organization*, 28, pp. 101-112.
- Crosbie, T. and Moore, J., 2004. Work-life balance and working from home. *Social Policy and Society*, 3(3), pp. 223-233.
- Delaporte, I. and Peña, W., 2020. Working from home under COVID-19: Who is affected? Evidence from Latin American and Caribbean countries. *GLO Discussion Paper Series 528*, Global Labor Organization (GLO).
- Dingel, J. I. and Neiman, B., 2020. How many jobs can be done at home?. *Journal of Public Economics*, 189, p. 104235.
- Fanous, A. 2012. *Surveying the field: Changes in quantity surveying*. Smashwords. Edited by A. Mullins.
- Huws, U., 1997. *Teleworking: Guidelines for good practice*. IES Report 329. Grantham, UK: Grantham Book Services.
- Ilimi, H.S., Tatt, S.L., Wen, D.T.Q., Kamarazaly, M.A., and Ling, S.C.A. 2021. Exploring the quantity surveying services from the employers' and graduates' perspective. *Malaysian Construction Research Journal*, 12(1), pp. 246-257.
- Jaafar, M., Jalali, A., and Sini, N.M. 2016. Assessing the duties and competencies of female quantity surveyors. *Asian Social Science*. 12(1), pp. 129-137.
- Jain, S., 2021. Work life balance: Issues and challenges during COVID-19. *Journal of Management Studies and Academic Research*, 6, pp. 5-10.
- Kale, A.R. 2020. Impact of COVID-19 on infrastructure and environment. *Purakala*, 31(37), pp. 98-105.
- Karanikas, N. and Cauchi, J. P., 2020. *Literature review on parameters related to Work-From-Home (WFH) Arrangements*. Commissioned Report. [Online] Available from: <https://eprints.qut.edu.au/205308/>.
- Kreiner, G.E., Hollensbe, E.C. and Sheep, M.L., 2009. Balancing borders and bridges: Negotiating the work-home interface via boundary work tactics. *Academy of Management Journal*, 52(4), pp. 704-730.
- Kulasekara, G., Jayasena, H.S. and Ranadewa, K.A.T.O., 2013. Comparative effectiveness of quantity surveying in a building information modelling implementation. In: *Proceedings of the Second World*

- Construction Symposium 2013: Socio-Economic Sustainability in Construction*. Colombo, Sri Lanka, pp. 101-107.
- Laumer, S. and Maier, C., 2021. Why do people (not) want to work from home? An individual-focused literature review on telework. In: *Proceedings of the 2021 on Computers and People Research Conference*. New York, NY, USA: ACM, pp. 41-49.
- van der Lippe, T. and Lippényi, Z., 2020. Beyond formal access: Organizational context, working from home, and work–family conflict of men and women in European workplaces. *Social Indicators Research*, 151(2), pp. 383-402.
- Louis, M.Y. and Kumar, S., 2020. Employees’ perceived benefits and drawbacks from “work from home” during COVID-19, *PalArch’s Journal of Archaeology of Egypt/Egyptology*, 17(6), pp. 2943-2957.
- Messenger, J.C. and Gschwind, L., 2016. Three generations of telework: New ICTs and the (r)evolution from home office to virtual office, *New Technology, Work and Employment*, 31(3), pp. 195-208.
- Ogunnusi, M., Hamma-Adama, M., Salman, H. and Kouider, T., 2020. COVID-19 pandemic: The effects and prospects in the construction industry. *International journal of real estate studies*, 14 (Special Issue 2).
- Overturf, S. 2021. Perceptions of remote work within the construction industry in the current pandemic environment. *Journal of Physics A: Mathematical and Theoretical*. University of Oklahoma
- Ozcelik, Y., 2010. The rise of teleworking in the USA: Key issues for managers in the information age. *International Journal of Business Information Systems*, 5(3), p. 211.
- Savić, D., 2020. COVID-19 and work from home: Digital transformation of the workforce. *Grey Journal*, 16(2), pp. 101-104.
- Siha, S.M. and Monroe, R.W., 2006. Telecommuting’s past and future: A literature review and research agenda. *Business Process Management Journal*, 12(4), pp. 455-482.
- Smith, P. 2004. Trends in the Australian quantity surveying profession: 1995-2003. *The ICEC International Cost Management Journal*, 19(1), pp. 1-15.
- Sullivan, C., 2003. What’s in a name? Definitions and conceptualisations of teleworking and homeworking. *New Technology, Work and Employment*, 18(3), pp. 158-165.
- de Wet, P., 2009. *Telecommuting in the Construction Industry: An Investigation into the Want of Utilising Available Telecommunication Technologies*. Thesis (MSc) University of Pretoria. [Online] Available from: <https://repository.up.ac.za/handle/2263/16348>
- Willis, C.J., and Ashworth, A., 1987. *Practice and Procedure for the Quantity Surveyor*. Collins.
- Yogeshwaran, G., Perera, B.A.K.S., and Ariyachandra, M.R.M.F., 2018. Competencies expected of graduate quantity surveyors working in developing countries. *Journal of Financial Management of Property and Construction*, 23(2), pp. 202-220.