



# Assessing the causal relationship of remote work and employee productivity – a study of corporate Malaysia

Barry Seng Wang Lim, Sulaiman Ainin, Nadisah Zakaria & Siong Min Foo

**To cite this article:** Barry Seng Wang Lim, Sulaiman Ainin, Nadisah Zakaria & Siong Min Foo (2025) Assessing the causal relationship of remote work and employee productivity – a study of corporate Malaysia, Cogent Social Sciences, 11:1, 2481194, DOI: [10.1080/23311886.2025.2481194](https://doi.org/10.1080/23311886.2025.2481194)

**To link to this article:** <https://doi.org/10.1080/23311886.2025.2481194>



© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 22 Mar 2025.



Submit your article to this journal



Article views: 4601



View related articles



View Crossmark data



Citing articles: 1 View citing articles



## Assessing the causal relationship of remote work and employee productivity – a study of corporate Malaysia

Barry Seng Wang Lim<sup>a</sup>, Sulaiman Ainina<sup>a</sup> , Nadisah Zakaria<sup>b</sup> and Siong Min Foo<sup>c</sup>

<sup>a</sup>Faculty of Business, Universiti-Malaya Wales, Kuala Lumpur, Malaysia; <sup>b</sup>Department of Finance, College of Business, Prince Sultan University, Riyadh, Kingdom of Saudi Arabia; <sup>c</sup>Accounting and Finance Department, School of Business and Economics, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

### ABSTRACT

The rise of remote work (RW), accelerated by the global pandemic, has reshaped work dynamics, driven by technological advancements and a focus on work-life balance. The main aim of this article to study impact on RW on employees' productivity. Empirical data was collected via a survey questionnaire on public sector employees. A total of 105 responses were analysed using PLS-SEM. Specifically, the study analyses the role of organisational support, technology availability (i.e. access to required devices and digital infrastructure for effective job execution) and employee wellbeing towards employee's productivity. The study also analysed the role of socioeconomic (such as nationality, gender, age, marital status and household income levels) as a moderator between these variables. In addition, the study analysed whether worker preference mediates the relationship between RW and employee productivity. Results showed technology's availability significant positive influence, while organisational support had a positive but insignificant impact. Employee well-being is strongly correlated with productivity. Socioeconomic profiles had no clear impact, but self-preference (SP) mediated effects. The findings imply that RW can increase employees' productivity but organisations must be willing to invest in technology (to ensure it is readily available and accessible, foster supportive environments and align practices with individual preferences.

### ARTICLE HISTORY

Received 10 September 2024

Revised 4 February 2025

Accepted 13 March 2025

### KEYWORDS

Remote work; employee productivity; organisational support; socioeconomics; pandemic

### SUBJECTS

Business, Management and Accounting; Industry & Industrial Studies; Urban Studies

## 1. Introduction

The world has been transformed by the COVID-19 outbreak, ushering in new social expectations and ways of living. COVID-19, a highly contagious and deadly virus, has prompted a shift in the standard operating procedures of businesses, making work-from-home (WFH) the new norm (Anakpo et al., 2023; OECD, 2020). WFH is an employment arrangement wherein employees are not obligated to physically attend a centralised workplace, such as an office building, warehouse or retail shop (Anakpo & Mishi, 2022; Gqoboka et al., 2022; Kniffin et al., 2021). Instead, they work from their homes or any offsite location (remote work [RW]), maintaining communication with colleagues and fulfilling responsibilities through telephone, email and virtual conferences (telework [TW]). Companies are increasingly facilitating RW for various reasons, such as reducing office rental expenses, enhancing work-life balance, saving on travel time and opening up the possibility of accessing specialist talent across borders (Thorstensson, 2020). As the COVID-19 pandemic shifted from acute to endemic, many firms appeared to embrace or, at the very least, accept this 'new normal' and began implementing formal flexible work policies (Makarius et al., 2021).

**CONTACT** Sulaiman Ainina [ainins@um.edu.my](mailto:ainins@um.edu.my) Faculty of Business, Universiti-Malaya Wales, 50480 Kuala Lumpur, Malaysia

© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

Working from home including the lack of supervision, could lead to conflicts. The downsides encompass the potential for a monotonous and uninspiring work environment, along with the challenge of establishing clear boundaries between work and leisure time. These disadvantages may contribute to workplace stress, subsequently affecting productivity as measured by the company's performance metrics (Anakpo et al., 2023; Gibbs et al., 2021). Communication, coordination and collaboration as more challenging in a virtual work setting, posing a significant obstacle to WFH, especially in roles where these elements are crucial, particularly for less-experienced employees. WFH has been shown to have both positive and negative impacts on productivity, contingent on factors, such as skills, education, tasks or industry (Gibbs et al., 2021; Kitagawa et al., 2021). As the COVID-19 pandemic shifted from acute to endemic, many firms appeared to embrace or, at the very least, accept this 'new normal' and began implementing formal flexible work policies (Makarius et al., 2021).

Recent reports from the business sector have highlighted a resurgence of resistance from managers, exemplified by figures like Elon Musk of Tesla (Berger, 2023) and Jeff Bezos of Amazon (Kay, 2023), who have expressed concerns about productivity challenges in managing a remote workforce (Kelly, 2023). Additionally, research that initially indicated increased productivity by the new remote workforce during and immediately after the COVID-19 pandemic lockdowns has since revealed updated findings suggesting a decline in productivity following the initial upswing (Bureau of Labor Statistics, 2023). Therefore, the question arises: Does the implementation of work flexibility or RW indeed lead to changes in worker productivity? Can we identify and quantify the factors that contribute to improvements or deterioration in outcomes, particularly within the context of the Malaysian workforce, encompassing both the current and emerging scenarios? Addressing these questions goes beyond advancing the research field; it also plays a crucial role in assisting policymakers, employee unions, employees and organisations in planning and understanding the costs and benefits associated with the WFH strategy.

While there is existing research on 'remote work and productivity' no empirical studies have presented a comprehensive model considering the many direct and indirect influencing factors and indicators, especially within the context of Malaysia. Although some research has covered the Malaysian workforce (Hashim et al., 2020; Tumin, 2020), it either took a singular sector focus or adopted a simplistic model that does not break down the 'remote work' construct. These limiting considerations do not adequately facilitate in-depth discussions around policy, intervention programmes or defining clear steps to move forward with this concept.

Despite the presence of research on 'remote work and productivity,' there is a gap in empirical studies presenting a comprehensive model that considers the myriad of direct and indirect influencing factors and indicators, particularly within the context of Malaysia. While certain research has addressed the Malaysian workforce (Hashim et al., 2020; Tumin, 2020), it either focused exclusively on a particular sector or utilised a simplistic model that does not dissect the 'remote work' construct. These limitations hinder the ability to engage in thorough discussions about policy, intervention programmes, or the formulation of clear steps to progress with this concept. The findings conclude that independent variables (IVs) of technology availability and accessibility and employee well-being have impacts on employee productivity, however, no similar evidence is profound for organisation support.

The subsequent sections of the research are structured as follows: [Section 2](#) outlines the methodology employed for the review. The findings are detailed in [Section 3](#), followed by discussions on these results in [Section 4](#). Finally, [Section 5](#) concludes the research with recommendations and an acknowledgement of study limitations.

## 2. Literature review

The commonly used term in discussions about the history and concept of RW, also known as WFH, is 'telecommuting.' NASA engineer Jack Nilles is credited with coining the term in 1973, a time when telephones were the primary tools enabling certain jobs, like telemarketers and call centre staff, to work remotely (Gupta, 2020). Nilles later refined his definition to describe telecommuting as 'working outside the conventional workplace and communicating by way of telecommunications or computer-based technology' (Nilles, 1994). However, in contemporary discussions, terms such as 'working remotely,' 'work-from-home (WFH)' or simply 'remote work' are more commonly preferred (Gupta, 2020).

Within the broader concept of RW, literature explores into sub-concepts, such as 'remote work intensity' measured by the frequency of allowed remote workdays per week (Apsalone et al., 2017; Phillips, 2020). Various sub-concepts related to facilitation factors for effective RW have also emerged. A logical categorisation groups these factors into three broad categories: (1) the firm's perspective, including WFH policies and support programmes; (2) intermediary considerations, encompassing the remote working environment and digital infrastructure; and (3) the employee, covering mental and physical well-being, attitude, and maturity.

In this study, the focus is the impact of RW on employee's productivity. From the outset of this research, the recurrent argument against implementing RW policies by organisations revolves around the potential negative impact on productivity. This concern gains credibility in the context of Malaysia, where productivity levels have remained stagnant, reaching only 37.1% of the regional leader, Singapore (ASEAN & ASEAN, 2021). Productivity, commonly defined as the ratio between output and input, serves as a measure of efficiency, with input encompassing labour and capital and output representing the main goods or services produced (OECD, 2001). Productivity plays a pivotal role, accounting for a significant portion of the measurable GDP per capita differences among global economies (Nayyar et al., 2021). Slow productivity growth in developing countries is identified as a major impediment to catching up with their developed counterparts (Maloney, 2021). The 'Regional Study on Labour Productivity in ASEAN's report (ASEAN & ASEAN, 2021) underscores the region's growth strategy focused on improving labour productivity. This productivity, which grew by an average of 3% annually from 1971 to 2018, is analysed with Singapore's leadership attributed to total factor productivity (TFP) increases and capital accumulation. However, the report warns that the primary driver of this productivity growth is a capital increase, emphasising the importance of factors like capital deepening (ASEAN & ASEAN, 2021). Given the research's interest in employee productivity, the focus narrows to labour quality within labour productivity. Examining Malaysia's decomposed labour productivity factors reveals that capital deepening has been a significant contributor, but the nation's labour productivity growth rates are comparable to only half of its peers. Notably, in recent periods, Malaysia has lagged not only in overall growth but especially in labour quality growth (ASEAN & ASEAN, 2021). While focusing into Malaysia's national labour quality is beyond the research's scope, the imperative for a comprehensive national framework addressing labour competitiveness, including the impact of changes in work practices like remote working on work quality and productivity, is evident.

