

Determining Factors Affecting Design Delivery in Working from Home Setup during the COVID-19 Pandemic

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Abstract. In the ongoing attempt to prevent the spread of the coronavirus (COVID-19) that has a severe impact globally, businesses are now adapting to the new normal. This pandemic has led many construction companies to adopt a new way of working and communicating with their remote teams. However, there are drawbacks observed in the implementation of the working from home setup. This study aims to identify the top factor affecting the design delivery in a consulting firm during WFH. A technical issue like internet connectivity was seen to be an upsetting factor in the study. In general, many are experiencing slower overall internet speed during the pandemic. Delivery of design is affected by the issue as this creates a domino effect in the project schedule and costs. With the continuous rise of COVID-19 cases, management should reassess its policies and remote working procedures to address employee productivity issues.

Keywords: work from home, design delivery, bandwidth, project schedule and cost

1. Introduction

The COVID-19 pandemic significantly impacts the construction sector, where design and engineering are part of the scope. With the restriction imposed by the government, alternative work arrangements are highly encouraged.

Working from Home [WFH] is presently known as an alternative to minimize the risk of COVID-19 infection [1]. The temporary setup is better than working from the office [WFO] since WFH is not just a preventive measure, but this also eliminates commute time, provides more flexible working hours, and improves work-life balance. However, there are also fundamental consequences of WFH, including its effects on productivity and the factors making WFH less productive than WFO [2].

According to a study conducted in July 2021 for an IT service industry, work productivity fell to 8-19% in the current WFH setup. The determinants of changes in productivity were then analyzed [2]. A study in Japan by Morikawa showed that the productivity of employees adopting the home working arrangement during the Covid-19 pandemic is, on average, 30%-40% lower than that in the office. Another study in the US among small and medium-sized firms reported a decrease in productivity of about 20 percent on average, as revealed in a paper by the National Bureau of Economic Research (NBER) [3]. In this paper, the researcher will focus on the top factors acknowledged by the team involved in the design phase delivery of a construction project. Especially that workforce and operations are common issues many infrastructure companies face amid the COVID-19 global crisis [4].

Although COVID-19 can be considered a force majeure in the construction sector, a possible time extension and variation order were discussed and approved by both parties (project owners and contractors). It is noteworthy to analyze and evaluate factors influencing the cause of the design delay during the WFH setup since management is closely monitoring the work in progress [WIP] to avoid project variances during its design phase.

In this paper, technical professionals in the design firm are participating in the survey. They will rank the factors that affect their productivity on the current setup. During interviews, the researcher initially gathered information on factors affecting WFH from colleagues and used the top 5 factors as choices in the survey.

2. Methodology

The method uses a qualitative approach in collecting and analyzing data in determining the design delivery drawback.

The main contributor to the survey is the employees working on the design phase delivery from the conceptual stage to construction documentation. There are (15) individuals or 14% of the total number of employees participating in a particular office branch. They are project managers, designers, drafters, and project administrators.

The questionnaire is consists of two sections using google forms and disseminated through e-mail and other messaging platforms available online. The first part was a demographic profile survey comprising their role in the project, workloads, and current location. In the second part, the participant will rank the items according to their perception. The choices are: (a) Internet Capability/ Connectivity; (b) Social Distractions; (c) Team Coordination; (d) Working Station; and (e) Multi-tasking (Figure 1).

2.1. Internet Capability / Connectivity

The most common technical issue encountered that slows down productivity is unreliable internet connections. The growing demand for broader bandwidth during the pandemic worsens the situation. A new survey and report from Waveform in the US reveal that 15.5% of its respondents face daily internet connectivity issues working from home. This is in addition to those facing weekly (22.2%) and monthly (15.2%) connectivity issues [5].

2.2. Social Distractions

Job distraction resulting from social media use negatively affects performance development and may challenge the mentality to focus on work [6]. The presence of family members can be a factor for distractions also. It can be challenging to get any job done when disturbed. Spending time on non-work related issues is a factor for distraction.

