

## **A SYSTEMATIC REVIEW AND META-ANALYSIS ON THE ASSOCIATION BETWEEN REMOTE WORK ARRANGEMENTS AND JOB SATISFACTION OF EMPLOYEES IN PRIVATE FIRMS**

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### **ABSTRACT**

This systematic review and meta-analysis examined the association between remote work arrangements and job satisfaction of employees in private firms. The papers were initially identified from Google Scholar and research databases. After applying inclusion and exclusion criteria, four cross-sectional studies were included in the analysis, involving a total of 696 respondents. The findings revealed a significant and positive relationship between remote work arrangements and job satisfaction ( $r = 0.204$ , 95% CI: 0.128-0.277). The heterogeneity test indicated acceptable variability in effect sizes, suggesting similarity in research design and characteristics of the included studies. The funnel plot and Egger's test provided no evidence of publication bias. The Begg and Mazumdar Rank Correlation Test also indicated no indication of selective reporting or publication bias. Furthermore, remote work arrangements were found to have a positive impact on job satisfaction. The extent and type of remote work, as well as job attributes and moderating factors, were identified as important considerations in this relationship. These findings enhance our understanding on how remote work arrangements contribute to employee satisfaction and carry significance for the development of organizational policies and practices.

**KEYWORDS:** Remote Work Arrangements, Job Satisfaction, Private Firms, Systematic Review and Meta-Analysis

### **INTRODUCTION**

Employees around the world are becoming increasingly dissatisfied with their jobs with work arrangements being a major factor. This problem appears to be related to work arrangements, as employees feel they do not have enough control over their work lives (Chung, & Van der Lippe, 2020; Wang, Liu, Qian, & Parker, 2021; Adnan BK., 2019). In a study of over 12,000 employees in France, Spain, and the United Kingdom, researchers found that job satisfaction decreased as workers had less control over their work (Huang et al., 2016). Another study with a European sample size of 1,600 workers found that dissatisfaction with one's job was highest among workers who felt they had the least say over their work environment (Bluyssen et al., 2016). In a similar vein, the results of a separate study conducted on American workers revealed that those individuals who reported having the least amount of control over their jobs also reported experiencing the highest levels of dissatisfaction (Dormann, Brod, & Engler, 2017).

On the other hand, the problem of job satisfaction is a pressing one in the Philippines. In the previous report of World Bank in 2014, it shows that job satisfaction had

decreased by 11% since 2007, with only 34% of employees expressing satisfaction with their current job (World Bank, 2014). Further report of World Bank in 2016 showed that only around one-third of the workforce in the Philippines is satisfied with their current job, with the majority citing dissatisfaction with their work arrangements as the main reason, and that only 38% of Philippine employees were satisfied with their jobs (ADB, 2016). This was significantly lower than the regional average of 54%.

Due to these troubling scenarios, many businesses have begun to devote significant attention to investigating the association between remote work arrangements and job satisfaction employees, particularly in light of recent developments in information and communication technology. In fact, technological advancements have made it easier for employees to work remotely, for as long as an internet connection is available (Caramela, 2017; Hendricks, 2014). In the survey conducted by Lister and Harnish (2017), roughly 90 percent of US workers favored remote work arrangements and a remote working environment. Similarly, European workers desire flexibility in working conditions, including working hours and remote work (Wiatr, 2019). In recent years, there has been an increase in expectations for remote work arrangements, which may have an effect on employee outcomes (Ciarniene & Vienazindiene, 2018; McDonald et al., 2018; Bjarntoft et al., 2020).

However, a lot of disagreements around the job satisfaction of employees working remotely as some argue that less distractions allow employees to feel appeased which can lead to better productivity, but others claim that household distractions may lead to dissatisfaction (Fonner & Roloff, 2010). For instance, the study of Gallup (2017) reported that more engagement, commitment, and enthusiasm are observable among those employees who are working remotely which signifies happiness to their job. Conversely, the article of Smith, Patmos, and Pitts (2018) highlighted that employees may be dissatisfied when they find difficulty in doing the task that needs collaboration alongside with other employees. Additionally, in the last 20 years, there are notable inconsistencies in the results when investigating the link between remote work and job satisfaction of employees (Gajendran & Harrison, 2007; Fonner & Roloff, 2010; Windsor, 2018; Ramos & Prasetyo, 2020).

Despite the importance of determining the true nature about the association between remote work and job satisfaction of employees, little research has attempted to systematically examine the research available (Allen, Golden, Shockley, 2015). With this, better understanding about the association of remote work and job satisfaction is necessary since several studies links job satisfaction to better organizational outcomes (Eliyana, & Ma'arif, 2019; Krishnan, Loon, & Tan, 2018). In lieu with this, the goals of this paper is to offer a comprehensive, theory-driven systematic review and meta-analysis of the relationship between remote work arrangement and job satisfaction among employees in private firms. Through this exploration, the researcher attempted to provide a precise estimate of the association between these two variables. Finally, conclusions about the effectiveness of remote work arrangements on employee job satisfaction were drawn in light of existing findings in the literature on this subject. Ultimately, this review seeks to bring light to a meaningful topic that affects many individuals within private organizations across industries worldwide.

## Review Question

1. Does remote work arrangement have positive association with the job satisfaction of employees in private firms?

## FRAMEWORK

Since the consequences of remote work arrangement needs to be investigated, the Lewin's field theory (1951) can help explain how individuals perceived themselves in a remote work environment. According to this theory, behavior is a function of the person and their environment, and changes in the environment can lead to changes in behavior.

Remote work can be seen as a change in the environment in which work is conducted. With remote work, individuals are no longer bound by physical proximity to their workplace, and they have greater autonomy over their work schedule and location. This change in environment can lead to changes in behavior, including increased job satisfaction.

One of the key components of Lewin's field theory is the idea of "forces" that influence behavior. In the case of remote work, there may be both positive and negative forces that affect job satisfaction. For example, remote work may increase job satisfaction by providing greater flexibility and control over one's work schedule and environment. However, it may also decrease job satisfaction by creating feelings of isolation and reducing opportunities for collaboration and social interaction.

Lewin's field theory also suggests that behavior is influenced by the "field," or the set of social and psychological factors that surround the individual. In the case of remote work, the field may include factors such as the availability of technology, the expectations of the organization, and the support of colleagues and supervisors. These factors can have a significant impact on job satisfaction.

