

The Effect of Technological Transformation and Work Stress on Organizational Performance with Work Engagement as Mediator

*Work Engagement
Solve Technology
Challenges and Stress*

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ABSTRACT

In the era of rapid technological advancement, work engagement has emerged as a critical factor influencing both individual and organizational performance. Defined as a positive mental state characterized by vigor, dedication, and absorption, work engagement can enhance productivity and overall performance. However, work stress resulting from excessive job demands may hinder these outcomes. This study aims to examine the effects of work stress and technological transformation on organizational performance, with work engagement as a potential mediator. Employing a quantitative approach, the research uses a Structural Equation Modeling (SEM) design. The study involved 80 employees of the Immigration Office Class I TPI Samarinda, selected through purposive sampling. Data were collected using questionnaires measuring technological transformation, work stress, work engagement, and organizational performance, and analyzed using SmartPLS 4.0. The findings indicate that technological transformation positively affects both work engagement and organizational performance, while work stress negatively impacts work engagement but does not directly influence performance. Moreover, work engagement does not mediate the relationships studied. The study concludes that effective stress management and optimized technology adoption are key to enhancing organizational performance.

Keywords: Organizational Performance, Technological Advancement, Technological Transformation, Work Engagement, Work Stress.

INTRODUCTION

In the current era of accelerated technological disruption, employee work engagement has become a pivotal determinant of organizational performance. Work engagement is defined as a positive, motivational psychological condition consisting of vigor, dedication, and absorption, and is recognized as a key predictor of productivity, commitment, and innovation in the workplace. Employees who demonstrate higher engagement tend to exhibit stronger alignment with organizational objectives, higher persistence in task execution, and greater emotional attachment to their roles. However, this ideal condition is highly vulnerable when employees are exposed to persistent work stress. Work stress, conceptualized as a psychological and physiological response triggered by excessive job demands, has consistently been associated with decreased motivation, reduced well-being, and impaired individual and organizational performance (Katou et al., 2022). Recent empirical studies confirm that unmanaged stress can erode engagement and diminish employee functioning, thereby posing a substantial risk to organizational achievement (Vaidyanathan & Mahapatra, 2020; Smoktunowicz et al.,

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2021; Don-Solomon et al., 2022; Hamid, 2022; Khajeh & Nouhi, 2023; Ibrahim & Hussein, 2024; Turan-Torun et al., 2025).

Technological transformation, while essential for increasing efficiency and modernizing public administration, simultaneously introduces new pressures on employees who must rapidly adapt to system changes, digital workflows, and evolving performance expectations. Although digitalization is often associated with enhanced performance outcomes, its success is contingent upon employee readiness and organizational support mechanisms. Evidence demonstrates that organizations capable of balancing technological advancement with employee well-being tend to experience higher engagement and superior operational performance (Don-Solomon et al., 2022; Hamid, 2022; Makowska-Tłomak et al., 2022; Cao et al., 2023; Ibrahim & Hussein, 2024).

This phenomenon is particularly relevant to the Class I Immigration Office of TPI Samarinda, which has undergone rapid technological transformation as part of national bureaucratic reform and digital public service initiatives. While digital systems were introduced to streamline processes and improve service quality, many employees have faced increased workload complexity and adaptation pressure. This condition potentially contributes to rising stress levels and declining engagement, ultimately jeopardizing organizational performance outcomes. Research by Mahaputra and Ardana (2020), Syahrul (2020), Gozali (2022), Rahayu et al. (2023), Irfandi et al. (2023), Octavianto and Raharjo (2023), work engagement does not always have a significant impact on organizational performance, while research by Holmberg et al. (2020) and Saputra and Putra (2025) reveals that work stress has a negative impact on performance, but not much has discussed about how good stress management can support organizational performance improvement.

This study introduces a distinctive contribution by reframing work stress not merely as a detrimental condition but as a potential developmental factor when managed strategically. Unlike previous research that predominantly emphasizes the negative consequences of work stress on employee attitudes and behavior, this study examines how effective stress management may convert stress into an opportunity to strengthen employee engagement and enhance organizational outcomes. Additionally, this research provides a new analytical lens on technological transformation by identifying the organizational conditions and behavioral factors necessary to optimize technology adoption and sustain employee engagement, an area that remains insufficiently explored, particularly within public sector environments.

