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Employee Perceptions, Proximity Bias, and Performance Evaluation in Hybrid Work: The Quasi-Moderating Role of Work Flexibility and Virtual Interaction

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Abstract

The development of hybrid work systems has brought about new dynamics in employee performance appraisal. This study aims to analyze the effect of employee perceptions of hybrid work (PK) and proximity bias (PB) on performance evaluation (EK), with work flexibility and virtual interaction (FI) as moderating and mediating variables. The study used three regression models, namely Model 1 (direct effect), Model 2(additional moderation), and Model 3 (interaction test), followed by a mediation test.The results showed that in Model 1,PK (0.437) and PB (0.369) had a positive and significant effect on EK. In Model 2, the addition of the FI variable produced a positive and significant effect on EK (PK = 0.110; PB = 0.290; FI = 0.440). Model 3 found that PK,PB, and FI remained positively and significantly influential (PK = 0.140; PB = 0.264; FI= 0.503), with the interaction PKFI strengthening the effect of PK on EK (0.346),while the interaction PBFI weakens the effect of PK on EK(-0.363). The mediation test shows that FI acts as a quasi-moderatorand mediator in the relationship between PK and PB on EK.These findings confirm that in the context of hybrid work, work flexibility and virtual interaction not only clarify performance evaluation but can also reduce the effect of physical presence bias(proximity bias). This research has implications for human resource management strategiesin designing fair and productive hybrid work policies.

INTRODUCTION

The changing work landscape in the wake of the COVID-19 pandemic has given rise to a new work model known as hybrid work, which combines working from the office (WFO), working from home (WFH), and even working from anywhere (WFA). This model offers greater flexibility to employees and has been widely adopted by various types of organizations as a strategy to increase productivity, promote cost efficiency, and achieve work-life balance. However, this change also poses new challenges for performance evaluation, especially given the emergence of proximity bias. It was proven that there was a significant demand for the continuation of remote work (Taneja et al., 2021). Adding to this preference is a desire to improve work-life balance (Eurofund, 2022), spend more time with family and reduce commuting (Chung et al., 2020). The majority of employees indicated a preference for a hybrid work arrangement, which is a combination of office and remote working (Barrero et al., 2021)

Proximity bias is the tendency of managers or superiors to give more positive assessments to employees who are physically present in the office more often than those who work remotely, even though their contributions and work quality are equal. This bias not only has the potential to

cause unfairness in performance assessments but also affects job satisfaction, motivation, and even long-term talent retention.

On the other hand, work flexibility and effective virtual interactions are believed to reduce the negative impact of proximity bias. When organizations build a hybrid work system that supports digital collaboration, transparent communication, and outcome-based performance appraisal, performance assessments become more objective and fair. The rapid transformation of work arrangements driven by digitalization and post-pandemic organizational restructuring has introduced hybrid work as a dominant model across industries. While hybrid work offers flexibility and autonomy, it also creates new challenges for organizations, particularly in ensuring fair and accurate performance evaluations. Traditional evaluation systems—historically designed around physical presence—are increasingly incompatible with dispersed and digitally connected workforces. Consequently, issues such as inconsistent supervisor perceptions, reliance on visibility rather than output, and the potential rise of proximity bias have become central practical and theoretical concerns in modern human resource management. These challenges underscore the need to understand how employee perceptions of hybrid work and managerial biases shape performance evaluation in contemporary organizational settings.

However, research on how perceptions of hybrid work and proximity bias affect performance evaluations, as well as how work flexibility and virtual interactions can serve as moderating factors, remains limited, especially in the context of organizations in developing countries such as Indonesia. Most previous studies have focused solely on the benefits of hybrid work or its technological challenges, without delving deeper into organizational behaviour and the dynamics of managerial bias in the performance appraisal process.

Hybrid work systems are more often applied to urban workers, especially those who are tech-savvy, namely Generation Y (millennials) and Generation Z (zoomers), especially if their work base is in the digital industry, start-ups, online education, and creative services. They have high technological adaptability, so using various virtual communication platforms, such as Zoom, Slack, Google Meet, and others, has become part of their daily routine. In addition, this generation is often vocal about issues of fairness, transparency, and meritocracy in the workplace. The emphasis on work-life balance, which is closely related to work flexibility, is often a consideration for them when choosing a job. The main distinction between virtual and traditional, in-person teams lies in the need for physical presence. In conventional teams, individuals from various cities or countries must gather in the same location to collaborate directly (Orta-Castañon et al., 2018). In contrast, virtual collaboration involves relying on information and communication technologies to facilitate interaction and joint work among participants (Hossain & Wigand, 2003).