Previous researches utilizing this theory have revealed that less stress are evident among employees who are remotely working (Konradt et al., 2003; Raghuram & Wiesenfeld, 2004), have better work-life balance (Taskin & Edwards, 2007), and greater satisfaction with their job (Maruyama et al., 2009).

Figure 1 illustrates the framework employed in conducting a systematic review and meta-analysis to examine the association between remote work arrangements and job satisfaction among employees. The objective of this study is to investigate the potential impact of remote work arrangements on enhancing employee job satisfaction. The population of interest for this research comprises employees working in private firms with exposure of remote work arrangement. Further, the selected studies comprised the remote work arrangement as factor and job satisfaction of employees as primary outcome.

The initial step in this process involved identifying relevant studies through a comprehensive search strategy. These studies were selected based on their inclusion of remote work arrangements as a factor in their research design. Only studies that investigated the relationship between remote work arrangements and job satisfaction among employees were included in the final analysis.

The selected studies were then carefully analyzed and synthesized. This involved a rigorous assessment of study quality and data extraction to ensure consistency and reliability. The data extracted from each study were combined, allowing for a quantitative analysis using meta-analytic techniques. This approach allows for the pooling of data across studies, enabling a more comprehensive and robust examination of the research question.

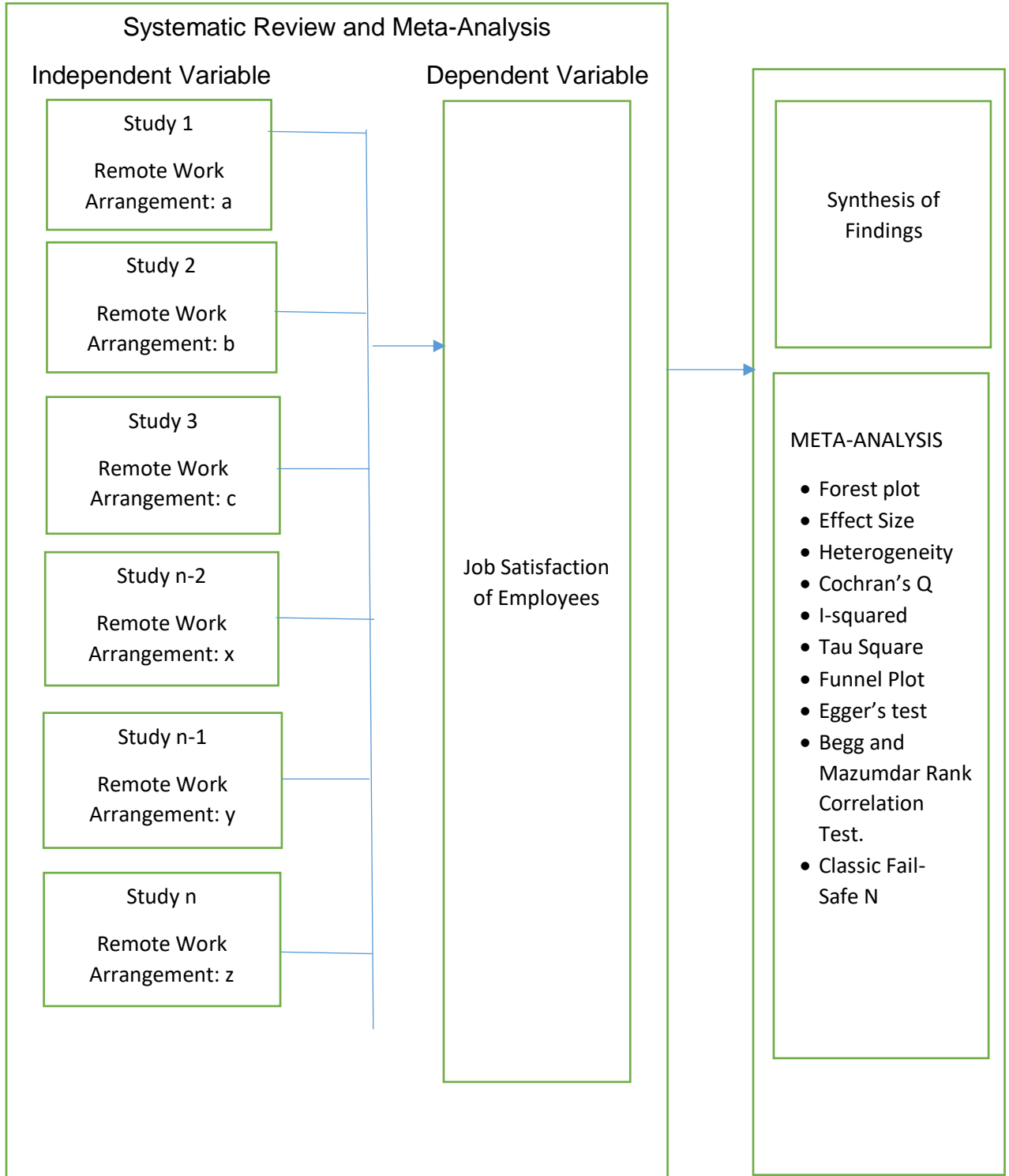


Figure 1. Conceptual Framework

## METHOD

### Research Design

This research employed a systematic review and meta-analysis to determine the association between remote work arrangement and job satisfaction of employees in private firms. This method aimed to arrive a good synthesis of the findings in the many studies dealing with the same intentions or goals. Moreover, the systematic reviews represent the most concrete forms of evidence. It is constructed by taking data from individual studies, systematically evaluating articles, combining them into one review, and making conclusions (Brettell, 2009).

Meta-analysis is a method to combine the results of individual studies, which may or may not be conducted in a systematic review. In this method, the first step locate studies of an issue by clearly specified procedures. Then, characterize the outcomes and features of the studies in quantitative research (Cochran, 2002). Finally, a meta-analysis used multivariate techniques (Reyment, 1991) to relate the characteristics of the tasks to results. It is the most appropriate method for this study because of the primary objective which is to determine the nature of association between remote work arrangement and job satisfaction of employees in private firms, out of the many available pieces of research from online databases.

### Inclusion and Exclusion Criteria

The inclusion criteria are essential to identify, select, and collect the sample literature, research studies, and specific studies to be included in this meta-analysis, which would undergo a systematic review. Further, the inclusion criteria ensured that the ends of the study were attained. It also prevented biases in the selection of studies before including the titles in the list. Thus, Polit and Beck (2018) stated that inclusion criteria outline the characteristics of subjects to be included in the study.