2.3. Team Coordinations

Ineffective communication and coordination are the primary contributors to project failure and negatively impact project success. Since coordination helps better monitor and control each project stage to ensure it progresses according to the prescribed timeline.

2.4. Working Station/Space

Suitability and availability of workspace at home is a WFH factor affecting productivity. Poor ergonomics is a high risk that can cause injuries and musculoskeletal disorders.

2.5. Multi-tasking

This factor is concerning, and studies show that it affects performance and may even damage the brain[7]. Performing two or more challenging tasks simultaneously will result in reduced productivity.

The researcher used a Ranking Question (RQ) method in obtaining preferential judgments or opinions from employees. A higher weight are given to items ranked first [8]. The RQ has five answer choices; weights are assigned as follows:

The #1 choice weights 5

The #2 choice weights 4

The #3 choice weights 3

The #4 choice weights 2

The #5 choice weights 1

$$\text{Total responses} = x_1w_1 + x_2w_2 + x_3w_3 + \dots + x_5w_5$$

The ranking is calculated as follows where:

w = weight of the ranked position

x = response count for answer choice



Fig. 1. Conceptual framework.

3. Results

In Table 1 and Figure 2, the percentage breakdown from respondents involved in one or multiple design projects was presented. These projects may or may not be a combined local and direct workshare assignments from abroad.

Table 1: Frequency Distribution of Workload

	Frequency (F)	Percentage (%)
Single Project	4	27%
Multiple Projects	11	73%

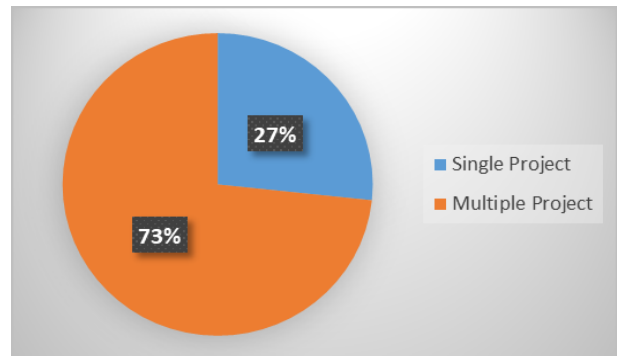


Fig. 2. Percentage distribution of workload.

At the same time, Table 2 and Figure 3 show the percentage breakdown from participants working from home within and outside Metro Manila. These percentages on workloads and current location significantly impact employees' preference on the ranking question.

Table 2: Frequency Distribution of Working from Home Location

	Frequency (F)	Percentage (%)
Metro Manila	9	60%
Outside Metro Manila	6	40%

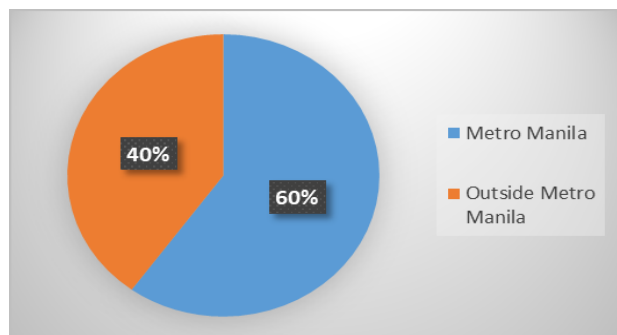


Fig. 3. Location of the respondents.

Table 3 and Figure 4 display the tabulation of the rank result. The researcher applies weights to ensure that when the data is presented, it is clear which answer choice is most preferred.