Recent studies have attempted to explore various aspects of hybrid work and its implications for employee performance and managerial assessment. Prior research highlights that hybrid work can enhance productivity, work–life balance, and autonomy when supported by adequate communication and digital infrastructure. Baker (2002) mentioned that technological collaboration tools influence employee effectiveness and managerial decision-making. At the same time, emerging evidence indicates that proximity bias—defined as the tendency of managers to favor employees who are physically present—remains prevalent even in hybrid and remote environments. Despite the shift toward outcome-based performance systems, several scholars argue that managers often subconsciously associate visibility with commitment and competence. Furthermore, research has shown that work flexibility and digital interaction patterns significantly

shape employee engagement and performance outcomes. Collectively, these studies demonstrate valuable progress, but they reveal important limitations.

A critical examination of the existing literature shows that most studies treat hybrid work, proximity bias, and performance evaluation as isolated constructs. Only a limited number of empirical works have examined how these factors interact simultaneously within a unified analytical model. Moreover, while flexibility and virtual collaboration have been studied as independent predictors of performance, their potential role as mediators or moderators in the relationship between hybrid work perceptions, proximity bias, and performance evaluation remains underexplored. Enhancing different aspects of team interdependence is also important for virtual teams, as it helps strengthen members' sense of belonging (Spitzmuller et al., 2023). At the team level, challenges related to collaboration, communication, and performance oversight by supervisors and managers become particularly critical (Gifford, 2022;. Additionally, teams must address the distinct difficulties of coordinating work in hybrid settings, where communication channels vary. In such arrangements, members collaborate both face-to-face and through digital platforms, making it essential to establish clear procedures and shared norms (Kaiser et al., 2022). Assume that managerial bias diminishes in digital environments, yet empirical evidence demonstrates that bias persists and may manifest differently depending on frequency of interaction and visibility. Thus, there is a theoretical and empirical gap in understanding how work flexibility and virtual interaction shape, strengthen, or weaken the influence of employee perceptions and proximity bias on performance outcomes within a hybrid workforce context.

Based on these gaps, the present study seeks to answer the following research question: How do employee perceptions of hybrid work and proximity bias influence employee performance evaluation, and what role do work flexibility and virtual interaction play as quasi-moderation and mediation mechanisms in these relationships? Accordingly, the objectives of this research are to analyze (1) the direct effects of hybrid work perceptions and proximity bias on performance evaluation, (2) the moderating influence of work flexibility and virtual interaction, and (3) the mediating role of these variables in clarifying the dynamics between perceptions, bias, and performance outcomes. The novelty of this study lies in its integration of hybrid work perceptions, proximity bias, and performance evaluation into a single conceptual framework, while simultaneously testing work flexibility and virtual interaction as quasi-moderator–mediator variables—an approach that has been largely absent in prior research. This contribution provides new insights for developing fair, objective, and output-based performance management strategies in hybrid work environments.

Considering the above, determining the research location is also an integral part of ensuring that the findings are representative and generalizable. The city of Jakarta and surrounding satellite cities known as Jabodetabek (Jakarta, Bogor, Depok, Tangerang, Bekasi) seems well positioned to describe this, given that many millennials and Gen Zers live there. Most of them are educated workers who work in various formal and informal sectors with a significant hybrid work system.

METHODS

This study employed a quantitative research design to examine the influence of employee perception of hybrid work and proximity bias on performance evaluation, with work flexibility and

virtual interaction serving as both moderating and mediating variables. A survey method was used as the primary approach for collecting empirical data from employees working under various work arrangements. The analysis model applied in this study is Moderated Regression Analysis (MRA), which is suitable for testing whether work flexibility and virtual interaction strengthen, weaken, or alter the direction of the relationship between the independent variables and performance evaluation. This design was selected because it allows for a rigorous examination of complex interaction effects while also enabling the use of mediation testing within the same analytical framework.