Abstracts were considered eligible for complete manuscript data extraction if the study met all the following criteria: studies utilizing correlational study about the relationship remote work arrangements and job satisfaction of employees; the remote work arrangement involves work from home, flexible work, and telecommuting conducted in private firms; the authors used job satisfaction as an outcome variable; published studies from 2000 to 2022 that investigated the said variables; the variables are quantified and measured through reliable assessment tools; reflected or specified the p-value, correlation coefficient, and the sample size of the data. The exclusion criteria were also set; those involves confounding variables that could confuse or influence study findings; irrelevant studies that are not related to remote work arrangements. Also, non – correlational studies; studies published in duplication; and if they do not reveal the relevant information fit for the study.

### Data Extraction

Extraction is the method of retrieving data out of data sources for further data processing. The process enabled a more comprehensive analysis of data through the coding of studies. Since this study utilized systematic review and meta-analysis, the researcher considered the qualified existing secondary data. A coding sheet was used to organize and code the information and other statistics of each selected study. This coding sheet revealed the selection criteria and other characteristics necessary for this study, such as title, authors, number of authors, total sample size (n), p-value, and r-value. The following were coded information: the authors, place of study coded according to the country where the organization is located, and the year of publication.

### Quality Assessment

There is no consensus on the best-standardized method for assessing the quality of studies to be reviewed, but a specific quality assessment for this systematic review was used to examine the quality of studies. These included the relevance of the research question, appropriateness of data, fitness of eligibility criteria, accessibility of online literature search, in-depth review in the determination of included and excluded studies, and the quality appraisal for its internal validity (Whiting et al., 2017).

**Appraisal tool for Cross-Sectional Studies (AXIS).** This tool is used to systematically assess research papers and to judge the reliability of the study being presented in the paper. AXIS also helps in assessing the worth and relevance of the study. The key areas to critical appraisal include assessing suitability of the study to answer the hypothesized question and the possibility of introducing bias into the study (Downes, Brennan, Williams, & Dean, 2016).

### Data Synthesis and Analysis

For the meta-analysis phase of this investigation, the p-value, r-value, Q-test, I-square test, forest plot analysis, and funnel plot analysis were used to synthesize the quantitative findings from the various qualified research studies (Ried, 2006).

**Effect Size and Forest Plot.** The effect size, precisely the correlation coefficient, for each study were considered as the unit of analysis for this research because it expressed the strength and direction of relationship as described by Field (2005) and Gabales (2010). The effect size provide the standardized measures of the magnitude of meta-analysis. CMA Version 4.0 (Borenstein, 2018) was used in this study to provide instant computational data from the simplest to the most complex statistical parameter required for the meta-analysis. In addition, a Forest plot was employed to graphically display the estimated results from several scientific studies addressing the same question and the overall results.

**Heterogeneity, Q and I-square tests.** The heterogeneity of studies was included in this meta-analysis which was evaluated according to Q statistics results (Borenstein et al., 2018). Whether combining studies included in meta-analysis work is appropriate statistically or not has been given by way of the presented distribution of effect sizes' confidence intervals visually (Cumming & Finch, 2005). The Q test was used to examine variation in effect sizes. In a meta-analysis, the Q test (Hedges et al., 2003) is typically used to test the homogeneity of effect sizes and the impact of moderators. The  $I^2$  statistic described the percentage of variation across studies that is due to heterogeneity rather than chance. The  $I^2$  is an intuitive and simple expression of studies' results (Hedges & Piggott 2001).

**Funnel Plot and Publication Bias.** A funnel plot was used primarily as a visual aid for detecting publication bias. Asymmetric inverted funnel shape arises from a 'well-behaved' data set, in which publication bias is unlikely. A funnel plot answers the question, "Is there any evidence of bias?" (Borenstein et al., 2009). The Rosenthal method and Orwin's Fail-Safe N method was utilized to be able to answer the question "How strong is the bias and what is the effect on the results?" and to determine the fail-safe number, which would render meaningless to the effect size found (Borenstein et al., 2009). Furthermore, the assessment was done by comparing the average effect size of studies published with the average effect sizes of studies published.

**Egger's test.** This test is proposed by Egger et al. (1997), is a statistical test that examines the relationship between the effect sizes of individual studies and their standard errors. It assumes that if there is no publication bias, the effect sizes should be distributed symmetrically around the true effect size. If there is publication bias, smaller studies with

less precise estimates may be more likely to be published if they show a statistically significant effect.

**Begg and Mazumdar Rank Correlation Test.** This statistics is introduced by Begg and Mazumdar (1994), is a non-parametric test that assesses the correlation between the effect size estimates and their corresponding variances or standard errors across studies. This test ranks the effect sizes and the corresponding variances or standard errors across studies and computes the Kendall's tau correlation coefficient. If there is no publication bias, there should be no correlation between the ranks of the effect sizes and their corresponding variances or standard errors. If there is publication bias, smaller studies with larger variances or standard errors may be more likely to be published if they show a statistically significant effect, leading to a positive correlation between the ranks of the effect sizes and their variances or standard errors.

**Fail-Safe N Method.** The Rosenthal method with modifications proposed by Orwin and Rosenberg (2005) address publication bias and the effect result. Fail-Safe N describes the robustness of a significant impact by calculating how many studies with effect size zero could be added to the meta-analysis before the result lost statistical significance (Borenstein et al., 2009). Thus, the evaluation were done by contrasting the average effect size of studies published with published studies.

## RESULTS AND DISCUSSION

### Study Selection

Google Scholar and research databases yielded a total of 18,843 studies (Google Scholar=16,400 and ProQuest=2,443). After removing unrelated studies, duplicates, and doing eligibility assessment, the full-text papers were collected for systematic review and meta-analysis. The study selection procedure is depicted in Figure 2.

As presented in the flow diagram that depicts the flow of information through the different phases of a systematic review of different studies. It maps out the number of records identified, included, and excluded, and the reasons for exclusions. The inclusion criteria were as follows: (a) studies utilizing correlational study about the relationship remote work arrangements and job satisfaction of employees; (b) the remote work arrangement involves work from home, (c) flexible work, and telecommuting conducted in private firms; (d) the authors used job satisfaction as an outcome variable; (e) published studies from 2000 to 2022 that investigated the said variables; (f) the variables are quantified and measured through reliable assessment tools; (g) reflected or specified the p-value, correlation coefficient, and the sample size of the data. Whereas the exclusion criteria were as follows: (a) irrelevant studies that are not related to remote work arrangements; (b) non – correlational studies; (c) studies published in duplication; (c) and if they do not reveal the relevant information fit for the study. Based on these sets of criteria, a total of 4 studies were included in the systematic review and meta-analysis.