A review of the literature highlighted that there are many factors related to RW that impact employee's productivity. For example, Pradnya et al. (2024) studied impact of work environment, peer support, work satisfaction and organisational support on remote working productivity while Al-Dmour et al. (2023) found organisational, individual, technological and client-related factors influenced employee's productivity. Elsewhere, Rüdinger (2024) in his thesis highlighted that internet quality, the desire to continue RW post pandemic and the presence of a dedicated home office room have a major impact on both employee's productivity and efficiency.

The literature examining the relationship between RW and productivity has predominantly relied on self-reporting by employees, often comparing WFH to work-from-office (WFO) setups. Studies by Austin-Egole et al. (2020), Allen et al. (2015), Chung and van der Lippe (2018) and Dockery and Bawa (2014) are examples employing such methods. While Malaysia-specific studies in this vein exist, they are generally confined to single organisations, particularly in academia and during the pandemic. On the quantitative side, a notable study by Bloom et al. (2015) focused on 249 employees in a Chinese call centre. However, the industry-specific nature of call centres, which inherently capture specific productivity parameters, limits the applicability of such models to other industries or job roles.

A model presented by the Organisation for Economic Co-operation and Development (OECD) in the report 'Productivity Gains from Teleworking in the post-COVID-19 Era: How Can Public Policies Make It Happen?' (OECD, 2020) stands out for its comprehensive approach. This model advocates for the structural adoption of RW across countries, sectors and occupations. It suggests policies to overcome cultural and legal obstacles, stimulate infrastructure investments and outline best practices for private sector stakeholders. The OECD model incorporates two channels: (1) cost reduction at the firm level and (2) increased efficiency at the employee level, with both contributing to defining organisational productivity. The right channel posits that RW increases worker satisfaction, thereby enhancing efficiency, while the

left channel claims that better firm performance results from cost reductions associated with RW. The report introduces the concept of a 'sweet spot' between remote working and worker efficiency, acknowledging the possibility of an inverted-U relationship without quantifying the specific threshold (OECD, 2020). The ASEAN labour productivity study (ASEAN & ASEAN, 2021) introduced a productivity model, although it does not address RW. This model identifies determinants of human capital productivity, emphasising factors beyond human capital quality, including deployment, utilisation, market policies and motivation by 'gainsharing'.

Comparing the two models, this research adopts and adapts the OECD model, focusing on the worker channel (increased efficiencies) while assuming cost-savings on the firm side through effective RW policies. This decision is driven by the model's broad applicability across economic sectors and industries and its compatibility with the identified constructs in this research. The adapted model incorporates worker factors, influencing factors of RW and organisational support, providing a logical structure for future supplementary research covering the firm perspective. The adapted model simplifies the focus on human capital productivity, assuming all other factors are equal and constant. The chosen constructs of this research align with the original OECD model, with the 'manager' replaced by the 'organization' encompassing policies, programmes, training and financial support. The combined reduction in the 'cost of doing business' and increased 'satisfaction' influence labour productivity, considering capital, TFP and human capital (workers) (APO, 2018).

In summary, the existing research on RW and productivity reveals four key gaps: (1) treating RW as a singular variable without breaking it down into specific facilitating or impeding factors; (2) overlooking the effects of socio-economic backgrounds on RW capabilities; (3) lacking correlation regarding the extent of an employee's self-preference (SP) to work and its impact on RW; and (4) insufficient coverage of all relevant job functions across all sectors of corporate Malaysia.

Based on the literature, this study focussed on three IVs: organisational support, technology availability and well-being. The first construct evaluates organisational responses to RW from the employee's perspective, encompassing clarity of the organisation's RW policy, both soft (e.g. training) and hard (e.g. tools and funding) support and subjective areas like social support programmes. The organisational support theory (OST) and perceived organisational support (POS) are common references in the literature. Eisenberger et al. (2020) and Errichiello and Pianese (2021) both found organisational support influences productivity. When employees perceive that their organisation values their contributions and cares about their well-being, they demonstrate higher engagement and motivation (Eisenberger et al., 2020). Support, such as regular feedback, mentoring and training reduces obstacles, enabling employees to perform efficiently. Thus, the following hypothesis is proposed:

**H1:** Organisation support has a strong impact on employee productivity.

The next construct, technology availability, refers to access to required devices and digital infrastructure for effective job execution. Literature explores the correlation between digital technology access and RW effectiveness, considering perspectives from managers (Urbaniec et al., 2022), focusing on diversity, equality and inclusion (Russell & Frachtenberg, 2021), and defining technology types for effective RW (Ilag, 2021). A survey by Universiti Tun Hussein Onn (UTHM) emphasises the importance of technology for Malaysian employees in the physical consulting industry (Suratkon & Azlan, 2021). Following this, the following hypothesis is developed:

**H2:** Technology availability has a medium effect on employee productivity.

Measuring well-being, a construct not directly observable, requires translation into measurable variables. The self-reporting subjective approach, recommended by the International Labour Organisation (ILO) and OECD, involves the individual's self-perception of well-being. Adapting the Allostatic Load framework from studies like 'Work Stress and Employee Health: A Multidisciplinary Review' (Ganster & Rosen, 2013) is a recurring conceptual approach to measure well-being. The framework distinguishes between physical (physiological) and mental (psychological) well-being (Ganster & Rosen, 2013; McEwen & Stellar, 1993). Employee well-being directly impacts focus, creativity and resilience. Poor mental or physical health leads to absenteeism, burnout and reduced productivity. Organisations that prioritise well-being through flexible work arrangements (such as RW) enable employees to maintain a healthy

work-life balance, which is essential for sustained productivity (Olawale et al., 2024). Hence, the following hypothesis was developed:

**H3:** Wellbeing has a profound influence on employee productivity.

Turning attention to the worker or employee, it is crucial to acknowledge the multitude of human factors contributing to each individual's uniqueness. While outside the social science research domain, certain 'softer-side' factors are worth considering in understanding RW relationships with productivity. Past and recent studies suggest that the socio-economic profile of the worker can influence their effectiveness while working remotely. For instance, a study conducted in Italy identifies five types of remote workers, with those from higher socio-economic backgrounds, having more experience with RW, better technology access and higher-paying jobs, being the most effective (Donati et al., 2021).

Considering socio-economics, defined as the 'interplay between social processes and economic activity within a society,' raises questions about its impact on a worker's ability to effectively RW, potentially moderating effects on productivity. Examples include working mothers lacking nearby family support for childcare, demographics in smaller homes hindering effective remote working, and other community and environmental factors distracting remote workers. The lower-income demographic's environment can exacerbate general health issues related to prolonged RW, such as isolation, sedentary lifestyles, bad ergonomics and stress (Hinge Health, 2020). The concept of trust-based working time (TBWT), introduced earlier, expands beyond organisational trust to encompass the current and potential talent pool's preference for flexible work options. This SP to work acknowledges the myriad justifications for flexibility, ranging from family commitments to the changing characteristics of the Generation Z workforce. TBWT, involving structural changes in measuring work productivity, shifts the focus from fixed work hours to the quality and sustainability of work. This construct offers insights into understanding how external factors can influence a worker's productivity in different work settings. Therefore, H4, H5 and H6 were developed.

**H4:** Socio-economic profile influences the relationship between organisational support and employee productivity.

**H5:** Socio-economic profile affects the relationship between technology availability and employee productivity.

**H6:** Socio-economic profile moderates the relationship between well-being and employee productivity.

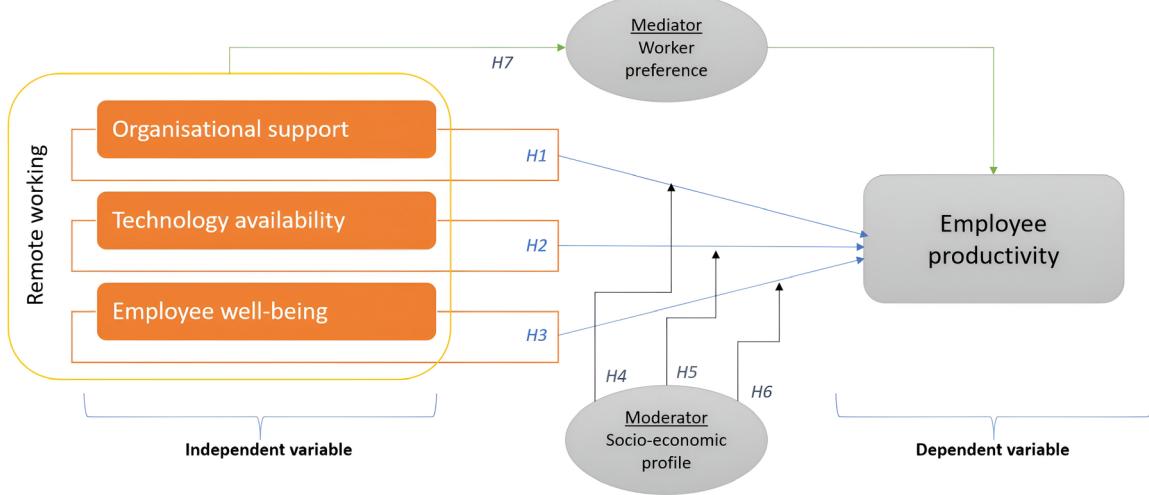
Finally, the research incorporates the concept of SP to work as a mediating variable. While outside the social science research domain, considerations of socioeconomic factors, trust and engagement play crucial roles in understanding the complex interplay between RW and productivity (Donati et al., 2021; Fernandez et al., 2023). Worker preference arbitrates the relationship between RW and employee productivity (IWG, 2022; PwC, 2022) hence the following hypothesis was developed:

**H7:** Worker preference arbitrates the relationship between RW and employee productivity.

Based on the discussion, the following framework is developed and serves as a guide for exploring the complex interplay between these variables and their collective impact on the productivity of remote workers. The conceptual framework is depicted below, as in [Figure 1](#).

