

The Impact of Work-Home Arrangement on the Productivity of Employees during COVID-19 Pandemic in the Philippines: A Structural Equation Modelling Approach

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ABSTRACT

The prevalence of telework/telecommuting or working from home arrangement enabled by digital technology has been increasing. In The Philippines, the government even passed a bill in 2019 otherwise known as "Telecommuting Act" which approves the employers of different types of organizations to implement work from home or alternative workplace arrangement to their employees. This study investigates the impact of work from home arrangement on the productivity of workers in The Philippines. Using Structural Equation Modelling, this study analyzed the causal relationship between "Work from Home Factors", "Job Satisfaction", "Job Performance", "Commuting Satisfaction", "Job Stress" and "Productivity". A total of 250 electronic questionnaires were collected from participants in The Philippines. This study found that, "Work from Home Factors" has significant positive effect on "Job Satisfaction" and "Productivity" but, it does not affect "Job Stress". Secondly, "Work from Home Factors" negatively affects "Job Performance". And lastly, "Job Performance" has negative significant effect on "Productivity". This study provides insights about the interrelationship among "Work from Home Factors", "Job Satisfaction", "Job Performance", "Commuting Satisfaction", "Job Stress" and "Productivity" thru the application of SEM. This study would be helpful to different organizations and management should they consider work from home as one of their work arrangements.

CCS CONCEPTS

• **Mathematics of computing** → Equational models; • **Computing methodologies** → Modeling methodologies..

KEYWORDS

Keywords Telework, Work from Home, Employee Productivity, Job Satisfaction, Job Stress, Job Performance, Structural Equation Modeling

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1 INTRODUCTION

The use of teleworking as a means of work arrangement has been growing due to the fast and impressive improvement of technology specifically, the information and communications technology [1]. Telework is defined as work that is performed from different locations such as (home) that enables employees to work using information and communications technology [2]. It was first coined as telecommuting in the 1970's by Jack Nilles and was developed from the perspective of traffic reduction, organization benefit, etc. [3]. In 1993, International Telework Association and Council was founded to promote telework with the aims of improving work-life balance, increasing employment opportunities, and reducing traffic and associated pollution [3].

Ever since telework has been introduced, substantial studies and research were conducted by different countries with regards on its impact on individual teleworkers, organizations and society. Some of the findings on the advantages and outcomes of telework includes: increase in employee productivity because they can work during their most productive time and will not be distracted by co-workers, increase in work-life balance [2], job satisfaction improvement, increase in employee loyalty, traffic and air pollution reduction [1]. And on the other side, the employers are able to save cost in terms of saving office space, electricity and equipment [1].

Telework have numerous terms such as telecommuting, remote working or working from home [4]. In this study, we will focus on working from home defined also as an alternative work arrangement in which employees perform tasks elsewhere that are normally done in a primary or central workplace, for at least some portion of their work schedule, using electronic media, personal computers and mobile phones to interact with others inside and outside the organization [4].

With the adoption of advanced electronic media and the internet, teleworking or working from home has become increasingly popular among large companies all over the world [3]. It is estimated that 10% of firms in Spain and around 50% of firms in the U.S., U.K. and Germany are using telework as a work arrangement [4]. In Japan, 13% of their firms have introduced telework or work from home [5]. In fact, in The Philippines, a law has been signed on March 2019 that allows workers to work from their homes, the bill is known as the Republic Act No. 11165 or the Telecommuting Act [6]. Therefore, it is fitting to conduct research on the effects of the work from home arrangement on the productivity of employees in The Philippines. The purpose of this study is to identify the impacts

of working from home in the productivity of employees in The Philippines. Using Structural Equation Modelling approach derived from similar studies [2], [5], [7], [8], [9], [10], [11] we determined the correlation among job satisfaction, commuting satisfaction, job performance, job stress, work from home factors and productivity which were collected from surveys.