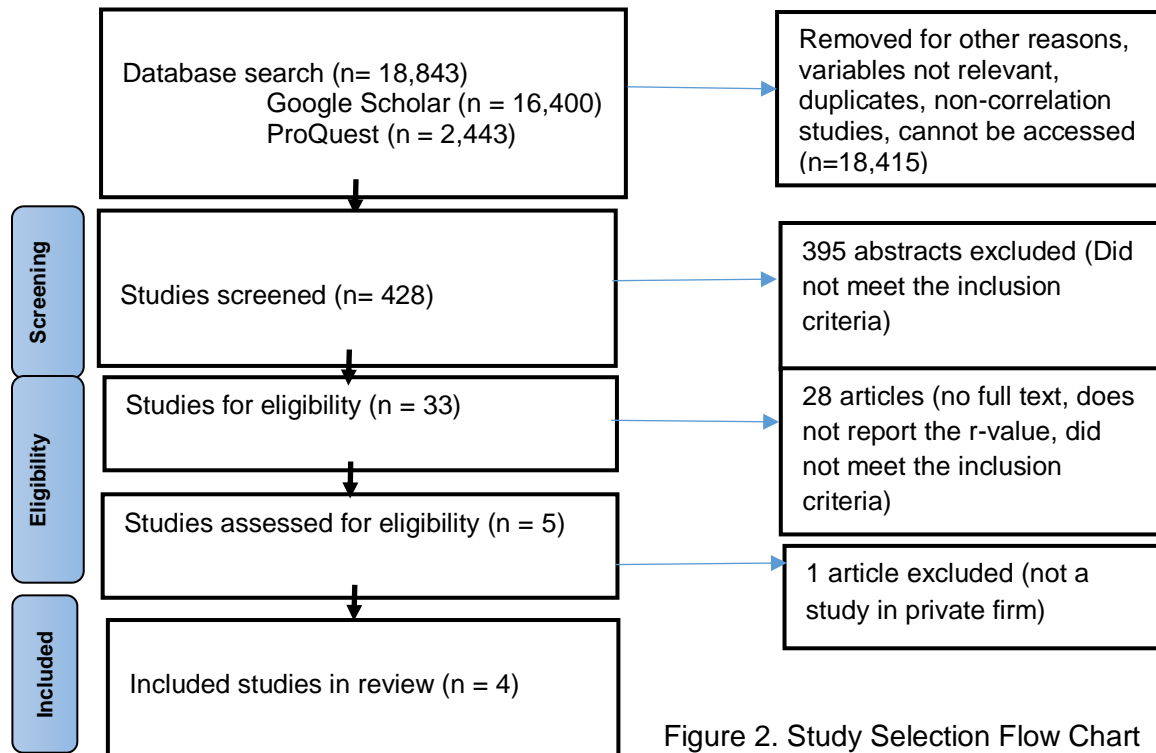


Figure 2. Study Selection Flow Chart

### Characteristics of the Included Studies

Table 1 presents the characteristics of the included studies. It highlights the four studies that explore the relationship between remote work arrangement and job satisfaction of employees in private firms. The studies included in this review are all cross-sectional in design and have used certain measures to assess remote work arrangements and job satisfaction. The studies have also used statistical analyses to examine the relationship between remote work arrangements and job satisfaction. The subjects in the studies include employees from multinational professional services, mining organizations, and technology firms, as well as teleworkers. ▼

**Study 1.** Schall (2019) conducted a cross-sectional study in the USA with 185 employees at a multinational professional services firm, examining the relationship between remote work and job satisfaction. Participants completed a remote work questionnaire, which is a single item to measure whether participants engaged in remote work or not. Pearson r correlation analysis indicated that remote work and job satisfaction had a low positive, significant relationship ( $r = .168, p < .05$ ). A job satisfaction index was also created ( $\alpha=.84$ ), which found that an inverted u-shaped curvilinear relationship between the extent of working remotely (telecommuting intensity) and job satisfaction was not found and instead support for a positive, linear relationship was found.

**Study 2.** Azmi (2022) also conducted a cross-sectional study, but in Malaysia, with 101 managers from a mining firm, using a work from home questionnaire ( $\alpha=.707$ ) and a job satisfaction questionnaire ( $\alpha=.894$ ). Pearson r correlation analysis showed a significant and positive relationship between work from home and job satisfaction ( $r=.326, p=.000$ ).

**Study 3.** Golden and Vega (2005) also conducted a cross-sectional study in the USA, with 321 professional-level employees of a technology firm, using an extent of telecommuting questionnaire ( $\alpha=.95$ ) and a job satisfaction survey ( $\alpha=.85$ ). Pearson r correlation analysis indicated a significant and positive relationship between the extent of



telecommuting and job satisfaction of employees ( $r=.16$ ,  $p=.000$ ). Furthermore, a curvilinear link between extent of telecommuting and job satisfaction was found, with satisfaction appearing to plateau at more extensive levels of telecommuting. Task interdependence and job discretion were found to moderate this link, suggesting that some job attributes play an important contingent role.

**Study 4.** Fonner and Rolloff (2010) conducted a cross-sectional study in the USA with 89 teleworkers, using a work arrangement questionnaire (work arrangement categories) and a job satisfaction survey ( $\alpha=.94$ ). The results showed a significant and positive relationship between telework and job satisfaction ( $r=.28$ ,  $p=.000$ ). Moreover, despite the challenges brought on by working remotely over 50% of the time, high-intensity teleworkers remain more satisfied than employees working in a collocated setting the majority of the time.

### Synthesis of Findings

After reviewing the four eligible cross-sectional studies on the relationship between remote work and job satisfaction, several cross-cutting findings can be identified as follows:

All studies found a significant and positive relationship between remote work and job satisfaction. This was consistent across different types of remote work arrangements, including telecommuting, working from home, and telework. Moreover, the relationship between the extent of remote work and job satisfaction was more complex. Schall (2019) found a positive, linear relationship, while Golden and Vega (2005) found a curvilinear, inverted U-shaped relationship that plateaued at more extensive levels of telecommuting. However, these findings were not inconsistent, as Schall's study used a different measure of the extent of remote work and did not measure high-intensity telecommuting.