The population in this study consisted of employees from multiple departments within organizations that have implemented hybrid or flexible work systems. A total of 272 respondents participated in the study using a purposive sampling technique. The inclusion criteria required respondents to have experience working under hybrid, WFO, WFH, or WFA settings. This sampling approach was considered appropriate because the research variables—work flexibility, perception of hybrid work, and virtual interaction—can only be meaningfully measured among individuals familiar with such work arrangements. The sample size also met the adequacy standard for quantitative studies using MRA and Structural Equation Modeling (SEM-PLS), ensuring reliable estimation of model parameters.

Data were collected through an online questionnaire distributed via organizational communication channels. The instrument was developed based on validated measurement scales from previous studies related to hybrid work, proximity bias, work flexibility, virtual interaction, and performance evaluation. Each construct was measured using multiple indicators on a Likert scale ranging from strongly disagree to strongly agree. Prior to the full distribution, the questionnaire was pre-tested to ensure clarity, readability, and reliability. Indicators were refined based on respondent feedback and expert judgment in human resource management and organizational psychology. The final instrument demonstrated strong validity and reliability, with Cronbach's Alpha and Composite Reliability values exceeding the recommended threshold of 0.70 and AVE values above 0.50.

RESULTS AND DISCUSSION

Respondent Characteristics

Table 1 shows the demographics of the 272 research respondents based on the following characteristics:

Atribut	Value	Frequency	Percentage
Gender	Male	105	38,61%
	Female	167	61,39%
Age/Generation	Z (20 – 28 years old)	113	41,55%

	Y (29 – 44 years old)	159	58,45%
Education	Highschool and below	17	6,25%
	College	39	14,33%
	Undergraduate	127	46,70%
	Graduate Degree or more	89	32,72%
Length of Employment	Less than 1 year	36	13,23%
	1 – 3 years	43	15,80%
	4 – 6 years	115	42,27%
	More than 6 years	78	28,70%
Department	Human Resource	47	17,28%
	Administration, Finance, dan Accounting	36	13,23%
	Operational/Production	29	10,67%
	Sales and Marketing	21	7,72%
	Logistik/Supply Chain	19	6,99%
	Information Technology	15	5,51%
	Health, Safety, and Environment	9	3,30%
	Procurement/Purchasing	17	6,26%
	Others	79	29,04%
Work Model	WFO (Work From Office)	202	74,26%
	WFH (Work From Home)	16	5,88%
	WFA (Work From Anywhere)	29	10,67%
	Hybrid	25	9,19%

Based on the characteristics of the respondents, the majority were women (61.39%), with a predominance of Generation Y aged 29–44 years (58.45%), indicating that the respondents were in their mature, productive years. In terms of education, most of them held a bachelor's degree (46.70%) and a postgraduate degree (32.72%), indicating that the quality of human resources in this study was relatively high. The respondents' work experience was also quite diverse, with the largest group having 4–6 years of experience (42.27%), followed by those with more than 6 years (28.70%), reflecting the perspectives of employees with medium to long experience. Respondents came from various departments, with the highest proportion in the "other" category (29.04%), followed by HR (17.28%) and administration, finance, and accounting (13.23%), indicating cross-functional representation within the organization. Regarding work models, the majority of respondents still use the conventional Work From Office model (74.26%). However, some have implemented hybrid (12.88%), Work From Anywhere (6.98%), and Work From Home (5.88%) models, showing a trend towards the adoption of flexible working, although it is not yet dominant.

Construct Validity and Reliability

The data collected from respondents through questionnaires was then processed using SmartPLS4 statistical software. The results of the validity and reliability tests are shown in the following table:
Construct Validity and Reliability Table

Variable	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
EK	0,969	0,971	0,973	0,763
FI	0,963	0,968	0,967	0,662
PK	0,954	0,958	0,960	0,648
PB	0,948	0,969	0,955	0,679

Source: Construct Reliability and Validity (SmartPLS4, 2025)

The validity and reliability test results indicate that all indicators have loadings> 0.70. The AVE value for each construct is also greater than 0.50, thus meeting the convergent validity requirement. The reliability test shows that Cronbach's Alpha and Composite Reliability for each construct are above 0.70; thus, it can be concluded that all constructs are reliable.