### 3. Methodology

This study adopts a basic research approach, specifically designed as explanatory research, to investigate the fundamental aspects. The primary aim is to address gaps in current knowledge regarding the cause-and-effect relationship between various RW factors and employee productivity. Utilising a quantitative approach through an employee survey methodology, the research incorporates structured expert interviews with human resource practitioners, peers and university faculty members for design inputs. This study was conducted in accordance with ethical standards, and approval was obtained from the Ethics Committee, University Malaya-Wales. All participants in this study gave informed consent before



**Figure 1.** Conceptual framework. (Source by Authors).

taking part. They were thoroughly informed about the study's purpose, procedures and any potential risks or benefits. Verbal consent was obtained, ensuring that participants were aware of their rights, including the option to withdraw from the study at any time without any consequences. Additionally, all collected data were anonymised to safeguard participant privacy. Verbal consent allows them to participate in this study without the fear of leaving a written record.

Data collection involves a survey administered on SurveyPlanet.com and structured expert interviews conducted virtually or face-to-face. The expert panel consists of six people consisting of three Human Resource practitioners, two academics and one person with RW experience. They all agreed that the constructs and items of the questionnaire reflects the true nature of the construct. Thus, ensuring the validity of the constructs. The questionnaire used the Likert scale (1–7) – with 1 being the lowest in strength and 7 being the strongest expression of agreement – is employed for the quantitative instrument, with rigorous development and validation processes.

The target population is specific to relevant working profiles in Malaysia, incorporating criteria such as experience in both WFO and WFH settings, Malaysian citizenship or permanent residency. As there is no database available to form a sampling frame, a database consisting of 1000 names fulfilling the criteria was created through social and professional networks. Subsequently, respondents in the list were approached and invited to participate in the survey. The process was repeated until a total of 125 responses agreed to participate. Although this may lead to selection bias, the biasness was reduced as blind selection method was adopted whereby the researchers were unaware of the participant's traits (e.g. age and socioeconomic status). In addition, at a firm level – respondents may belong to any industries except for micro-enterprises and government/public sector employees – defined as sales turnover that is less than RM300,000 OR with full-time employees of less than 5 (BNM, 2013), and those from the government or public sector knowing that as these firms are assumed to be less structured, volatile in work expectations or may not even have a traditional fixed-office.

Constructs in the employee survey are operationalised, breaking them down into descriptive areas for ranking by respondents. The socio-economic profile of employees and the SP to work are assessed through multiple-choice questions. Three IVs related to remote working and a dependent variable (DV) of employee productivity are measured on a scale of 7. Details of each construct are summarised in Table 1 as follows:

The data analysis plan employs structural equation modelling (SEM), a multivariate statistical analysis technique allowing for the analysis of structural relationships and evaluation of multivariate causal relationships. The plan incorporates descriptive statistical analysis, chi-square testing for categorical datasets, and partial least square SEM (PLS-SEM) analysis, chosen over ANOVA for multigroup analysis due to its prevalence in recent business research studies. Overall, this comprehensive research design aims to

**Table 1.** Summary of construct and operationalising areas.

Construct (measure)	Decomposed areas	Source (adopted/adapted)
Moderator – Employee's socio-economic profile Multiple choice	S1. Nationality status (Malaysian citizen and PR status only) S2, S3. Gender, age (categorise workplace generation) S4. Marital status S5. Care giver status S6. Household income levels S7, S8, S9. Organisational size (exclude micro), type and industry sector (exclude public servants) S10, S11. Occupation status, job role and function (exclude business owners) S12. WFO and WFH experience (must have experienced both)	Household Income and Basic Amenities Survey Report 2019 (DOSM, 2020), The Malaysia Standard Industrial Classification 2008 (MSIC 2008) (DOSM, 2008) and SME Definitions (SMECorp, 2022)
Mediator – Employee's self-preference to work Multiple choice	A13. Regularity of WFO, WFH, other remote spaces – <i>measured in days per week</i> A14. Difference in work hours across WFO and WFH – <i>measured in hours per day</i> A15. Work commute durations and type – <i>measured in hours per day, self and public</i> A16. Remote work policy current, and desired – <i>measured in days per week</i> A17. Facilities provided by employer – <i>across 6 measures of policy, training, tools, fiscal, social and managerial/coaching</i>	Working Time and Work-Life Balance Around the World, Welcome to Generation Z (Gomez et al., 2018), Americans are embracing flexible work – and they want more of it (McKinsey & Company, 2022)
(IV1) Remote working – Organisational support provided for remote work Scale – 7	B18. Digital infrastructure availability (by employer and self) – <i>across 5 measures of device, internet, facilities/tools, workspace home and others</i>	Handbook of Research on Remote Work and Worker Well-Being in the Post-COVID-19 Era (Errichello & Pianese, 2021), Perceived Organisational Support: Why Caring About Employees Counts (Eisenberger et al., 2020)
(IV2) Remote working – Technology availability and accessibility to the remote worker Scale – 7	B19. Physical and mental well-being across WFO and WFH – <i>across 4 measures of physical at office, mental at office, physical at home and mental at home</i>	The Impact of Technological Developments on Remote Working: Insights from the Polish Managers' Perspective (Urbaniec et al., 2022), After the Pandemic: Tech, Work and the Tech Workforce (Russell & Frachtenberg, 2021), Tools and Technology for Effective Remote Work General Terms (Ilag, 2021)
(IV3) Remote working – Well-being of the remote worker Scale – 7	C20, C21. Effectiveness while WFO, versus while WFH – <i>across 4 measures of individual, collaborative, communications and administrative</i> C22, C23. Benefits for WFO, versus while WFH – <i>across 4 measures of individual, collaborative, communications and administrative</i>	Work Stress and Employee Health: A Multidisciplinary Review (Ganster & Rosen, 2013), Stress and the individual. Mechanisms leading to disease (McEwen & Stellar, 1993)
(DV) Employee Productivity – Work productivity and effectiveness of the employee while remote Scale – 7		Productivity Gains from Teleworking in the post-COVID-19 Era: How Can Public Policies Make it Happen? (OECD, 2020)

(Source by Authors).

contribute valuable insights into the dynamics of RW and its impact on employee productivity, addressing the identified gaps in the existing body of knowledge.

## 4. Results

### 4.1. Descriptive analysis

From an initial set of 125 completed surveys, only 105 responses were valid and analysed. Demographic analysis revealed a balanced gender distribution, with 55% millennials, 28% generation-X, 14% Generation and 3% boomers. Regarding relationship status, 62% were married, 34% were single, and the remainder were reported as 'others.' The distribution by household income (monthly, gross) was tabulated across Malaysia's current national classification (DOSM, 2020) of household demographics of bottom-40% (B40 earning up to MYR4,900), middle-40% (M40 earning between MYR4,901 till MYR11,000) and the top-20% (T20 earning upwards of MYR11,001). Household income distribution showed 18% in the B40 category, 31% in the M40 category and a majority in the T20 class. Worker profiles indicated that 69% worked

**Table 2.** Measures tested and analyses for core hypothesis statement.

Hypothesis	Test and analysis
H1 – Organisation support has a strong impact on employee productivity	Pass 1: Reliability and validity test between constructs: Support provided by the employer – 6 indicators measuring company policy, providing training, tools, managerial/coaching, as well as social and fiscal or other support (question B17)
H2 – Technology availability has a medium effect on employee productivity	Technology availability by the employee – 5 indicators measuring the availability of laptop/other devices, internet, productivity tools, conducive workspace at home, conducive workspace outside/near home (question B18)
H3 – Wellbeing has a profound influence on employee productivity	The well-being of the employee – 2 indicators measuring physical and mental well-being (question B19) AND Effectiveness while WFH – 4 indicators measuring of individual, collaborative, administrative work tasks, and communications (question C21) Pass 2 (reliability indicators only): PLS-SEM analysis between: Support provided by the employer – 4 indicators measuring company policy, providing training, tools, managerial/coaching (question B17) Technology availability by the employee – 4 indicators measuring the availability of laptop/other devices, internet, conducive workspace at home, conducive workspace outside/near home (question B18) The well-being of the employee – 2 indicators measuring physical and mental well-being (question B19) AND Effectiveness while WFH – for each of the 4 measures of individual, collaborative, communications and administrative (question C21)

(Source by Authors).