Furthermore, several moderating factors were found to influence the relationship between remote work and job satisfaction. Golden and Vega (2005) found that task interdependence and job discretion moderated the curvilinear link between extent of telecommuting and job satisfaction, suggesting that some job attributes play an important role in the relationship. Fonner and Rolloff (2010) found that despite the challenges brought on by working remotely over 50% of the time, those employees engaged in high-intensity telework remained more satisfied than those working predominantly in a collocated setting.

In addition, the findings suggest that remote work have positive association with job satisfaction, but the extent and type of remote work, as well as moderating factors, may play an important role in the relationship. Furthermore, the review highlights the significance of considering the specific type and extent of remote work when examining its relationship with job satisfaction. Different remote work arrangements, such as telecommuting, working from home, or telework, were found to yield similar positive relationship with job satisfaction. This consistency indicates that various forms of remote work can contribute to enhanced employee satisfaction. Additionally, the review identifies important moderating factors that influence the remote work-job satisfaction relationship. Specifically, task interdependence and job discretion were found to be significant moderators. These factors indicate that the nature of the job and the level of autonomy provided to remote workers play a crucial role in determining their job satisfaction levels. The presence of these moderating factors emphasizes the importance of considering contextual factors when evaluating the impact of remote work on job satisfaction.

### Table 1. Characteristics of the Included Studies

Authors	Place	Study Design	Aim	Subjects	Measures	Analysis	Results
Schall, M. A. (2019)	USA	Cross-sectional	Examining the relationship between remote work and job satisfaction of employees	185 employees at a multinational professional services firm	Remote work questionnaire . A single item was created to measure whether participants engaged in remote work or not.  Job satisfaction Index ( $\alpha=.84$ )	Pearson r correlation	Remote work and job satisfaction had a low positive, significant relationship ( $r = .168, p < .05$ )  An inverted u-shaped curvilinear relationship between the extent of working remotely (telecommuting intensity) and job satisfaction was not found and instead support for a positive, linear relationship was found.
Azmi (2022)	Malaysia	Cross-sectional	Determine the relationship between work from home arrangement, job satisfaction and performance level of the employees in mining organization	101 managers from a mining firm	Work from home questionnaire ( $\alpha=.707$ )  Job satisfaction questionnaire ( $\alpha=.894$ )	Pearson r correlation	There is a significant and positive relationship between work from home and job satisfaction ( $r=.326, p=.000$ )
Golden & Vega (2005)	USA	Cross-sectional	attempt to resolve inconsistent findings on the relationship between telecommuting and job satisfaction by hypothesizing a curvilinear, inverted U-shaped relationship between the extent of telecommuting and job satisfaction	321 professional-level employees of technology firm	Extent of Telecommuting ( $\alpha=.95$ )  Job Satisfaction Survey ( $\alpha=.85$ )	Pearson r correlation  hierarchical regression analysis	There is a significant and positive relationship between extent of telecommuting and job satisfaction of employees ( $r=.16, p=.000$ )  A curvilinear link between extent of telecommuting and job satisfaction, with satisfaction

							<p>appearing to plateau at more extensive levels of telecommuting.</p> <p>In addition, task interdependence and job discretion moderated this link, suggesting that some job attributes play an important contingent role</p>
Fonner & Roloff (2010)	USA	Cross-sectional	examines the extent to which telework affects job satisfaction through the experiences of worklife conflict, stress due to meetings and interruptions, perceived organizational politics, and information exchange	89 teleworkers	<p>Work Arrangement questionnaire (work arrangement categories)</p> <p>Job Satisfaction Survey (<math>\alpha=.94</math>)</p>		<p>There is a significant and positive relationship between telework and job satisfaction (<math>r=.28, p=.000</math>).</p> <p>Moreover, despite the challenges brought on by working remotely over 50% of the time, high-intensity teleworkers remain more satisfied than employees working in a collocated setting the majority of the time</p>

### Meta-Analysis

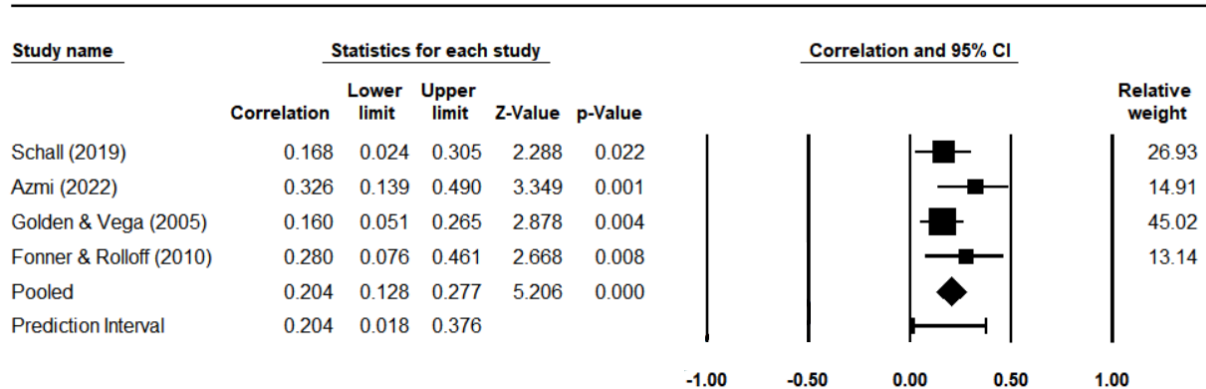
The results of the analysis, which is based on four studies that include 696 respondents with a correlation effect size index, show that there is a significant relationship between remote work arrangement and job satisfaction of employees ( $r=0.204, 95\% \text{ CI: } 0.128-0.277$ ), which means that the true effect size could fall anywhere in this range. Meanwhile, the z-value is 5.206 with a p-value less than 0.001 suggests that the null hypothesis that the mean effect size is zero can be rejected, indicating that in the universe of populations comparable to those in the analysis, the mean effect size is not precisely zero.

**Forest Plot.** The forest plot shows the results of a meta-analysis on the relationship between remote work arrangements and job satisfaction of employees. In Figure 3, each study is represented by a square, with the size of the square indicating the weight of that study in the analysis. It is reflected that the study of Golden and Vega (2005) has the highest relative weight among all studies. This is due to the higher sample size which contribute to its relative weight. This is explained by Dettori , Norvell, and

Chapman (2021) that studies that have a larger sample size (N) provide more information and are therefore allotted greater weight.