Data Processing Results

Table

Variable	Model 1	Model 2	Model 3
Employee Percepetion (PK)	0,437***	0,110	0,140
Proximity Bias (PB)	0,369***	0,290***	0,264***
Flexibility dan interaction (FI)		0,440***	0,503***
Employee Perception* Flexibility and Interaction (PK*FI)			0,346***
Proximity Bias* Flexibility and interaction (PB*FI)			-0,363**
R-Square	0,447	0,508	0,649
F-Stat			

Model 1 (Basic Regression/Multiple Linear Regression)

The independent variables, employee perception (PK) and proximity bias (PB), are hypothesised to influence performance evaluation (EK). Model 1 found that PK and PB had positive, significant effects on EK, with coefficients of 0.437 and 0.369, respectively. These findings indicate that the more positive employees' perceptions of hybrid work are, the higher their performance evaluations will be. In addition, employees who are physically present and actively involved in the office tend to improve the performance evaluations of high-performing employees.

Model 2 (Regression with added moderation)

In the second model, there is an addition of moderating variables, namely work flexibility and virtual interaction (FI), which are suspected to influence performance evaluation directly. Model 2 produced a positive and significant effect of all independent variables, including the additional moderation variables, on the respective dependent variables: 0.110 PK, 0.290 PB, and 0.440 FI. The addition of moderation variables that directly affect EK shows that increasingly flexible work, accompanied by intense virtual interaction, makes performance evaluation assessments clearer.

Model 3 (Interaction Test)

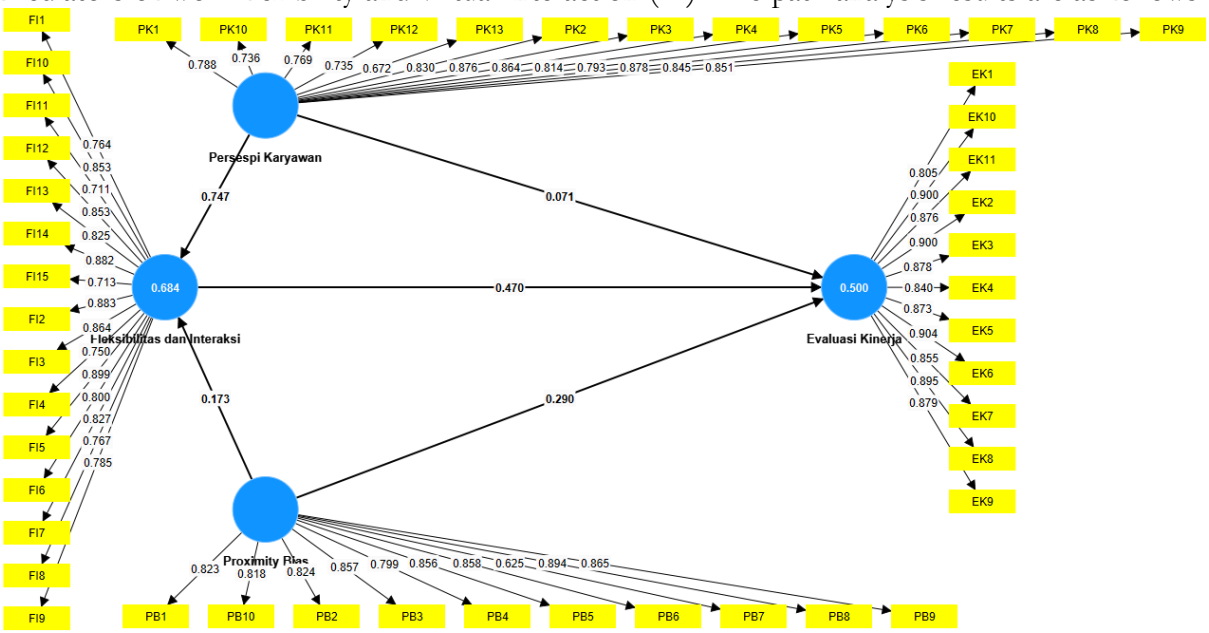
Based on the interaction test results, there are several findings that (1) all independent variables (PK, PB, FI) have a positive and significant effect of 0.140 PK, 0.264 PB, and 0.503 FI on EK, respectively; (2) the effect of employee perceptions of hybrid work on performance evaluation can be strengthened by the presence of a moderating variable (FI) of 0.346; (3) however, at the same time, the effect of proximity bias on performance evaluation is weakened by the presence of a moderating variable (FI), which is negative at 0.363.

Considering that FI, as a moderating variable in model 2, has a significant p-value at a 5% error rate, and the PK variable moderated by FI or abbreviated as PK*FI, also produces a significant p-value, the FI variable meets the quasi-moderation criteria. The same applies to the PB variable moderated by FI, abbreviated as PB*FI. Thus, the FI variable can act as both a mediator and a moderator.