Table 3: Overall Rank on Factors Affecting Design Delivery during Working from Home

<i>Factors</i>	Total Responses	Weight (w)	Overall Rank
Internet connectivity	58	5	1
Social distractions	34	4	5
Team coordination	43	3	4
Working space	44	2	3
Multi-tasking	46	1	2

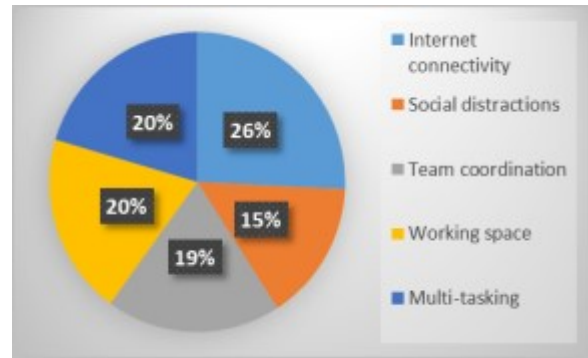


Fig. 4. Overall rank.

4. Discussion

Based on the survey ranking in Table III. Results show that a technical issue like internet connectivity tops the survey ranking on WFH productivity factors. Design delivery is more likely affected by a slow internet connection since the team uses a web-based design application most of the time. Surprisingly in Table II, 60% of the participants work within Metro Manila, with good broadband services yet experienced connectivity issues.

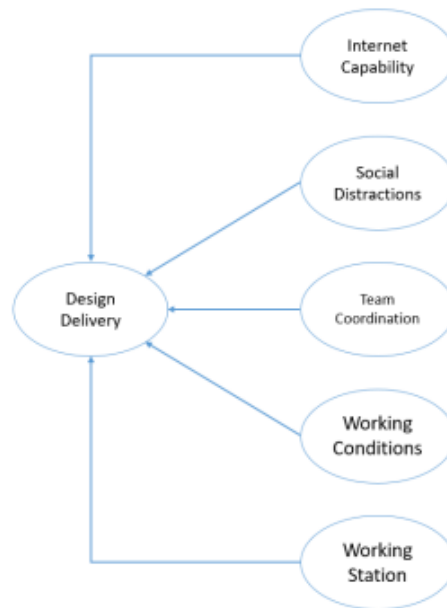


Fig. 5. Future research direction.

Multi-tasking having second in the rank is a factor that is a concern also. In table 1, the data shows that 73% are engaged in multiple projects. This employee-related factor can be associated with the self-management of time. It is essential to practice work-life balance to address this concern. The results highlight the importance of considering work-life satisfaction and creating opportunities for improved work-family balance in a WFH arrangement [9].

Factor involving working space issue rank 3rd in the survey. This factor concerns the ergonomic hazards experienced by the staff. In fact, during the transition from WFO to WFH, management sent out a Home Workstation Assessment checklist, and everyone was required to accomplish the form.

Team coordination in the 4th rank is a minor issue, according to the survey result. Aside from the traditional corporate emails, the company utilized the Microsoft Teams application to keep the team connected throughout the present setup.

Social Distractions in 5th place, received the lowest rank in the survey. Employees might have done strategies to overcome this factor. They are focused and persistent that they opt to be disturbed.

Figure 5 represents the future research direction which analyze (a) Internet Capability/ Connectivity; (b) Social Distractions; (c) Team Coordination; (d) Working Station; and (e) Multi-tasking using structural equation modeling.

5. Conclusion

The study finds that internet connectivity remains problematic even though the country's internet speed has dramatically improved in global rankings, according to the 2021 Ookla Speedtest Global Index Report [10]. Previously, the Philippines had the slowest internet speed among the five original members of the Association of Southeast Asian Nations[11].

The internet speed requirements have become a critical issue already as more companies allow their people to work from home [12-22]. The management should reassess the current arrangement for employees who are experiencing technical issues at home. With the easing of restriction this year, a return to office [RTO] can be a better option and should be reconsidered for employees with internet connectivity issues. Undeniably, internet speed in the office is way faster and reliable than what is available at home. Also, technical problems are resolved quickly in the office compared when having troubles in a remote setup.

When internet connectivity is the main issue, maybe working from home is not practical for other businesses. The researcher, a project administrator, involved in the design delivery, can attest that productivity was compromised in the current WFH setup.

6. Acknowledgment

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