On the other hand, the diamonds at the bottom of the plot represent the summary effect size and its confidence interval. As explained by Gopalakrishnan and Ganeshkumar (2013), the forest plot displays the overall effect size, which considers the findings of each individual study, represented by a diamond shape. Hence, the points of the diamond represent the upper and lower limits of the confidence interval. Based on the result, the summary effect size is  $r = 0.204$  with a 95% confidence interval of 0.128 to 0.277, which indicates a low and positive relationship between remote work arrangements and job satisfaction of employees from which the studies were drawn. This means that on average, employees who engage in remote work arrangements tend to have higher job satisfaction than those who are less engaged.

### Meta Analysis



**Figure 3. Forest Plot Showing the Relationship Between Remote Work Arrangement and Job Satisfaction**

**Heterogeneity Test.** In Table 2, it presents the results of heterogeneity test which assesses the variation in study outcomes between studies. The Q-statistic is utilized as a means to test the null hypothesis that there is a common effect size among all the studies included in the analysis (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006). Based on the results of analysis, the calculated Q-value is 3.163 with 3 degrees of freedom, and a corresponding p-value of 0.367. Since it is most likely equal to the degrees of freedom, it means that all of the included studies share the same true effect size. This is backed by Higgins, Thompson, Deeks, and Altman's (2003) that the anticipated value of Q should match the degrees of freedom if all studies share a uniform true effect size. Moreover, considering the selected criterion alpha of 0.100, we cannot reject the null hypothesis that the true effect size is the same across all the studies.

In the results, the  $I^2$  value of 5% suggests that only a small portion (5%) of the total variation in effect sizes is due to heterogeneity among the studies. Most of the observed variation (95%) can be attributed to sampling error or chance. Essentially, this low  $I^2$  value indicates that there is little inconsistency among the effect sizes of the included studies, and the observed results are relatively homogeneous. The minor variation that does exist could be a product of random variation or slight methodological differences between studies rather than significant discrepancies in effect sizes. This corroborates to the study of Higgins and Thompson (2002) that low  $I^2$  value would mean that the variability is due to sampling error and not by true heterogeneity between studies.

Furthermore, the Tau-squared ( $\tau^2$ ) provides an estimate of the between-studies variance in a random-effects model. In this analysis,  $\tau^2$  is calculated as 0.000 in Fisher's

Z units, suggesting that there is no variability in true effect sizes across the studies. This means that the differences observed in effect sizes can be largely attributed to within-study error or sampling variability, and not to real differences in effect sizes across studies. Similarly, Tau ( $\tau$ ), which is the standard deviation of the true effect sizes, is found to be 0.019 in Fisher's Z units. This is a relatively small value, suggesting that there is minimal dispersion of true effect sizes across the included studies. This observation of low Tau-squared and Tau values in this analysis, which signifies minimal fluctuation in true effect sizes across the studies, is affirmed by Borenstein, Hedges, Higgins, and Rothstein (2009), and consequently lends additional credence to the estimated pooled effect size.

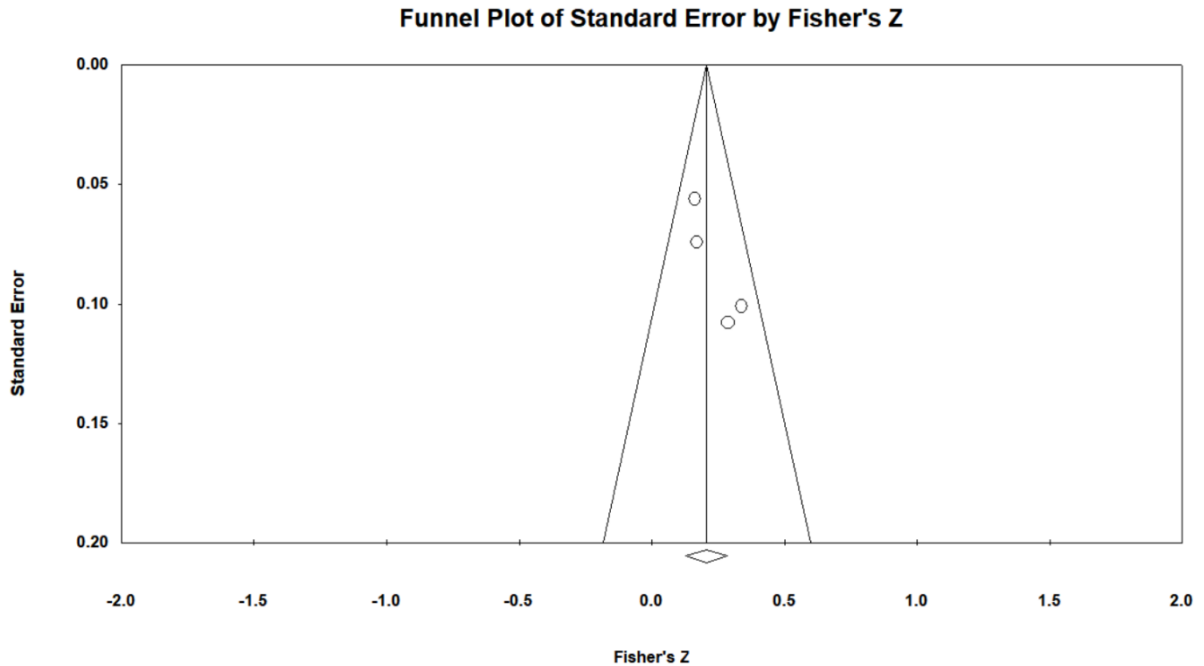
Taken together, all of these results reinforce the notion of low heterogeneity among the studies in this meta-analysis, providing additional confidence in the pooled effect size estimate. These results affirm that the small amount of observed variability in study results is more likely due to chance or sampling error rather than significant differences in true effect sizes across studies. Thus, suggesting that the included studies have similar research design, participant, measures, analysis, and other characteristics of the study.

**Table 2**  
**Heterogeneity Table**

Heterogeneity			Tau-squared		
Q value	Df (Q)	p value	I <sup>2</sup>	T	T <sup>2</sup>
3.163	3	.376	5.162	.019	.000

**Test for Publication Bias.** A funnel plot is a graphical representation of the distribution of effect sizes from individual studies included in a meta-analysis. The plot consists of a scatter of points, with each point representing an individual study.