Based on the phenomena and research gaps identified, this study addresses the problem of how work stress and technological transformation influence organizational performance, and whether work engagement functions as a key explanatory mechanism in this relationship. Accordingly, this study aims to examine the effect of work stress and technological transformation on organizational performance, as well as to analyze the mediating role of work engagement in these relationships. Through this approach, the research offers empirical evidence that well-managed stress, supported by conducive leadership and organizational systems, can play a constructive role in productivity rather than functioning solely as a performance barrier. By integrating these perspectives, the study generates a more comprehensive explanation of how public organizations can navigate digital transformation while maintaining workforce resilience, performance continuity, and institutional effectiveness.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The Effect of Technology Transformation and Work Stress on Work Engagement

Recent research underscores the increasingly central role of technological transformation in shaping employee attitudes and organizational outcomes (Bozkus, 2023). Digital transformation, defined as the strategic integration of digital technologies into processes, structures, and practices, has been linked positively to work engagement, organizational commitment, and performance outcomes. For instance, empirical

evidence shows that digital transformation significantly enhances employee engagement and organizational commitment through supportive leadership, internal communication, and training initiatives that facilitate technology adoption and workplace flexibility, which in turn increases job motivation and productivity. A systematic literature review by Nursyidah (2025) highlights that employee engagement acts as a critical mechanism linking work motivation to improved organizational performance outcomes.

Work stress has been widely studied for its impact on employee outcomes and organizational performance. Traditionally, stress in the workplace was viewed negatively, however, recent research suggests a more nuanced understanding. According to contemporary studies, eustress, a positive form of work stress, can stimulate coping mechanisms, enhance alertness, and increase motivation, ultimately strengthening work engagement when managed appropriately. For example, Ali et al. (2021) and Alolabi et al. (2022) found that moderate levels of work stress can trigger adaptive responses that heighten focus and involvement in tasks, thereby positively influencing work engagement. Similarly, Atmaja and Marika (2024) and López Zapata et al. (2024) reported that work stress, when supported with proper organizational resources, correlates with improvements in productivity and employee psychological investment, suggesting that stress does not always result in disengagement.

H1: Technology transformation has a positive effect on work engagement.

H2: Work stress has a positive effect on work engagement.

Factors Influencing Organizational Performance

Work engagement has been widely recognized as a critical factor influencing organizational performance. Engaged employees are more energetic, committed, and focused on achieving organizational goals, which translates into higher productivity, efficiency, and overall performance. Recent studies show that work engagement positively impacts both individual and organizational outcomes by enhancing motivation, job satisfaction, and proactive behaviors (Vachhrajani et al., 2022; Liu et al., 2024). Employees with high engagement levels are more likely to leverage available resources, adopt innovative practices, and contribute to a collaborative work environment, which strengthens organizational capabilities and resilience. In public sector organizations, where performance metrics are often tied to service quality and procedural efficiency, work engagement has been identified as a key driver of improved organizational outcomes (Octavianto & Raharjo, 2023; Wardhani & Ali, 2025).

Similarly, technology transformation has been found to improve organizational performance by reshaping structures and cultural orientations toward more flexible, innovative, and efficient systems. Digital transformation not only changes operational workflows but also enhances adaptability and resilience, leading to better performance metrics in both public and private sectors. However, studies by Wulan et al. (2024) emphasize that successful outcomes depend on contextual factors such as leadership support, employee readiness, and organizational learning capabilities. Despite these positive links, research also points to challenges such as the risk of digital fatigue and the need for strategic management of human-technology interactions, suggesting that technology transformation's impact on work engagement and performance is nuanced and contingent on implementation quality (Awad & Martin-Rojas, 2024). Work stress can positively affect performance when seen as a challenge that fosters growth, as shown by Gameda and Lee (2020), but its benefits depend on supportive organizational conditions and management, according to Saputra and Putra (2025).

H3: Work engagement has a negative effect on organizational performance.

H4: Technology transformation has a positive effect on organizational performance.

H5: Work stress has a positive effect on organizational performance.

Work Engagement as a Mediating Variable

Furthermore, work engagement plays a critical mediating role in translating organizational interventions into tangible performance outcomes. Organizational initiatives such as digital transformation, when designed to improve workflow efficiency, enhance job autonomy, and provide timely access to information, can foster higher levels of employee engagement (Omachi & Ajewumi, 2024). Engaged employees are more likely to demonstrate vigor, dedication, and absorption in their work, which subsequently leads to improved task performance and overall organizational effectiveness. Empirical evidence supports this mechanism, indicating that digital transformation initiatives indirectly enhance organizational performance through increased work engagement, as employees become more motivated and better equipped to meet evolving job demands (Irfandi et al., 2023).