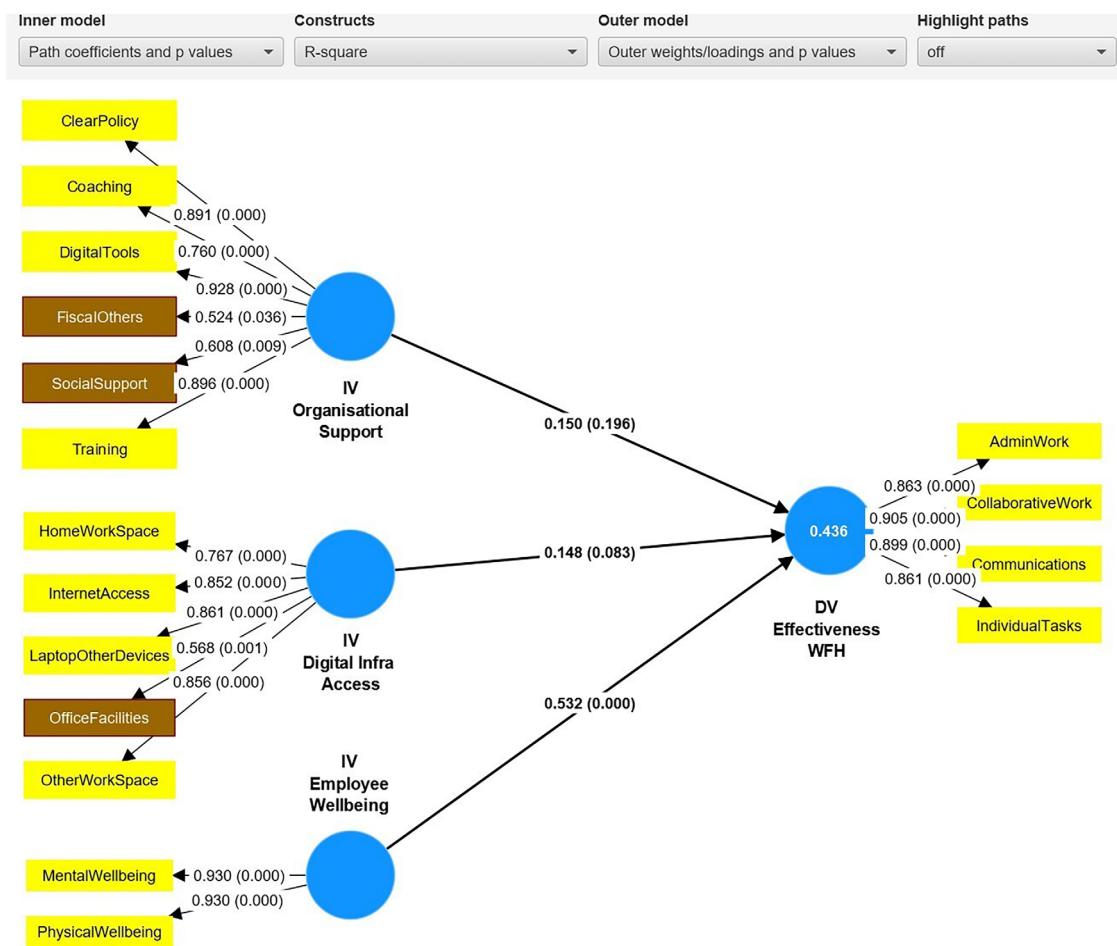
primarily from a desk-bound location, 21% spent most work hours outside the office, and 61% belonged to large firms, 21% to medium-sized firms and 18% to small-sized firms. Firm classifications were based on the Malaysian government's standard definitions (DOSM, 2020; SMECorp, 2022). Regarding business coverage, 69% worked for multinational companies, 31% for local Malaysian firms and 78% in the services sector. The measurement model's internal consistency was assessed for the correlation between indicators and their respective constructs. The core relationships evaluated the impact of organisational support (H1), technology availability (H2) and well-being (H3) on employee productivity.

#### 4.2. Reliability test

To assess the correlation between the various indicators used for each major construct, including both IVs and the DV, internal consistency testing was applied to the measurement model. This was done to guarantee that the survey metrics fairly represented the factors that were being examined. The following describes the particular testing protocols. After each measure was shown to be reliable (i.e. those that did not satisfy the requirements were eliminated), the study of the model concentrated on the core or direct links. This entailed investigating the basic connections between the single DV and the three IVs, which correspond to hypotheses 1–3. The analysis then went on to investigate these main associations concerning moderator effects (hypotheses 4–6) and mediator effects (hypothesis 7). The first stage comprised a detailed analysis of survey results about the fundamental or direct relationships. The understanding of how each IV, which is built from a group of indicators, affects the results of the DV is based on the core measurement model. A summary of the corresponding indicators for each concept along this set of direct relationship paths is given in Table 2. Table 2 also describes the tested measures and analyses for core hypothesis statement.

The internal consistency test, conducted in two parts, aimed to assess the reliability and validity of the measurement model. In the first part, Cronbach's alpha was utilised to gauge the scale reliability, with values ranging from 0 to 1. A Cronbach's alpha value of 0.7 or higher is commonly considered satisfactory (Cortina, 1993). In this study, all constructs demonstrated Cronbach's alpha values within the range of 0.844–0.913, surpassing the benchmark value of 0.7, as illustrated in Figure 2.

The second part of the internal consistency test examined the outer loadings, which indicate the contribution of each variable's indicators to their respective constructs. Table 3 presents the results of reliability tests for the DV and IVs. Indicators with loadings of 0.7 or higher are deemed highly satisfactory (Sinkovics & Ghauri, 2009; Vinzi et al., 2010). In the measurement model, three indicators exhibited loadings below 0.7 and were consequently excluded from their respective constructs. These indicators included



**Figure 2.** Internal consistency test results. (Source by Authors).

**Table 3.** Reliability test.

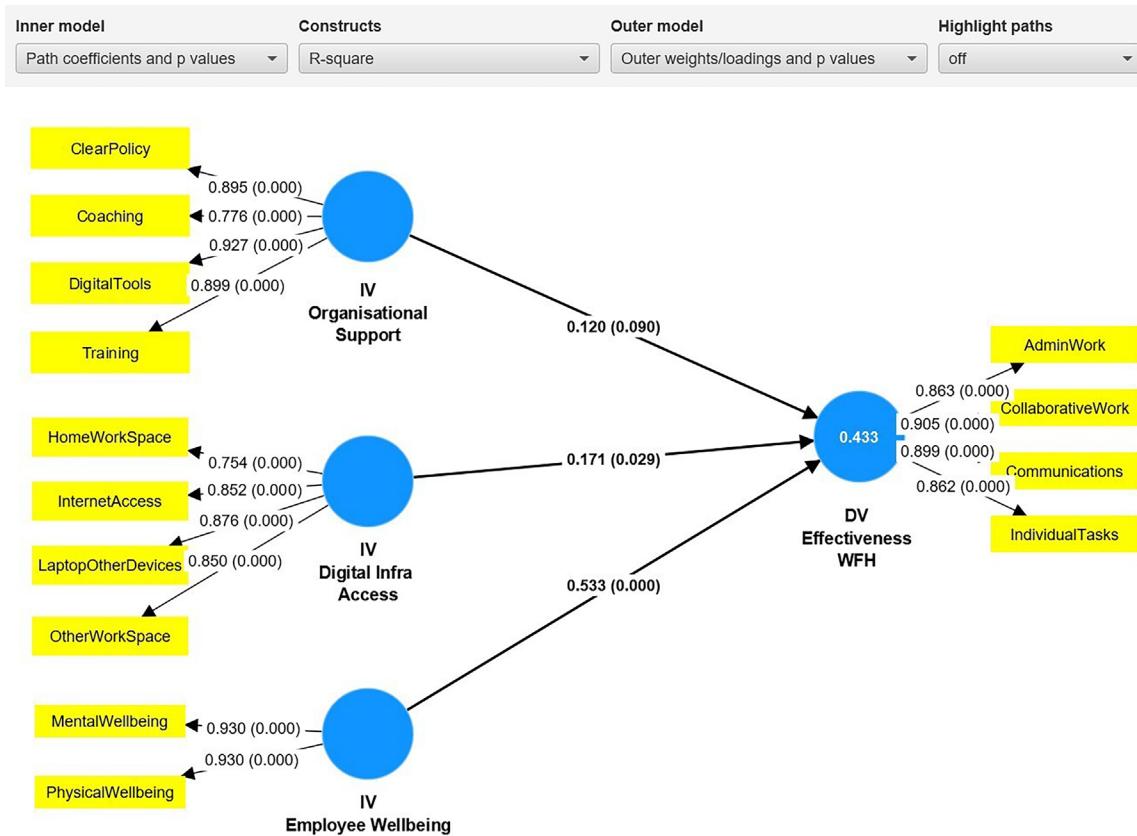
Variable	Cronbach's Alpha	Composite reliability ( $\rho_{\alpha c}$ )	Composite reliability ( $\rho_{\alpha c}$ )	Avg variance extracted (AVE)
DV_Effectiveness_WFH	0.905	0.905	0.934	0.779
IV_Digital_Infra_Access	0.860	0.982	0.89	0.622
IV_Employee_Wellbeing	0.844	0.844	0.928	0.865
IV_Organisational_Support	0.913	0.919	0.901	0.613

(Source by Authors).

fiscal and other support, social support from organisational support and office facilities from digital infrastructure access. All remaining measures were retained in the measurement model. Pass 2 of the analysis involved conducting partial least squares structural equation modelling (PLS-SEM) on the final measurement model, focusing on the core relationships between the IVs and DV, excluding moderating and mediating effects. PLS-SEM was chosen due to its ability to handle complex causal relationships, including those involving latent variables. The resulting model, depicted in Figure 3, provided  $p$  values and standardised coefficients for each relationship, which are discussed in detail in the subsequent sections.

#### 4.3. PLS-SEM

The outcomes derived from the PLS-SEM coefficients shed light on pivotal relationships within the conceptual framework. The assessment of organisational support and employee productivity yielded a  $p$  value of 0.09 and a standardised coefficient of 0.12, indicating a relationship that is not statistically significant compared to the other two constructs, namely access to digital infrastructure and employee



**Figure 3.** IV to DV measurement model. (Source by Authors).

wellbeing. Despite the lack of statistical significance, the data direction suggests a contributively role in measuring employee productivity.