2 METHODOLOGY

The study followed quantitative method of gathering data which is done through questionnaire that was distributed to various respondents. A quantitative study as defined by Bhatti and Sundram (2015) is a way of calculating the data through the application of statistical methods and analysis and the outcome of the analysis represent numbers that further explains the propose remedy of a particular research problem [10].

3 PARTICIPANTS AND PROCEDURE

The respondents chosen for this survey were participants from The Philippines who are employed fulltime, part time, freelance, and self-employed. The questionnaire was distributed thru online platforms from June 27 to July 11, 2020 and was able to gather up to 260 respondents. Out of the 260 respondents only 250 were valid participants and were the ones considered in the study [10].

The respondents in the study are 55% female and 45% male. In terms of age more than half of them are 18 to 27 years old, the remaining are aged above 27 years old. Most of the respondents are single (74%). Table 1 presents the description of the respondents.

4 MEASURES

Measures used in the questionnaire consisted of six factors that were adopted from past researches and are detailed in Table 3. The measures consisted of five sections namely “Job Satisfaction”, “Commuting Satisfaction”, “Job Performance”, “Work from Home Factors” and “Job Stress” which are factors perceived to have an indirect or direct influence on productivity [2], [7],[11],[13],[14], and the sixth and last section “Productivity” is designed to measure the perceived productivity of the participant [12].

A 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree was used to determine the participant’s condition in terms of “Job Satisfaction”, “Commuting Satisfaction”, “Work from Home Factors” and “Job Stress”. “Job Performance” was measured using a 5-point Likert scale ranging from 1 = all of the time, 5 = none of the time.

5 STRUCTURAL EQUATION MODELLING

To validate the proposed model, a Structural Equation Modeling (SEM) was applied using Statistical Package for Social Science (SPSS) and Analysis of a Moment Structure (AMOS) Maximum Likelihood estimation approach [15] [16] [17]. SEM is a multivariate statistical method that involves the estimation of parameters for a system of simultaneous equations [18]. The SEM was used as it can analyze simultaneously the pathways in the model and test the goodness of fit [19].

The Four indices used to assess and construct validity of the data are: full model test, incremental fit indices, goodness of fit index and badness of fit index [15] [16] [17] [18] [19].

6 RESULTS

Figure 1 represents the SEM result and Table 2 presents the overall model fit results respectively. It can be seen that the (χ^2/df) score is within acceptable limits of below 5 as used by Dimantidis et al [19] which indicated no significant difference between SEM estimated covariance matrices and the observed sample [15]. The incremental of fit indices was measured using NFI, TLI and CFI. The results for TLI and CFI are both above the 0.90 threshold [19] while the NFI is close to the 0.95 threshold [15 – 19]. The values that are greater than the threshold are considered a good model fit. The goodness of fit index was measured by GFI and AGFI. Both GFI and AGFI results considered fitting well since the values are close to the threshold at 0.90 [15 – 19]. Lastly, badness of fit index was measured by RMSEA. the RMSEA result is below the threshold at 0.07 [15-19] which indicates a good model fit.

The result of the factor loadings of each indicator to its latent variable is shown in Table 3. It is found that five out of six indicators of the latent variable “Job Satisfaction” is significant since their factor loading is higher than 0.70. While, satisfaction with salary and incentives is found to have insignificant effect on “Job Satisfaction”.

For the “Commuting Satisfaction” it is found that all its indicators have significant direct effect. On the other hand, “Commuting Satisfaction” was dropped from the final SEM result since it is insignificant to the other latent variables.

For “Job Performance” there were three significant indicators out of seven while for “Work from Home Factors” no indicator has significant effect. As for the “Job Stress” there were only three insignificant indicators out of ten.

7 DISCUSSION

The current study utilized Structural Equation Modelling (SEM) to analyze the impacts of work from home in the productivity of employees in the Philippines.