However, the mediating effect of work engagement is not automatic and depends heavily on contextual and organizational factors. Recent studies highlight that effective leadership, strong organizational support systems, and employee readiness for change are essential in ensuring that engagement can effectively convert external interventions and work-related pressures into positive performance outcomes. Without these enabling conditions, high engagement may not be sufficient to offset the negative effects of excessive work stress or poorly managed organizational change. As noted by Bernburg et al. (2021), engagement alone may not fully mediate the relationship between organizational factors and performance if employees lack adequate support or resources. These findings underscore the importance of cultivating a supportive organizational environment to maximize the mediating role of work engagement in dynamic and demanding work settings.

H6: Work engagement mediates the effect of technology transformation on organizational performance.

H7: Work engagement mediates the effect of work stress on organizational performance.

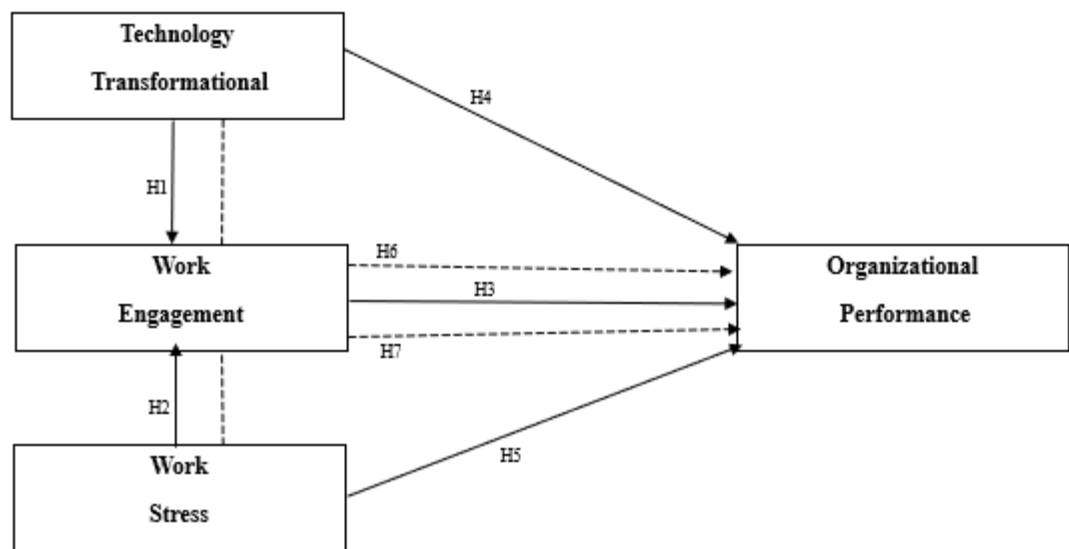


Figure 1. Research Framework

Figure 1 shows the conceptual framework of this study that analyzes the influence of technological transformation and work stress on organizational performance, with work engagement as a mediating variable. Technological transformation is assumed to influence organizational performance directly and indirectly through work engagement, while work stress also influences work engagement and organizational performance directly. Work engagement acts as a mediator linking technological transformation and work stress with organizational performance, explaining how external and internal factors

can enhance or degrade performance. The research hypotheses include the direct influence of technological transformation and work stress on work engagement (H1, H2) and organizational performance (H4, H5), and the mediating role of work engagement in these relationships (H6, H7). This framework illustrates that effective management of technology and work stress can enhance organizational performance both directly and through increased employee engagement.

RESEARCH METHODS

This study employed a quantitative research design with an explanatory approach aimed at analyzing the causal relationships among technology transformation, work stress, work engagement, and organizational performance. This design was selected to examine both direct and indirect effects among variables through hypothesis testing based on empirical data. To test the proposed research model, the study applied the Partial Least Squares–Structural Equation Modeling (PLS-SEM) technique, which is suitable for predictive research, complex latent variable models, and conditions involving relatively small sample sizes or non-normally distributed data.

Data were collected using a structured questionnaire distributed to respondents. The research instrument was designed using a Likert scale to measure respondents' perceptions of technology transformation, work stress, work engagement, and organizational performance. Prior to data analysis, the collected responses were screened to ensure completeness, identify potential outliers, and detect response pattern bias that could affect the validity and reliability of the findings. The population of this study consisted of all employees at the Class I Immigration Office of TPI Samarinda, totaling 130 individuals, including civil servants, contract employees, and outsourced personnel. A purposive sampling technique was employed to ensure that respondents possessed sufficient experience and understanding of organizational changes and technological transformation. The inclusion criteria required respondents to have an active employment status within the institution and have a minimum work tenure of one year to ensure adequate exposure to digital systems, procedural changes, and evolving work demands. Based on these criteria, 67 respondents met the requirements and were included in the analysis.