This finding leads to the rejection of hypothesis H1. On the other hand, the evaluation of technology availability and employee productivity resulted in a significant  $p$  value of 0.029 and a standardised coefficient of 0.171, indicating a substantial 17% contribution to the productivity relationship. This finding aligns with hypothesis H2 and is consistent with empirical evidence discussed in previous literature. The notion that employees with better access to essential digital technology infrastructure and conducive RW environments would experience improved productivity outcomes is supported by this result. The examination of employee wellbeing and productivity yielded a remarkable finding, with a  $p$  value of 0.00 and a standardised coefficient of 0.045, indicating a highly significant relationship. This suggests a substantial 53% contribution to productivity, supporting hypothesis H3. The particularly notable aspect of this result is the high coefficient, underscoring the importance of employee wellbeing in influencing productivity outcomes, especially in the context of RW. While existing literature generally supports the association between good wellbeing and enhanced productivity, previous research has not extensively explored the specific link between wellbeing and productivity in RW settings. The significant 53% contribution observed in this study suggests that among various factors, employee wellbeing emerges as a crucial consideration in designing interventions and strategies to improve productivity outcomes in RW scenarios. This finding aligns with prior studies suggesting that prolonged periods of RW or extended working hours may lead to adverse physical and mental health effects, consequently impacting productivity levels negatively (Golden, 2012; Sharpe & Fard, 2022). Notably, the prominence of employee wellbeing in the results may also indicate the recognition of its importance by remote workers themselves. Moving forward, the study examined the moderating variable's influence on the three core relationships. This involved assessing how a worker's socioeconomic background moderates the strength and direction of the relationships between various RW factors and productivity outcomes (Golden, 2012; Sharpe & Fard, 2022).

**Table 4.** Measures tested and analysed for moderating hypothesis statement.

Hypothesis	Test and analysis
H4 – Socio-economic profile influences the relationship between organisational support and employee productivity	Pass 1: Reliability and validity test between constructs: Reference the description above. No outer loading of the moderator needed assessment as only one indicator was used in the measurement (load factor = 1). Pass 2 (reliability indicators only*): PLS-SEM analysis between: All direct pathways (assigned notation p3) Support provided by employer (IV1) – 4 indicators as above AND Effectiveness while WFH (DV) – 4 indicators as above <i>Moderated</i> by socioeconomic profile – 1 indicator which coded the household income type (B40, M40, T20) as captured through the survey profiling (question S6)
H5 – Socio-economic profile affects the relationship between technology availability profile and employee productivity	Pass 1: Reliability and validity test between constructs: Reference the description above. No outer loading of the moderator needed assessment as only one indicator was used in the measurement (load factor = 1). Pass 2 (reliability indicators only*): PLS-SEM analysis between: All direct pathways (assigned notation p3) Technology availability by employee (IV2) – 4 indicators as above AND Effectiveness while WFH (DV) – 4 indicators as above <i>Moderated</i> by socioeconomic profile – 1 indicator which coded the household income type (B40, M40, T20) as captured through the survey profiling (question S6)
H6 – Socio-economic profile moderates the relationship between physiological well-being and employee productivity	Pass 1: Reliability and validity test between constructs: Reference the description above. No outer loading of the moderator needed assessment as only one indicator was used in the measurement (load factor = 1). Pass 2 (reliability indicators only*): PLS-SEM analysis between: All direct pathways (assigned notation p3) Wellbeing of the employee (IV3) – 2 indicators as above AND Effectiveness while WFH (DV) – 4 indicators as above <i>Moderated</i> by socioeconomic profile – 1 indicator which coded the household income type (B40, M40, T20) as captured through the survey profiling (question S6)

(Source by Authors).

Following this, the moderating variable undergoes testing against each of the three core relationships. This selected moderator variable aims to examine the influence, both in terms of strength and direction, of an employee's socio-economic profile on the relationships between each respective RW independent variable (IV) and their productivity outputs (see [Table 4](#)).

In the initial pass, which resembled previous assessments, the focus was on evaluating the internal consistency of the measurement model. Since the moderator construct consisted of only one measure – a categorical variable representing household income type – there was no need for an outer loading assessment. If the income levels had not been categorised, the moderator would have been treated as a continuous variable instead (Basbeth et al., 2018). Once the measurement model's quality had been confirmed, the analysis shifted to examining the moderating effects of their strength and direction. Again, PLS-SEM was utilised to determine significance and path coefficients, as depicted in [Figure 4](#).

[Table 5](#) presents the results for the moderator constructs. The total effects of the results, as shown in [Table 5](#), indicate insignificant outcomes for all moderated relationships, regardless of their form. The *p* values across all moderated relationships demonstrate this lack of significance.

The PLS-SEM coefficient results indicate that the moderating effect of a worker's socioeconomic profile on organisation support and employee productivity is not significant (*p* value of 0.358). Therefore, no further assessment is required, leading to the rejection of H4. Similarly, the moderating effect of a worker's socioeconomic profile on technology availability and employee productivity is also insignificant (*p* value of 0.364), resulting in the rejection of H5. Additionally, the moderating effect of a worker's socioeconomic profile on employee wellbeing and employee productivity is found to be insignificant (*p* value of 0.647), leading to the rejection of H6. Finally, the mediating effect of 'self-preference to work' is tested across all relationships between IV constructs and DV. This mediator variable aims to examine how the relationship changes when a worker expresses a stronger desire to WFH versus WFO, or vice versa. Essentially, the analysis seeks to understand how organisational support for RW, access to digital infrastructure and well-being affect RW productivity when factoring in an individual's preference for WFH or WFO. This investigation explores whether strong preferences for one work mode influence the relationships differently compared to when preferences are not considered, as indicated by earlier findings.

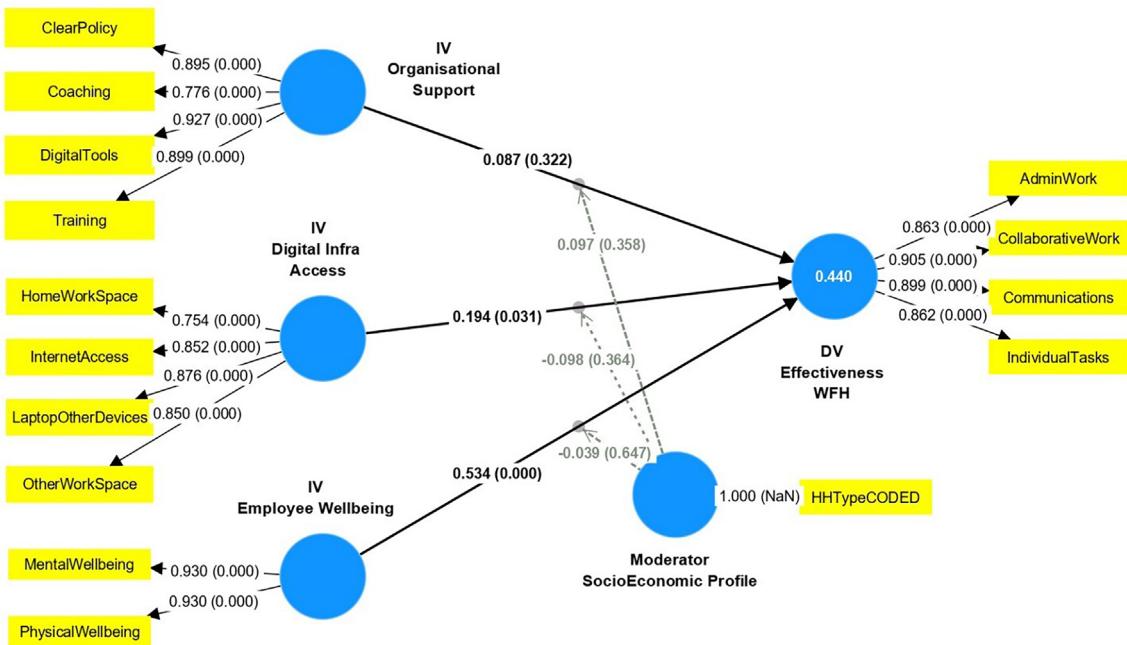


Figure 4. Moderator measurement model. (Source by Authors).

Table 5. Moderating effects – full evaluation.

	Original sample	Sample mean	Standard deviation	T-statistics	p Values
Moderator_SocioEconomic Profile -> DV_Effectiveness_WFH	0.014	0.012	0.074	0.185	0.853
Moderator_SocioEconomic Profile x IV_Organisational_Support -> DV_Effectiveness_WFH	0.097	0.082	0.105	0.918	0.358
Moderator_SocioEconomic Profile x IV_Digital_Infra _Access -> DV_Effectiveness_WFH	-0.098	-0.083	0.108	0.908	0.364
Moderator_SocioEconomic Profile x IV_Employee_Wellbeing -> DV_Effectiveness_WFH	-0.039	-0.043	0.086	0.458	0.647

(Source by Authors).

Finally, the mediating effect of 'self-preference to work' was examined across all relationships between IV constructs and the DV. Table 6 presents the measures for mediating hypothesis statements. The evaluation indicated significant indirect effects on organisational support and employee well-being, while technology availability showed no mediation. Results for the SP to work mediator (WM) (H7) demonstrated a significant indirect effect between the mediator and DV ( $p$  value 0.039). Notably, the examination of the mediator's SP for work reveals a significant indirect effect on the DV in pathway p2 ( $p$  value 0.039). Contrarily, the indirect effects in pathway p1, connecting the IVs to the mediator, exhibit varying results. Specifically, IV1 and IV3 display significance, whereas IV2 emerges as statistically insignificant (refer to Table 6). Consequently, in the topmost level of the flowchart, IV1 and IV3 are directed left, while IV2 is positioned to the right.