The direct, indirect and total effect of each path is presented in Table 4. SEM indicated that WFH has the highest positive total effect on S (β : 0.546, $p=0.001$) followed by productivity (β : 0.274, $p=0.002$). These results are consistent with previous researches by Kazekemi [5 & 9] and Nakrošienė et. al [2] which has shown that teleworking increases work satisfaction and productivity [5].

For S, it is found that it has negative total effect on JP (β : -0.331, $p=0.003$). This finding contradicts the previous study of Inuwa which signifies that job satisfaction has a positive and significant relationship with job performance [10]. Unexpectedly, JS is found to have a positive total effect on JP (β : 0.487, $p=0.001$). Future research is recommended to look into the relationship of these two variables.

Regarding the main variables affecting productivity, it is found that S has the highest positive total effect (β : 0.453, $p=0.001$) followed by WFH (β : 0.274, $p=0.002$). Based from the findings, the positive effect of WFH on productivity is consistent with Kazekemi [5 & 9] and Nakrošienė et. al [2], while the positive effect of S to productivity is contradictory with the same study of Kazekemi [5 & 9] who found that work telework increases work satisfaction but work satisfaction does not influence labor productivity.

On the other hand, JP has the highest negative total effect (β : -0.527, $p=0.001$) on productivity followed by JS (β : -0.257, $p=0.001$). These findings are only consistent with JS which was found to have

Table 1: Descriptive Statistics of Respondents (N = 250).

| Question | Options | N | % |
|---------------------------------------------------|-----------------------------------------------|-----|-----|
| Gender | Male | 113 | 45% |
| | Female | 137 | 55% |
| Age | 18 to 27 years old | 147 | 59% |
| | 28 to 37 years old | 66 | 26% |
| | 38 to 49 years old | 27 | 11% |
| | 50 years old and above | 10 | 4% |
| Marital Status | Single | 186 | 74% |
| | Married | 60 | 24% |
| | Others | 4 | 2% |
| Number of Children | None | 189 | 76% |
| | 1-2 | 32 | 13% |
| | 3-4 | 26 | 10% |
| | 5 or more | 3 | 1% |
| Employment Status | Employed full-time | 215 | 86% |
| | Employed part-time | 7 | 3% |
| | Freelance/Contractor | 7 | 3% |
| | Self-employed | 21 | 8% |
| Work hours in a day | 0 - 10 hours | 189 | 76% |
| | 10.01 - 12 hours | 54 | 22% |
| | Exceeds 12 hours | 7 | 3% |
| Work Arrangements | Reports for work in the office/site full time | 105 | 42% |
| | Part time work from home | 109 | 44% |
| | Full time work from home | 36 | 14% |
| Frequency of work from home in a week | 6-5 x a week | 48 | 19% |
| | 3-4x a week | 72 | 29% |
| | 2 x a week | 21 | 8% |
| | once a week | 45 | 18% |
| | Less than often or never | 64 | 26% |
| Frequency of work in the office or site in a week | 6-5 x a week | 87 | 35% |
| | 3-4x a week | 63 | 25% |
| | 2 x a week | 55 | 22% |
| | once a week | 13 | 5% |
| | Less than often or never | 32 | 13% |
| Commute time to work | less than 1 hour | 89 | 36% |
| | 1 - 2 hours | 132 | 53% |
| | more than 2 hours | 29 | 12% |
| Mode of Commute | Walk or bike | 11 | 4% |
| | Private car | 71 | 28% |
| | Motorcycle | 15 | 6% |
| | Public transportation | 153 | 61% |

an impact on productivity of employees by Ekenabor [14]. For the effect of JP to productivity, it is contradictory with previous study conducted by Ma and Ye [7] which has used JP as measurement of employee productivity.