Data analysis was conducted using the PLS-SEM approach with the assistance of SmartPLS version 4.0 software. The analysis process began with an evaluation of the measurement model, including assessments of indicator reliability, Cronbach's alpha, composite reliability, and convergent and discriminant validity. Following this, the structural model was examined to test the hypothesized relationships among the study variables. Both direct and indirect effects were analyzed, including the mediating role of work engagement. Mediation testing was performed using a bootstrapping procedure to determine the significance of path coefficients and to provide robust statistical inference.

RESULTS

This study proposes a statistical test for construct development in path analysis. External model measurements involve predefined criteria for statistical analysis using PLS-SEM. The validity and reliability of the data should be evaluated to ensure the presence of adequate factor loads, Cronbach's alpha, and composite reliability. Table 1 presents an evaluation of convergent validity based on the value of the load factor and the general rule (0.700). This test will be used to support statistical analysis in the next presentation.

Table 1. Convergent Validity Test

Variable	Items	Loading Factor	Cronbach's Alpha	Composite Reliability
Technology Transformation	X1.1	0.872	0.929	0.942
	X1.2	0.867		
	X1.3	0.887		
	X1.4	0.881		
	X1.5	0.877		
	X1.6	0.783		
	X1.7	0.824		
	X1.8	0.892		
Work Stress	X2.1	0.798	0.916	0.931
	X2.2	0.732		
	X2.3	0.804		
	X2.4	0.758		
	X2.5	0.839		
	X2.6	0.812		
	X2.7	0.824		
	X2.8	0.775		
Organizational Performance	Y1	0.844	0.950	0.958
	Y2	0.742		
	Y3	0.779		
	Y4	0.790		
	Y5	0.829		
	Y6	0.868		
	Y7	0.827		
	Y8	0.858		
Work Commitment	Z1	0.771	0.950	0.957
	Z2	0.853		
	Z3	0.887		
	Z4	0.831		
	Z5	0.832		
	Z6	0.842		
	Z7	0.842		
	Z8	0.886		
	Z9	0.853		

The measurement model was evaluated by analyzing the factor loadings, Cronbach's alpha, and composite reliability values for each construct. The results demonstrate that all items across the four latent variables, technology transformation, work stress, organizational performance, and work commitment, exhibit strong convergent validity. This is evidenced by loading factor values that exceed the recommended threshold of 0.70. The loading coefficients range between 0.783 and 0.892 for technology transformation, 0.732 and 0.839 for work stress, 0.742 and 0.868 for organizational performance, and 0.771 and 0.887 for work commitment, confirming that each indicator adequately reflects the construct it was designed to measure.

Reliability testing further confirms the robustness of the measurement model. All constructs show Cronbach's alpha coefficients above the minimum acceptable value of 0.70, indicating internal consistency among items. Technology transformation records an alpha of 0.929, work stress 0.916, organizational performance 0.950, and work commitment 0.950, demonstrating high reliability. Composite reliability values, which offer a more conservative reliability estimate for PLS-SEM, also fall within the ideal range (>0.70), with scores of 0.942 for technology transformation, 0.931 for work stress, 0.958 for organizational performance, and 0.957 for work commitment. These results confirm that the constructs possess high reliability and internal coherence. Thus, the measurement results indicate that the model meets the criteria for convergent validity and reliability, and therefore, the constructs are suitable for further structural evaluation.