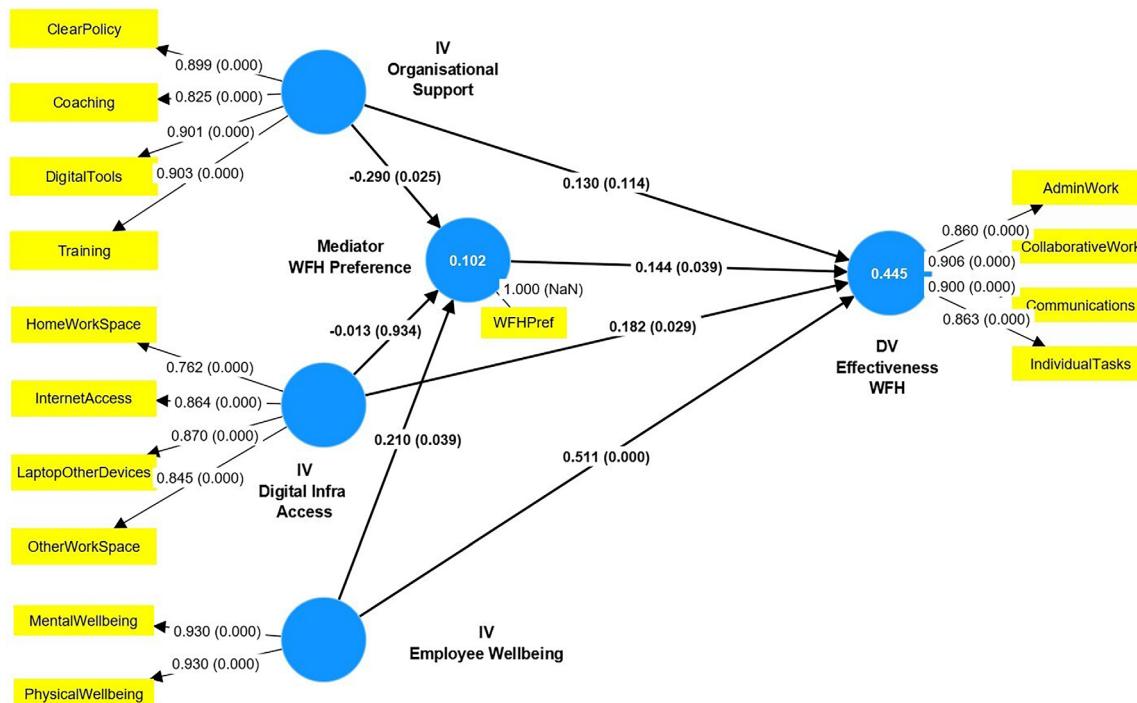
The process of testing the mediating effects involves a series of tests and analyses applied to the earlier core or direct relationships. Similar to previous assessments, the first step is to evaluate the internal consistency of the measurement model. Unlike before, no outer loading assessment is necessary in this case because the mediator construct consists of only one measure. Once the quality of the measurement model has been confirmed, the mediating effects are analysed for their type and strength. Again, the significance and path coefficients are derived using the PLS-SEM methodology (see Figure 5).

Table 7 shows the full evaluation of mediating effects. The results from the PLS-SEM coefficients indicate that the indirect effect (pathway p2) between the mediator, SP to work, and the DV is significant, with a  $p$  value of 0.039. However, the indirect effects (pathway p1) between the IVs and the mediator show different outcomes, with IV1 and IV3 being significant while IV2 is not (see Table 7). As a result, IV1 and IV3 are directed to the left, while IV2 is directed to the right at the topmost level of the flowchart.

**Table 6.** Measures tested and analysed for mediating hypothesis statement.

Hypothesis	Test and analysis
H7 – Worker preference mediates the relationship between remote work and employee productivity	<p>Pass 1: Reliability and validity test between constructs: Reference the description above. No outer loading of the mediator needed assessment as only one indicator was used in the measurement (load factor = 1).</p> <p>Past 2 (reliability indicators only*): PLS-SEM analysis between:</p> <ul style="list-style-type: none"> <li>Direct pathway (assigned notation p3)</li> <li>Support provided by employer (IV1) – 4 indicators as above</li> <li>Technology availability by employee (IV2) – 4 indicators as above</li> <li>Wellbeing of the employee (IV3) – 2 indicators as above</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Effectiveness while WFH (DV) – 4 indicators as above</li> <li>Indirect pathway (assigned notation p1)</li> <li>Support provided by employer (IV1) – 4 indicators as above</li> <li>Technology availability by employee (IV2) – 4 indicators as above</li> <li>Wellbeing of the employee (IV3) – 2 indicators as above</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Self-preference to work (mediator) – 1 indicator which compared the responses of two questions: allowed WFH intensity versus preferred WFH intensity (question A16)</li> <li>Indirect pathway (assigned notation p2)</li> <li>Self-preference to work (mediator) – 1 indicator which compared the responses of two questions: allowed WFH intensity versus preferred WFH intensity (question A16)</li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>Effectiveness while WFH (DV) – 4 indicators as above</li> </ul>

(Source by Authors).

**Figure 5.** Mediator measurement model. (Source by Authors).

Upon assessing the next level of the flowchart, it is found that the direct relationship (p3) of H1 is not significant, whereas H2 and H3 are significant, as discussed earlier. This leads to the conclusion that the SP to work construct fully mediates the relationship between organisational support IV and productivity DV, partially mediates the relationship between employee well-being IV and productivity DV, and does not mediate the relationship between access to digital infrastructure IV and productivity DV.

In essence, the mediating analysis indicates that individuals' SP for work will have a predominant influence, overshadowing any organisational support provided (or lacking) to employees, while it disregards any direct causality between access to digital infrastructure and productivity outcomes. Regarding employee wellbeing, SP will only partially alter the way individuals engage in RW. This conclusion is

**Table 7.** Mediating effects – full evaluation.

	Original sample	Sample mean	Standard deviation	T- statistics	p Values
IV_Digital Infra _Access -> DV_Effectiveness_WFH	0.182	0.192	0.083	2.181	0.029
IV_Digital Infra _Access -> Mediator_WFH Preference	-0.013	-0.018	0.154	0.082	0.934
IV_Employee Wellbeing -> DV_Effectiveness_WFH	0.511	0.508	0.084	6.053	0.000
IV_Employee Wellbeing -> Mediator_WFH Preference	0.210	0.213	0.102	2.063	0.039
IV_Organisational_Support -> DV_Effectiveness_WFH	0.130	0.126	0.082	1.580	0.114
IV_Organisational_Support -> Mediator_WFH Preference	-0.290	-0.289	0.129	2.247	0.025
Mediator_WFH Preference -> DV_Effectiveness_WFH	0.144	0.142	0.070	2.063	0.039

(Source by Authors).

**Table 8.** Results for all hypothesis statements.

Hypothesis	Results
<b>H1</b> – Organisation support has a strong impact on employee productivity	Rejected – Measuring <i>organisation support</i> and <i>employee productivity</i> resulted in a <i>p</i> value of 0.09 and a standardised coefficient of 0.12
<b>H2</b> – Technology availability has a medium effect on employee productivity	Supported – Measuring <i>technology access</i> and <i>employee productivity</i> resulted in a <i>p</i> value of 0.029 and a standardised coefficient of 0.171
<b>H3</b> – Wellbeing has a profound influence on employee productivity	Supported – Measuring <i>well-being</i> and <i>employee productivity</i> resulted in a <i>p</i> value of 0.00 and a standardised coefficient of 0.53
<b>H4</b> – Socio-economic profile influence the relationship between organisational support and employee productivity	Rejected – Moderating effects of a worker's <i>socioeconomic profile</i> on <i>organisation support</i> and <i>employee productivity</i> is insignificant ( <i>p</i> value of 0.358)
<b>H5</b> – Socio-economic profile affects the relationship between technology availability profile and employee productivity	Rejected – Moderating effects of a worker's <i>socioeconomic profile</i> on <i>technology access</i> and <i>employee productivity</i> is insignificant ( <i>p</i> value of 0.364)
<b>H6</b> – Socio-economic profile moderates the relationship between well-being and employee productivity	Rejected – Moderating effects of a worker's <i>socioeconomic profile</i> on <i>employee wellbeing</i> and <i>employee productivity</i> is insignificant ( <i>p</i> value of 0.647).
<b>H7</b> – Worker preference mediates the relationship between remote work and employee productivity	Supported – Mediating effects only on <i>wellbeing</i> (partial), and on <i>organisation support</i> (full) towards <i>work productivity</i> . No mediating effects were found between <i>technology access</i> and <i>productivity</i>

(Source by Authors).

consistent with the statistical trends and logical interpretation of the relationships between all three IVs and the DV. Therefore, H7 receives support from these findings.

To conclude, the hypotheses proposed at the beginning of this study underwent thorough examination, resulting in diverse findings. The summarised outcomes for each hypothesis are presented in **Table 8**. In brief, the hypotheses produced a range of results. Organisational support (H1) was not supported, whereas technology availability (H2) and employee well-being (H3) were validated. Socioeconomic profile exhibited no significant moderating effects (H4, H5 and H6), while worker preference was observed to mediate the relationships in distinct ways (H7).

According to Werbeloff (2023), the core components of research, including aims, questions, and objectives, should remain interconnected from inception to conclusion, forming a cohesive narrative. This study aimed to investigate the relationship between RW and employee productivity, with a focus on uncovering causal links across various constructs identified through the literature review process. At its broadest level, the goal was to contribute to discussions on optimising RW practices for organisations, challenging the prevalent assumption that productivity decreases with RW and advocating for progressive workforce environments in Malaysia. The research objectives were successfully achieved. These objectives included establishing a framework for assessing RW's impact on productivity, identifying relevant variables impacting employee productivity in RW settings, defining measurement models for these variables, and examining how workers' backgrounds, environments or profiles influence their productivity.