Mediation Test

After finding that FI can act as a moderator and mediator (quasi), a FI mediation test was then conducted. Conceptually, work evaluation in the modern era can be influenced by employees' perceptions of hybrid work (PK) and proximity bias (PB), either directly or indirectly through the

mediators of work flexibility and virtual interaction (FI). The path analysis results are as follows:



Picture 1. Path Analysis
Source: Output SmartPLS4 by researcher (2025)

Each path is analysed for its coefficient, significance level, and role in supporting or rejecting the hypothesis. A summary of the path coefficient results and conclusions is shown in the table.
Table of Coefficients, t-statistics, and P-Values

Relationship	Coefficient	t-statistik	P-value	Description
PK → FI	0,747	13,473	0,000	Significant
PB → FI	0,173	2,194	0,028	Signifikan
PK → EK	0,071	0,383	0,702	Not Significant
PB → EK	0,290	2,506	0, 012	Signifikan
FI → EK	0,470	2,480	0,013	Signifikan
PK → FI → EK	0,351	2,476	0.013	Signifikan
PB → FI → EK	0,081	1,346	0,178	Not Significant

Source: Output SmartPLS4 by researcher (2025)
The path analysis results show that employee perception (PK) has a positive and significant effect on work flexibility and virtual interaction (FI) with a coefficient of 0.747 (p-value 0.000), while proximity bias (PB) also has a significant effect on FI, albeit with a smaller effect size (0.173; p-value 0.028). However, PK does not have a direct effect on performance evaluation (EK) (p-value 0.702), while PB has a positive and significant effect on EK (0.290; p-value 0.012). FI itself has a significant effect on EK (0.470; p-value 0.013). Furthermore, the mediation test shows that PK has a significant effect on EK through FI (0.351; p-value 0.013), while PB through FI is not significant (p-value 0.178). Thus, FI plays an important mediating role in the relationship between PK and EK, but is ineffective in mediating the relationship between PB and EK.

Based on the above results, it was found that employee performance evaluation (EPE) in the current era is strongly influenced by work flexibility and the intensity of virtual interaction (VI). However, the existence of VI is also strongly determined by employees' understanding of increasingly diverse work systems (hybrid work). Proximity bias also plays a role in determining work flexibility and virtual interaction. Considering the direct influence of PK and PB on EK and the indirect influence of PK and PB on EK through FI, both of which are significant, this variable is classified as partial mediation. In other words, the mediator FI plays only a partial role in explaining the relationships among PK, PB, and EK.

DISCUSSION

The results of this research show complex dynamics in performance evaluation in the context of hybrid work. First, the findings indicate that employee perception (EP) has a significant effect on work flexibility and virtual interaction (FI), but does not directly affect performance evaluation (PE). Conversely, proximity bias (PB) has a direct and significant effect on PE. These findings reinforce the argument that positive perceptions of hybrid work do not necessarily improve performance evaluations without the support of mechanisms such as flexibility and real virtual interaction. This aligns with the Job Demands–Resources (JD-R) theory, in which job resources (in this case, flexibility and virtual interaction technology) serve as catalysts for transforming positive perceptions into measurable outcomes such as performance (Bakker & Demerouti, 2017). Recent studies also emphasise that collaboration technology and work flexibility are key factors that bridge perceptions of new work models with actual productivity (Wang et al., 2023).

The results of the analysis show that employee perception (PK) has a very strong positive influence on work flexibility and virtual interaction (FI) (coefficient = 0.747, $p < 0.001$), while proximity bias (PB) also contributes positively to FI, albeit with less strength (0.173, $p < 0.05$). These findings indicate that when employees view hybrid or flexible systems positively, they tend to more readily accept and utilize work flexibility and virtual interaction as part of their work styles, a concept consistent with the literature that identifies flexibility and virtual communication as important resources in hybrid or remote work contexts, such as in the Job Demands-Resources model (Coulston et al., 2025).

The significant effect of PB on EK indicates that physical presence bias continues to influence performance evaluations, even as organizations adopt hybrid work models. This finding is consistent with the research by Choudhury et al. (2023), which shows that managers tend to rate employees who are more frequently physically present at the office higher, regardless of their objective contributions. However, the results of the mediation test in this study show that FI does not mediate the relationship between PB and EK, indicating that evaluation bias related to physical presence tends to operate directly, independent of the intensity of virtual interaction. The practical implication is that performance evaluations in organizations remain prone to structural bias when output-based performance metrics do not complement physical presence indicators.