This research has a few limitations that should be considered for future studies. The study used S, JS, JP and CS as variables that may affect the productivity of an employee. There are other variables that can be incorporated in the study that may perhaps have more significant relationship with work from home factors and productivity. Also, the indicators used in measuring work from home resulted to only one significant loading. Further study is to

incorporate more indicators relating to work from home factors. This could produce a different SEM result and may improve the correlation among other variables. Finally, it is recommended to use different questionnaire in assessing job performance of an employee. This is due to the SEM result of job performance which is contradicting to previous study of Ma and Ye [7].

8 CONCLUSION

This study investigated the impact of work from home arrangement on the productivity of employees in the Philippines using Structural

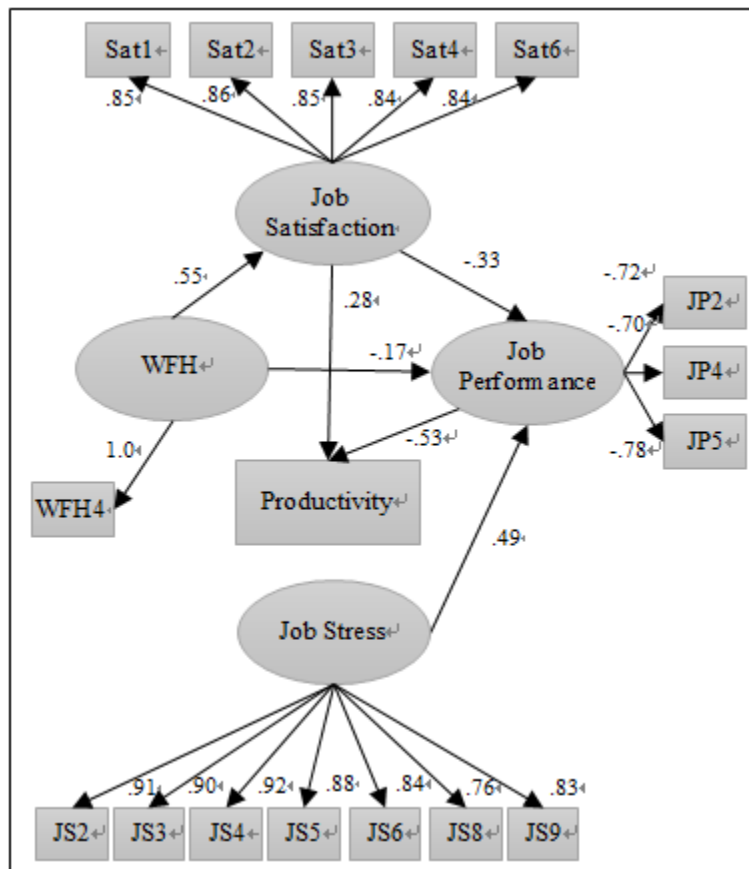


Figure 1: Final Model of Impact of Work from Home Arrangement on the Productivity of Employees.

Table 2: Parameter Estimates and Goodness of Fit.

| Goodness of fit measure | Par. estimates | Rec. values | Suggested by |
|-------------------------------------------------|----------------|-------------|--------------|
| Normed chi-square (χ^2/df) | 2.047 | < 5 | [19] |
| Incremental Fit Indices | | | |
| Normed Fit Index (NFI) | 0.892 | >0.95 | [15-19] |
| Tucker Lewis Index (TLI) | 0.931 | >0.90 | [19] |
| Comparative Fit Index (CFI) | 0.941 | >0.90 | [19] |
| Goodness-of-fit index | | | |
| Goodness of Fit Index (GFI) | 0.849 | >0.90 | [19] |
| Adjusted Goodness of Fit Index (AGFI) | 0.810 | >0.90 | [15-19] |
| Badness-of-fit index | | | |
| Root Mean Square Error of Approximation (RMSEA) | 0.065 | <0.07 | [15-19] |