Contrary to managers' default belief that RW leads to reduced productivity, survey respondents reported higher productivity levels when working from the office compared to RW. Further analysis revealed that individual tasks were more efficiently performed in remote settings, while administrative, collaborative and communication tasks were better executed in office environments. Despite the confirmation of reduced overall productivity in RW settings, the study provided valuable insights. First, it confirmed the permanence of RW as a trend, driven by factors such as work-life balance considerations and shifts in workforce demographics. Second, it highlighted the tangible benefits of flexible work arrangements for organisations, such as access to a broader talent pool. Third, it identified actionable areas for improvement to mitigate productivity challenges associated with RW. The study identified organisational support, access to digital infrastructure and employee well-being as key factors influencing remote workers' productivity. While organisational support and employee well-being significantly impacted productivity, access to digital infrastructure did not show a significant effect. These findings suggest that policymakers and organisations should prioritise support for employee well-being and organisational initiatives. Furthermore, the analysis explored the role of socioeconomic profiles and SP to work as potential moderators and mediators. Although the moderating analysis yielded insignificant results, the mediating analysis revealed significant effects of well-being and organisational support on productivity through SP to work. Lastly, the study shed light on the perceived benefits of RW, such as increased focus, flexible scheduling for work-life balance and reduced commute times. Collaboration was identified as the primary benefit of working from the office, followed by work-life segregation and access to effective infrastructure. Overall, the study met its objectives, offering valuable empirical evidence to enhance understanding in the underexplored domain of RW and productivity. The findings, particularly regarding worker well-being and SP to work, contribute significantly to the discourse on this topic, warranting further research continuation.

## 5. Conclusion

This study, which involved stringent sample selection resulting in 105 accepted participants, comprised individuals evenly distributed across genders and representing various generations. Predominantly, the participants were married with household incomes above B40 and occupied desk-bound positions in large, multinational firms within the services sector. The research delved into the relationships between organisational support, technology availability, employee well-being and employee productivity. Organisational support exhibited a positive but non-significant impact on employee productivity. This finding contradicts with the studies conducted by Eisenberger et al. (2020) and Errichiello and Pianese (2021). Future studies should explore this further. Nevertheless, the finding maybe as, such as the population of the studies were not similar: Eisenberger et al. (2020) study was conducted in the USA while Errichiello and Pianese (2021) was based on a case study on an Italian IT multinational. Both technology availability and employee well-being showed a positive and significant influence on employee productivity.

This paper further delved into the moderating effect of socioeconomic profiles and the mediating effect of SP to work. Socioeconomic profiles were found not to moderate relationships between IVs and productivity. SP to work emerged as a mediator, influencing the relationship between organisational support and productivity and partially mediating the connection between employee well-being and productivity. This is supported by Abraham Maslow's (1943) proposition of the 'hierarchy of needs,' emphasising fulfilling innate human needs leading to self-actualisation (Maslow, 1943). Diverse research findings on WFO versus WFH productivity presented a nuanced perspective, leaning towards WFO. However, variable breakdowns challenge sweeping statements on either side.

Recommendations include firms acknowledging the permanence of RW, adopting a hybrid approach, and investing in RW factors. Firms must provide effective organisational support, i.e. providing resources, assistance and care for employees to help them increase productivity. Clear communication, training, equitable procedures, acknowledgement and emotional support are all part of this. Employee well-being, motivation and job happiness are all improved by strong organisational support, which also increases overall performance and productivity.

A shift towards measuring productivity based on output and trust is advised. For remote workers, engaging in open discussions with employers about preferences and recognising the importance of building trust over time is crucial. Understanding that managers prioritise productive output over the location and timing of work is emphasised. Policy recommendations urge policymakers to encourage and incentivise flexible work arrangements, address global talent retention challenges and consider policies supporting the benefits of RW.

One limitation of the study is the potential for sampling bias despite the stringent sample selection process. The participants were predominantly married individuals with household incomes above the B40 threshold, employed in desk-bound positions within large, multinational firms. This demographic composition may not fully represent the broader population, particularly those in different socioeconomic brackets, employment sectors, or marital statuses. Consequently, the findings may not be generalisable to a wider range of individuals, limiting the study's external validity. One recommendation to address this limitation is to diversify the participant pool by actively recruiting individuals from various socioeconomic backgrounds, employment sectors and marital statuses. This can be achieved through targeted outreach efforts, such as partnering with organisations representing diverse demographics or utilising online platforms to reach a wider audience. By including a more diverse sample, the study can enhance its external validity and provide insights that are more applicable to a broader range of individuals. A second limitation of the study is the number of responses analysed: only 105. Although the number may not allow the findings to be generalised, future work could replicate with larger samples to validate the findings.

Additionally, conducting follow-up studies with different participant demographics can help validate and expand upon the findings. In addition, future studies should adopt the longitudinal approach as it would allow researchers to examine how organisational support, technology availability, employee well-being and productivity dynamics vary across different population segments over time. Besides that, future studies should incorporate qualitative research methods, such as interviews or focus groups, as the qualitative approach can provide deeper insights into the experiences and perspectives of participants from diverse backgrounds. Furthermore, researchers should consider exploring potential cultural or contextual factors that may influence the relationships between the study variables. This could involve conducting cross-cultural studies to compare findings across different regions or countries, considering cultural norms, organisational practices and societal values. By considering these factors, the study can offer more nuanced recommendations that are sensitive to diverse cultural contexts and better inform organisational policies and practices.

This study resulted in the creation of a suitable framework and measurement model that can be reused, or further developed, to advance the understanding of how to manage the RW megatrend that shall remain relevant for the current and foreseeable future. The findings imply that RW can increase employees' productivity but organisations must be willing to invest in technology (to ensure it is readily available and accessible, foster supportive environments and align practices with individual preferences. Adapting to the evolving workforce needs is crucial for successful RW implementation.

### **Author contribution statement**

The corresponding author, Ainin Sulaiman was responsible for conceptualising the study, finalising the draft, and submitting the article to the journal. The co-authors made significant contributions to the research and writing of the article. Barry Seng Wang Lim is responsible in data collection and data analysis, Nadisah Zakaria is responsible to write introduction, literature review and Siong Min Foo is responsible in writing methodology, analysis and conclusion. The authors also share responsibility and accountability for the results presented in the published research. All authors have read and approved the final work.

### **Disclosure statement**

No potential conflict of interest was reported by the author(s).

## Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## About the authors

**Barry Seng Wang Lim** received his Bachelor of Science with Honours from the University of Greenwich, UK in 2003. He subsequently held multiple positions with both public and private sectors across fields of technology, financial services and management consulting. He further obtained a Master of Business Administration (MBA) at the University of Malaya-Wales and is currently pursuing a PhD from the same university in the areas of economic productivity and business. Barry's research interests are in the domains of business, international trade, socioeconomics, and public policy.

**Sulaiman Ainin** is currently attached to the Faculty of Business, International University of Malaya-Wales. Prior to that she was with Universiti Malaya for thirty years. She obtains her PhD from University of Birmingham, UK. Her research interests include, Technology Adoption, Performance, ICT, Social Media, Big data, Halal, and social economic impact.

**Nadisah Zakaria** is an accomplished scholar and educator with extensive experience in finance and business. Her dedication to research, teaching, and program development has made her a valuable asset to various institutions and organisations in Malaysia, Saudi Arabia, and the United Kingdom. Dr. Nadisah's research interests encompass corporate finance, corporate restructuring, mergers and acquisitions, as well as pricing and mispricing of assets. She has received recognition for her work, including a prestigious studentship for her Ph.D. studies. With a strong commitment to academia and a wealth of experience, Dr. Nadisah Zakaria continues to contribute significantly to the field of finance.

**Siong Min Foo** has extensive experience in finance and corporate management, and he obtained PhD in finance. Previously, he worked as a Vice President at Makto Capital Management Limited in Hong Kong, where he structured, originated, and advised on transactions related to public and private equity and debt investments. He also worked as a Vice President - Research at Ping An China Securities (Hong Kong) Company Limited, where he focused on cross-border M&A, corporate finance activities, and IPOs across Asia.

## ORCID

Sulaiman Ainin  <http://orcid.org/0000-0002-8989-712X>

## Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. However, due to ethical, privacy and security concerns, certain data cannot be shared publicly.

## References

- Al-Dmour, H., Al Hasan, R., Thneibat, M., Masa'deh, R., Alkhadra, W., Al-Dmour, R., & Alalwan, A. (2023). Integrated model for the factors determining the academic's remote working productivity and engagement: Empirical study. *Sage Open*, 13(3). <https://doi.org/10.1177/21582440231194393>
- 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. <https://doi.org/10.1177/1529100615593273>.
- Anakpo, G., & Mishi, S. (2022). Hesitancy of COVID-19 vaccines: Rapid systematic review of the measurement, predictors, and preventive strategies. *Human Vaccines & Immunotherapeutics*, 18(5), 2074716. <https://doi.org/10.1080/21645515.2022.2074716>
- Anakpo, G., Nqwayibana, Z., & Mishi, S. (2023). The impact of work-from-home on employee performance and productivity: A systematic review. *Sustainability*, 15(5), 4529. <https://doi.org/10.3390/su15054529>
- APO. (2018). *Asian economy and productivity map*. Asian Productivity Organization (APO).
- Apsalone, M., Dukeov, I., Baumane-Vitolina, I., Sumilo, E., & Berke-Berga, A. (2017). *New challenges of economic and business development – digital economy*. University of Latvia.
- ASEAN & ASEAN. (2021). Regional study on labour productivity in ASEAN. Jakarta: Association of Southeast Asian Nations.
- Austin-Egole, I. S., Iheriohanma, E. B., & Nwokorie, C. (2020). Flexible working arrangements and organizational performance. *Journal of Humanities and Social Science*, 25, 50–59. <http://doi.org/10.9790/0837-2505065059>