In Figure 4, the funnel plot appears symmetrical, which suggests that there is no publication bias or other forms of bias in the selection of studies. The funnel plot shows that the studies with smaller sample sizes have a wider spread of effect sizes, while the studies with larger sample sizes have a narrower range of effect sizes. This would reflect the fact that smaller studies (which appear at the bottom) are more likely to be published if they have larger-than-average effects, thereby increasing their likelihood of meeting the statistical significance criterion (Borenstein et al., 2021). Moreover, it conforms to the concept of Borenstein et al. (2017) and DerSimonian and Laird (2015) that symmetric distribution of data in an inverted funnel shape arises from a 'well-behaved' data set, in which publications bias is unlikely.



**Figure 4. Funnel Plot to test for Publication Bias**

**Egger’s test.** To further test for publication bias in the meta-analysis, the Egger's regression intercept was analyzed as shown in Table 3. Based on the results of analysis, it has yielded an intercept (B0) of 3.09, with a 95% confidence interval ranging from -1.279 to 7.463. The intercept represents the estimated effect size when the standard error is zero. The t-value for the intercept is 3.043, with degrees of freedom (df) equal to 2. The two-tailed p-value associated with the test is 0.093. This value indicates the probability of observing an intercept as extreme as the one obtained in the sample data, assuming that there is no publication bias present in the population. Since the two-tailed p-value is greater than the standard alpha level of 0.05, we cannot conclude that there is evidence of publication bias in the meta-analysis. This further indicates that the effect size is distributed symmetrically around the true effect size. This aligns to Egger et al. (1997) notion that if there is no publication bias, the effect sizes should be distributed symmetrically around the true effect size.

**Table 3  
 Egger’s Test Results**

<b>Intercept</b>	<b>95% lower limit</b>	<b>95% upper limit</b>	<b>df</b>	<b>t-value</b>	<b>P-value</b>
3.09	-1.279	7.463	2	3.043	.093

**Begg and Mazumdar Rank Correlation Test.** The test examines whether there is a correlation between the effect size estimates and their variances, as an indication of bias in the literature search (Begg & Mazumdar, 1994). The two-tailed p-value associated with the test is 0.308. Since the p-value is greater than the standard alpha level of 0.05, we cannot conclude that there is evidence of publication bias in the meta-analysis. This means that the correlation between effect size estimates and their variances is not statistically significant, and there is no indication of selective reporting or publication of studies based on their results. The absence of publication bias shown in the results, as supported by the Begg and Mazumdar Rank Correlation Test, strengthens the robustness

and reliability of the meta-analysis results. Publication bias, if present, could potentially distort the true effect size estimation (Borenstein, Hedges, Higgins, & Rothstein, 2009).

**Table 4**  
**Begg and Mazumdar Rank Correlation Test Results**

<b>Tau</b>	<b>z-value for Tau</b>	<b>p-value</b>
.500	1.019	.308

**Classic fail-safe N analysis.** The classic fail-safe N analysis provides an estimate of the number of missing studies that would be needed to bring the overall p-value of the meta-analysis to be greater than the alpha level of 0.05, which is a commonly used criterion for statistical significance. Based on the result, it has yielded a z-value of 5.591 and a two-tailed p-value of 0.00. This means that the effect size estimate is statistically significant, and the probability of observing such a result by chance is extremely low. The fail-safe N value of 29 indicates the number of additional studies with null results that would be needed to reduce the significance of the meta-analysis to a non-significant level. This suggests that the observed effect size is likely to be robust and not simply due to publication bias or selective reporting of studies with positive results. This finding aligns with the notion by Rosenthal (1979) that a substantial fail-safe N value suggests that a significant number of non-significant studies would need to be included in the analysis to modify the overall findings. As a result, this strengthens the confidence in the observed effect and reinforces its robustness.

<b>z-value</b>	<b>p-value</b>	<b>fail-safe N value</b>
5.591	.000	29

### **Conclusions**

In conclusion, the systematic review and meta-analysis of four studies on the relationship between remote work arrangements and job satisfaction of employees in private firms has shown a significant positive correlation between the two variables. The effect size indicates a low but meaningful relationship between remote work arrangements and job satisfaction. This finding suggests that organizations that offer remote work arrangements to their employees could see an increase in their job satisfaction levels.

The heterogeneity test results indicated that the studies included in the analysis had an acceptable amount of variability in their effect sizes, which implies that the studies had similar research design, participant, measures, analysis, and other characteristics of the study. The funnel plot analysis showed a symmetrical distribution of effect sizes from individual studies included in the meta-analysis, which suggests that there is no publication bias or other forms of bias in the selection of studies.

Additionally, the non-significant publication bias, as demonstrated by the Egger's test, and Begg and Mazumdar Rank Correlation Test shows that the results are not due to selective reporting or publication of studies based on their results. Furthermore, the classic fail-safe N analysis showed that the results are robust and not influenced by missing studies.

### **REFERENCES**

- Abilash, K. M., & Siju, N. M. (2021). Telecommuting: An empirical study on job performance, job satisfaction and employees commitment during pandemic circumstances. *management*, 8(1), 3547-3560.
- Adnan Bataineh, K. (2019). Impact of work-life balance, happiness at work, on employee performance. *International Business Research*, 12(2), 99-112.
- Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychological science in the public interest*, 16(2), 40-68.
- Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2009). Introduction to meta-analysis. John Wiley & Sons.
- Bailey, D. E., & Kurland, N. B. (2002). A review of telework research: Findings, new directions, and lessons for the study of modern work. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 23(4), 383-400.
- Bjärntoft, S., Hallman, D. M., Mathiassen, S. E., Larsson, J., & Jahncke, H. (2020). Occupational and individual determinants of work-life balance among office workers with flexible work arrangements. *International journal of environmental research and public health*, 17(4), 1418.
- Bluyssen, P. M., Roda, C., Mandin, C., Fossati, S., Carrer, P., De Kluizenaar, Y., ... & Bartzis, J. (2016). Self-reported health and comfort in 'modern' office buildings: first results from the European OFFICAIR study. *Indoor Air*, 26(2), 298-317.
- Caramela, S. (2017). 4 Ways to Define Leadership. Retrieved from <https://www.businessnewsdaily.com/3647-leadershipdefinition.html>
- Chung, H., & Van der Lippe, T. (2020). Flexible working, work–life balance, and gender equality: Introduction. *Social Indicators Research*, 151(2), 365-381.
- Ciarniene, R., & Vienazindiene, M. (2018). Flexible work arrangements from generation and gender perspectives: Evidence from Lithuania. *Engineering Economics*, 29(1), 84-92.
- Cooper, C. D., & Kurland, N. B. (2002). Telecommuting, professional isolation, and employee development in public and private organizations. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 23(4), 511-532.
- Cubacub, M., & Elizabeth, G. (2021). An exploratory case study: The role of work characteristics on engagement and job satisfaction among non-tech workers in tech industries in the Philippines during Covid-19 pandemic.
- Dettori JR, Norvell DC, Chapman JR. Seeing the Forest by Looking at the Trees:



- How to Interpret a Meta-Analysis Forest Plot. *Global Spine J.* 2021 May;11(4):614-616. doi: 10.1177/21925682211003889. PMID: 33939533; PMCID: PMC8119923.
- Dormann, C., Brod, S., & Engler, S. (2017). Demographic change and job satisfaction in service industries-the role of age and gender on the effects of customer-related social stressors on affective well-being. *Journal of Service Management Research*, 1(1), 57-70.
- Downes, M. J., Brennan, M. L., Williams, H. C., & Dean, R. S. (2016). Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ open*, 6(12), e011458.
- Eliyana, A., & Ma'arif, S. (2019). Job satisfaction and organizational commitment effect in the transformational leadership towards employee performance. *European Research on Management and Business Economics*, 25(3), 144-150.
- Felstead, A., & Henseke, G. (2017). Assessing the growth of remote working and its consequences for effort, well-being and work-life balance. *New Technology, Work and Employment*, 32(3), 195-212.
- Fonner, K. L., & Roloff, M. E. (2010). Why teleworkers are more satisfied with their jobs than are office-based workers: When less contact is beneficial. *Journal of Applied Communication Research*, 38(4), 336-361.
- Gallup, Inc. (2017). "State of the American Workplace." Accessed 19 October 2018. <https://www.gallup.com/workplace/238085/state-american-workplace-report-2017.aspx>
- Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: meta-analysis of psychological mediators and individual consequences. *Journal of applied psychology*, 92(6), 1524.
- Golden, T. D., & Veiga, J. F. (2005). The impact of extent of telecommuting on job satisfaction: Resolving inconsistent findings. *Journal of management*, 31(2), 301-318.
- Gopalakrishnan S, Ganeshkumar P. Systematic reviews and meta-analysis: Understanding the best evidence in primary healthcare. *J Fam Med Primary Care* 2013;2:9–14.
- Hendricks, D. (2014). Is telecommuting the wave of the future? *Forbes*. <https://www.forbes.com>
- Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *BMJ*, 327(7414), 557-560.
- Huang, J., Wang, Y. S., & You, X. Q. (2016). The job demands-resources model

- and job burnout: The mediating role of personal resources. *Current Psychology*, 35, 562–569. <https://doi.org/10.1007/s12144-015-9321-2>
- Huedo-Medina, T. B., Sánchez-Meca, J., Marín-Martínez, F., & Botella, J. (2006). Assessing heterogeneity in meta-analysis: Q statistic or I<sup>2</sup> index? *Psychological Methods*, 11(2), 193-206.
- Kizza, J. M., Kizza, W., & Wheeler. (2013). *Guide to computer network security* (pp. 387-411). Berlin: Springer.
- Krishnan, R., Loon, K. W., & Tan, N. Z. (2018). The effects of job satisfaction and work-life balance on employee task performance. *International Journal of Academic Research in Business and Social Sciences*, 8(3), 652-662.
- Lister, K. and Harnish, T. (2017), '2017 State of telecommuting in the US employee workforce, Global Workplace Analytics and FlexJobs, accessed 22 June 2017 at <http://globalworkplaceanalytics.com/whitepapers>
- Locke, E. A. (1976). The nature and causes of job satisfaction. *Handbook of industrial and organizational psychology*.
- McDonald, P., Cathcart, A., Grant-Smith, D., Laundon, M., Mayes, R., Moore, K., & Williams, P. (2018). Submission to the Select Committee on the Future of Work and Workers.
- Pauline Ramos, J., & Tri Prasetyo, Y. (2020, September). The Impact of Work-Home Arrangement on the Productivity of Employees during COVID-19 Pandemic in the Philippines: A Structural Equation Modelling Approach. In *2020 The 6th International Conference on Industrial and Business Engineerin* (pp. 135-140).
- Ramos, P.J., & Prasetyo, Y. (2020). The impact of work-home arrangement on the productivity of employees during COVID-19 pandemic in the Philippines: A structural equation modelling approach. In *2020 The 6th International Conference on Industrial and Business Engineerin* (pp. 135-140).
- Smith, S. A., Patmos, A., & Pitts, M. J. (2018). Communication and teleworking: A study of communication channel satisfaction, personality, and job satisfaction for teleworking employees. *International Journal of Business Communication*, 55(1), 44-68.
- Torten, R., Reaiche, C., & Caraballo, E. L. (2016). Teleworking in the new milleneum. *The Journal of Developing Areas*, 50(5), 317-326.
- Townsend, K., McDonald, P., & Cathcart, A. (2017). Managing flexible work arrangements in small not-for-profit firms: the influence of organisational size, financial constraints and workforce characteristics. *The International Journal of Human Resource Management*, 28(14), 2085-2107.
- Virick, M., DaSilva, N., & Arrington, K. (2010). Moderators of the curvilinear

- relation between extent of telecommuting and job and life satisfaction: the role of performance outcome orientation and worker type. *Human relations*, 63(1), 137-154.
- Wang, B., Liu, Y., Qian, J., & Parker, S. K. (2021). Achieving effective remote working during the COVID-19 pandemic: A work design perspective. *Applied psychology*, 70(1), 16-59.
- Wiatr, A. (2020). Flexible working arrangements-current conditions and research directions. *Business Management*, 1.
- Windsor, D. A. (2018). *Job satisfaction and staff turnover in telecommuting compared to on campus environments* (Doctoral dissertation, Grand Canyon University).
- World Bank Group. (2014). *World development report 2016*: World Bank Publications.
- World Bank Group. (2016). *World development report 2016*: World Bank Publications.
- Yap, C. S., & Tng, H. (1990). Factors associated with attitudes towards telecommuting. *Information & Management*, 19(4), 227-235.