Equation Modelling (SEM). Specifically, this study measured different variables used from previous studies that may have an effect on the productivity of employees and in turn, may also be affected by work from home factors. The variables considered in the study included “Job Satisfaction”, “Job Performance”, “Job Stress” and lastly “Work from Home Factors”. The results showed that “Work from Home Factors” increases “Job Satisfaction” and “Productivity” of an employee but it decreases the “Job Performance”. While, “Job

Performance” directly decreases “Productivity”, “Job Satisfaction” directly increases it. In turn, “Job Satisfaction” decreases when “Job Performance” increase. In terms of “Job Stress” it indirectly decreases “Productivity” and directly increases “Job Performance”. The correlation concluded from this study would bring insights to organizations should they consider work from home as one of their work arrangements.

Table 3: List of Factors, Indicators, and Factor Loadings.

| Factor | Item | Loadings (>0,7) |
|------------------------------|---------------------------------------------------------------------------------------|-----------------|
| Job Satisfaction (S) | Generally, I am satisfied with my job | .85 |
| | I find my job very interesting. | .86 |
| | My current job meets my expectations. | .85 |
| | My current job is pleasant. | .84 |
| | I am satisfied with my salary and other incentives. | .68 |
| | I am satisfied with my current job position. | .84 |
| Commuting Satisfaction (CS) | My daily commute is relaxed and calm | .90 |
| | I am confident I would always be in time | .83 |
| | My commute is not tiring | .84 |
| | My commute is not stressful | .87 |
| | I am satisfied with my daily commute | .94 |
| Job Performance (JP) | How often was your performance higher than most workers on your job? | .65 |
| | How often was your performance lower than most workers on your job? | -.72 |
| | How often did you do no work at times when you were supposed to be working? | -.68 |
| | How often did you find yourself not working as carefully as you should? | -.70 |
| | How often was the quality of your work lower than it should have been? | -.78 |
| | How often did you not concentrate enough on your work? | -.66 |
| | How often did health problems limit the kind or amount of work you could do? | -.68 |
| Work From Home Factors (WFH) | I have a comfortable working place at home which is suitable for work from home | .66 |
| | I am more productive when I am less distracted by my co-workers | .44 |
| | The job allows me to make my own decisions about how to schedule my work | .62 |
| | I don't feel any stress in balancing my work and household chores | .71 |
| | I am more productive when I avoid commuting | .56 |
| Job Stress (JS) | I have felt fidgety or nervous as a result of my job | .62 |
| | Working here makes it hard to spend enough time with my family | .91 |
| | I spend so much time at work, I can't see the forest for trees | .90 |
| | Working here leaves little time for other activities | .92 |
| | I frequently get the feeling I am married to the company | .88 |
| | I have too much work and too little time to do it | .84 |
| | I feel guilty when I take time off from job | .69 |
| | I sometimes dread the telephone ringing at home because the call might be job related | .76 |
| | I feel like I never have a day off | .83 |
| | Too many people at my level in the company get burned out by job demands | .64 |

Table 4: Direct, Indirect, and Total Effects.

| Path | Direct effect | P value | Indirect effect | P value | Total effect | P value |
|--------------------|---------------|---------|-----------------|---------|--------------|---------|
| JS → JP | 0.487 | 0.001 | No Path | - | 0.487 | 0.001 |
| JS → Productivity | No Path | - | -0.257 | .001 | -0.257 | 0.001 |
| WFH → S | 0.546 | 0.001 | No Path | - | 0.546 | 0.001 |
| WFH → JP | -0.174 | 0.078 | -0.181 | .002 | -0.355 | 0.001 |
| WFH → Productivity | -0.064 | 0.478 | 0.339 | .001 | 0.274 | 0.002 |
| S → JP | -0.331 | .003 | No Path | - | -0.331 | 0.003 |
| S → Productivity | 0.278 | 0.004 | 0.175 | 0.002 | 0.453 | 0.001 |
| JP → Productivity | -0.527 | 0.001 | No Path | - | -0.527 | 0.001 |

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