- Basbeth, F., Bin Razik, M., & Ibrahim, M. (2018). *Four hours basic PLS-SEM A step by step guide with video clips for student*. iPRO Publication.
- Berger, C. (2023). Twitter employees woke up to a 2:30 a.m. email from Elon Musk: 'The office is not optional'. Fortune. <https://fortune.com/2023/03/24/return-to-office-elon-musk-twitter-tesla-layoffs/>
- Bloom, N., Liang, J., Roberts, J., & Ying, Z. J. (2015). Does working from home work? Evidence from a Chinese experiment. *The Quarterly Journal of Economics*, 130(1), 165–218. <https://doi.org/10.1093/qje/qju032>
- BNM. (2013). Circular on new definition of small and medium enterprises (SMEs). Bank Negara Malaysia.
- Bureau of Labor Statistics. (2023). *Productivity and cost*. US Department of Labor. Bureau of Labor Statistics.
- Chung, H., & van der Lippe, T. (2018). *Flexible working, work-life balance, and gender equality*. Social Indicators Research.
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78(1), 98–104. <https://doi.org/10.1037/0021-9010.78.1.98>
- Dockery, A., & Bawa, S. (2014). Is working from home good work or bad work? Evidence from Australian employees. *Australian Journal of Labour Economics*, 17, 163–190. <https://search.informit.org/doi/10.3316/informit.746092618289790>
- Donati, S., Viola, G., Toscano, F., & Zappalà, S. (2021). Not all remote workers are similar: Technology acceptance, remote work beliefs, and wellbeing of remote workers during the second wave of the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, 18(22), 12095. <https://doi.org/10.3390/ijerph182212095>
- DOSM. (2008). *The Malaysia standard industrial classification 2008*. MSIC Department of Statistics.
- DOSM. (2020). *Household income & basic amenities survey report 2019*. Department of Statistics.
- Eisenberger, R., Rhoades Shanock, L., & Wen, X. (2020). Perceived organizational support: Why caring about employees counts. *Annual Review of Organizational Psychology and Organizational Behavior*, 7(1), 101–124. <https://doi.org/10.1146/annurev-orgpsych-012119-044917>
- Errichello, L., & Pianese, T. (2021). *Handbook of research on remote work and worker well-being in the post-COVID-19 era*. IGI Global Publication.
- Fernandez, J., Lee, J., & Landis, K. (2023, January 18). *Helping gen Z employees find their place at work*. Harvard Business Review. <https://hbr.org/2023/01/helping-gen-z-employees-find-their-place-at-work>
- Ganster, D. C., & Rosen, C. C. (2013). *Work stress and employee health: A multidisciplinary review*. Southern Management Association.
- Gibbs, M., Mengel, F., & Siemroth, C. (2021). *Work from home & productivity: Evidence from personnel & analytics data on IT professionals* (pp. 2021–2056). University of Chicago, Becker Friedman Institute for Economics Working Paper.
- Golden, L. (2012). *The effects of working time on productivity and firm performance: A research synthesis paper*. International Labour Organisation.
- Gomez, K., Mawhinney, T., & Betts, K. (2018). *Welcome to generation Z*. Deloitte LLP.
- Gqoboka, H., Anakpo, G., & Mishi, S. (2022). Challenges facing ICT use during COVID-19 pandemic: The case of small, medium and micro enterprises in South Africa. *American Journal of Industrial and Business Management*, 12(09), 1395–1401. <https://doi.org/10.4236/ajibm.2022.129077>
- Gupta, A. (2020). *The history of remote work: How it came to be what it is today. Sorry, I Was on Mute*. <https://www.sorryonmute.com/history-remote-work-industries/>
- Hashim, R., Bakar, A., Noh, I., & Mahyudin, H. A. (2020). Employees' job satisfaction and performance through working from home during the pandemic lockdown. *Environment-Behaviour Proceedings Journal*, 5(15), 461–467. <https://doi.org/10.21834/ebpj.v5i15.2515>
- Hinge Health. (2020). *New health risks of the remote workplace*. Hinge Health, Inc.
- Ilag, B. N. (2021). Tools and technology for effective remote work general terms. *International Journal of Computer Applications*, 174(21), 13–16. <https://doi.org/10.5120/ijca2021921109>
- IWG. (2022). *The future of work: A trends forecast for 2022*. IWG Plc.
- Kay, G. (2023). *Amazon employees reportedly plan to walk off the job over its return-to-office mandate and layoffs*. Business Insider: <https://www.businessinsider.com/amazon-staff-plan-walk-off-job-return-to-office-report-2023-5>
- Kelly, J. (2023). *While CEOs blame remote work for decreased productivity, here's the bigger picture*. Forbes: <https://www.forbes.com/sites/jackkelly/2023/05/19/while-ceos-blame-remote-work-for-decreased-productivity-heres-the-bigge-r-picture/?sh=6897362c7b84>
- Kitagawa, R., Kuroda, S., Okudaira, H., & Owan, H. (2021). Working from home and productivity under the COVID-19 pandemic: Using survey data of four manufacturing firms. *PLoS One*, 16(12), e0261761. <https://doi.org/10.1371/journal.pone.0261761>
- Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., Bamberger, P., Bapuji, H., Bhave, D. P., Choi, V. K., Creary, S. J., Demerouti, E., Flynn, F. J., Gelfand, M. J., Greer, L. L., Johns, G., Kesebir, S., Klein, P. G., Lee, S. Y., ... Vugt, M. V. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *The American Psychologist*, 76(1), 63–77. <https://doi.org/10.1037/amp0000716>
- Makarius, E. E., Larson, B. Z., & Vroman, S. R. (2021). What is your organization's long-term remote work strategy. *Harvard Business Review*, 123, 568–579. <https://hbr.org/2021/03/what-is-your-organizations-long-term-remote-work-strategy>

- Maloney, W. F. (2021). *The world bank productivity project* ( Vol. 4). World Bank.
- Maslow, A. H. (1943). *A theory of human motivation*. Psychological Review.
- McEwen, B., & Stellar, E. (1993). *Stress and the individual. Mechanisms leading to disease*. Arch Internal Me.
- McKinsey & Company. (2022). *Americans are embracing flexible work—and they want more of it*. McKinsey & Company. <https://www.mckinsey.com/industries/real-estate/our-insights/americans-are-embracing-flexible-work-and-they-want-more-of-it#/>
- Nayyar, G., Hallward-Driemeier, M., & Davies, E. (2021). *At your service? The promise of services-led development*. World Bank Group.
- Nilles, J. (1994). *Making Telecommuting Happen: A Guide for Telemanagers and Telecommuters*.
- OECD. (2001). *Measuring productivity -OECD manual: Measurement of aggregate and industry level productivity growth*. OECD Publishing. <https://doi.org/10.1787/9789264194519-en>
- Olawale, O., Ajayi, F. A., Udeh, C. A., & Odejide, O. A. (2024). Remote work policies for IT professionals: Review of current practices and future trends. *International Journal of Management & Entrepreneurship Research*, 6(4), 1236–1258. <https://doi.org/10.51594/ijmer.v6i4.1056>
- Organisation for Economic Co-operation and Development. (2020). *Productivity gains from teleworking in the post COVID-19 era: How can public policies make it happen*. OECD Publishing.
- Phillips, S. (2020). Working through the pandemic: Accelerating the transition to remote working. *Business Information Review*, 37(3), 129–134. <https://doi.org/10.1177/0266382120953087>
- Pradnya, T., Chakravorty, C., & Chandra, R. (2024). Factors influencing productivity in remote working an analysis of IT sector employees. *International Journal of Advances in Engineering and Management*, 6(1), 157–165. <https://doi.org/10.35629/5252-0601157165>
- PwC. (2022). *Global workforce hopes and fears survey*. PricewaterhouseCoopers International.
- Rüdinger, J. (2024). Factors influencing productivity when working from home [Unpublished master's thesis]. Johannes Kepler University Linz. <chrome-extension://efaidnbmnnibpcajpcglclefindmkaj/https://epub.jku.at/obvulihs/download/pdf/9792497>. Accessed on January
- Russell, A., & Frachtenberg, E. (2021). *After the pandemic: Tech, work, and the tech workforce*. EEE Computer.
- Sharpe, A., & Fard, S. M. (2022). *The current state of research on the two-way linkages between productivity and well-being*. International Labour Organization.
- Sinkovics, R., & Ghauri, P. (2009). *New challenges to international marketing*. Emerald Publishing Limited.
- SMECorp. (2022). *SME definitions*. SME Corporation Malaysia: <https://www.smeCorp.gov.my/index.php/en/policies/2020-02-11-08-01-24/sme-definition>
- Suratkon, A., & Azlan, A. (2021). *Working from home (WFH): Challenges and practicality for construction professional personnel*. University Tun Hussein Onn Malaysia Publisher's Office.
- Thorstensson, E. (2020). *The influence of working from home on employees' productivity – Comparative document analysis between the years 2000 and 2019–2020*. Karlstad University.
- Tumin, S. A. (2020). *Covid-19 and work in Malaysia: How common is working from home*. Khazanah Research Institute.
- Urbaniec, M., Małkowska, A., & Włodarkiewicz-Klimek, H. (2022). The impact of technological developments on remote working: Insights from the Polish managers' perspective. *Sustainability*, 14(1), 552. <https://doi.org/10.3390/su14010552>
- Vinzi, V., Chin, W., & Hense, J. (2010). *Handbook of partial least squares*. Springer.
- Werbelloff, M. (2023). *How strong is the golden thread of your thesis?* STATS AUNTIE: <https://statsauntie.com/how-strong-is-the-golden-thread-of-your-thesis/>