Interestingly, PK did not show a significant direct effect on performance evaluation (EK) ($p = 0.702$), while PB had a positive direct effect on EK (0.290, $p < 0.05$). This indicates that although positive perceptions of the hybrid system facilitate the adoption of flexibility/virtual interaction, these perceptions alone (without FI facilitation) are not sufficient to influence performance evaluation in an organizational context directly.

Work flexibility and virtual interaction (FI) were found to have a significant direct effect on PE (0.470, $p < 0.05$), indicating that greater flexibility and greater virtual interaction intensity are associated with higher performance evaluation. This supports the argument that in the modern work context, physical presence is not the only indicator of productivity; rather, the ability to adapt to flexibility and interact effectively virtually are important aspects of performance evaluation, which in line with studies on performance management practices in hybrid environments that emphasize the need for continuous communication and output measurement that goes beyond mere presence (Mabaso & Manuel, 2024).

In the mediation test, the relationship PK → FI → EK proved to be significant (0.351, $p < 0.05$), meaning that FI mediates part of the influence of PK on EK. In other words, positive perceptions of the hybrid system affect performance evaluation when FI mediates the flexibility and virtual interaction channel. However, mediation for PB (PB → FI → EK) was not significant ($p = 0.178$), indicating that, for proximity bias, its contribution to performance is more direct and does not depend on the channel through flexibility/virtual interaction. This may indicate that the bias toward physical presence (proximity) still has the power to influence supervisors' perceptions of performance, regardless of how much work flexibility or virtual interaction is implemented.

In addition, the study's results confirm that FI has a positive effect on EK and also mediates the relationship between PK and EK. This mediation is partial, meaning that although PK has an indirect effect on EK through FI, its contribution does not fully eliminate other factors, including proximity bias. A study by Lee & Park (2024) also found that the use of virtual interaction technology improves the accuracy of performance assessments by clarifying work outcome indicators, thus supporting the findings of this study. However, the fact that FI fails to mediate the influence of PB indicates that technology and flexibility have not fully neutralised inherent managerial bias.

These findings are important from both practical and theoretical perspectives. Theoretically, the results support the idea that in a hybrid/flexible work context, resources (such as flexibility and virtual interaction) can be crucial mediators between perceptions of work models and performance outcomes—consistent with the Job Demands-Resources (JD-R) framework, which states that job resources can strengthen the relationship between working conditions and positive outcomes such as performance. However, because proximity bias has a direct effect that does not go through mediation, physical presence bias must still be taken into account in the design of performance evaluation systems to avoid unfairness.

CONCLUSION

From a managerial perspective, especially for workers in the Greater Jakarta area, the results of this study imply that in order for positive perceptions of hybrid work to contribute significantly to performance evaluations, organizations need to ensure that work flexibility and virtual interaction are fully activated and optimized (e.g., flexible work policies, collaboration platforms, virtual communication training). If flexibility and virtual interaction are only promised symbolically, without operational support, the impact on employee perceptions may not be immediately visible in performance. This can be a valuable note for employers or companies in the Jakarta satellite area, helping them view employee perceptions and develop more positive work schedules.

This study aligns with previous research by (Dale et al, 2024) which states that opportunities to explore the diverse and complex aspects of employee well-being in a hybrid work environment—insights that would not be revealed through a few interviews or broad, simplified surveys. Future research on the organizational and individual factors that shape whether hybrid work has a positive or negative impact on well-being could help improve recommendations for practitioners designing support strategies for hybrid work.

As an additional note, a study by Seo and Park (2025) on performance appraisal in the context of "smart work" (similar to hybrid) shows that when the psychological distance between evaluators and employees increases (due to minimal physical interaction), evaluators tend to focus on outcomes rather than processes—an effect consistent with the idea that flexibility/virtual interaction (FI) is a key determinant of performance evaluation (not just employee perceptions). This reinforces the interpretation that FI plays a crucial role among the variables.

For further research, it is recommended to examine other moderators or contextual variables, such as manager trust, organizational culture, task type, or job complexity, to determine whether the influence paths differ across conditions. Also, future research could expand the sample across industries and countries to test the model's generalizability.

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