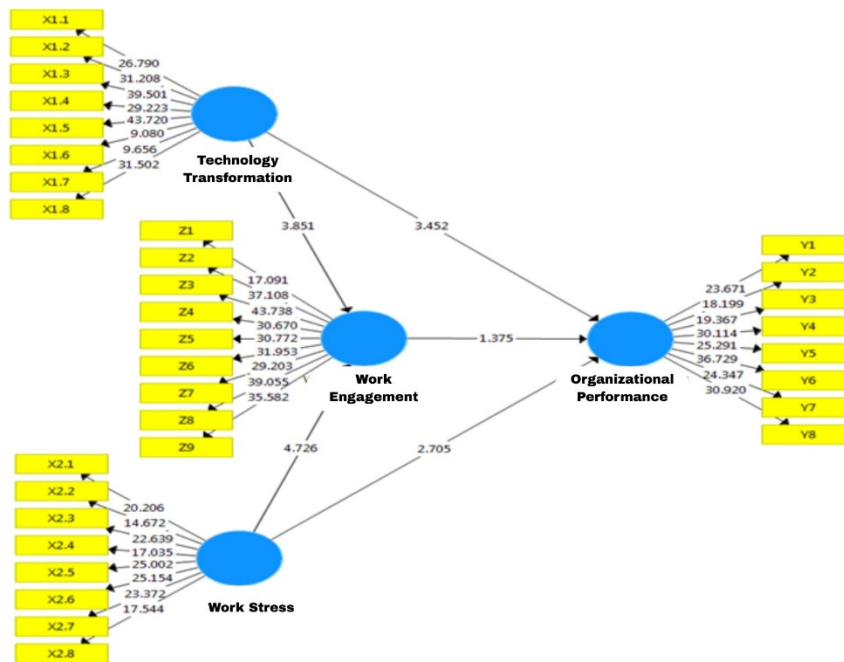


Figure 2. Bootstrapping Result

Figure 2 shows the results of the PLS-SEM bootstrapping used to test the significance of the relationship between the study variables. The analysis shows that technological transformation significantly influences work engagement and organizational performance, as indicated by a t-statistic value above 1.96. Work stress also significantly influences work engagement and organizational performance, indicating that employee stress is related to levels of work engagement and performance. However, work engagement did not significantly influence organizational performance, as the t-statistic value fell below the significance level. Therefore, work engagement cannot act as a mediating variable in the relationship between technological transformation and work stress on organizational performance.

Table 2. Hypothesis Test Results

Hypothesis	Std. Dev	t-statistics	p-values	Decision
Technology Transformation -> Work Engagement	0.366	3.851	0.000	Accepted
Work Stress -> Work Engagement	0.443	4.726	0.000	Accepted
Work Engagement -> Organizational Performance	0.163	1.375	0.170	Rejected
Technology Transformation -> Organizational Performance	0.360	3.452	0.001	Accepted
Work Stress -> Organizational Performance	0.322	2.705	0.007	Accepted
Technology Transformation -> Work Engagement -> Organizational Performance	0.060	1.139	0.255	Rejected
Work Stress -> Work Engagement -> Organizational Performance	0.072	1.257	0.209	Rejected

Based on Table 2, the hypothesis testing indicates that several direct relationships among variables are statistically significant. The results show that technology transformation has a significant positive effect on work engagement ($t = 3.851$; $p < 0.000$), indicating that employees exposed to technological improvements tend to be more engaged in their work. Similarly, work stress also demonstrates a significant positive effect on work engagement ($t = 4.726$; $p < 0.000$), suggesting that moderate levels of work pressure may trigger adaptive engagement responses among employees. Further analysis shows that both technology transformation ($t = 3.452$; $p = 0.001$) and work stress ($t = 2.705$; $p = 0.007$) significantly influence organizational performance. This implies that

technological adaptation and manageable work demand contribute directly to improving performance outcomes.

However, the relationship between work engagement and organizational performance is not significant ($t = 1.375$; $p = 0.170$), indicating that engagement alone does not directly translate into measurable performance improvements within the observed organizational context. Consequently, the mediation effects of work engagement in the relationships between technology transformation and organizational performance ($t = 1.139$; $p = 0.255$) as well as between work stress and organizational performance ($t = 1.257$; $p = 0.209$) were also found to be statistically insignificant. This suggests that work engagement does not function as an effective mediating variable in this model.

DISCUSSION

The hypothesis testing results indicate that technology transformation has a significant effect on work engagement. This finding is consistent with previous studies by Saraswaty and Pusparini (2023), Rahayu et al. (2023), Irfandi et al. (2023), and Octavianto and Raharjo (2023), which suggest that digital transformation through improvements in SOPs, enhanced competencies, ease of technology use, and increased work autonomy can enhance employee motivation and engagement. Therefore, effectively managed technology transformation not only boosts productivity but also strengthens work engagement within the organization.

The results also show that work-related stress significantly affects work engagement. This aligns with Mahaputra and Ardana (2020), who found that increased work stress can reduce employee engagement and performance, as well as with Darmadi (2022) and Gozali (2022), who reported that work stress impacts productivity, motivation, and organizational commitment. Furthermore, Harahap and Nasution (2023) emphasize that effective stress management plays a key role in maintaining employee engagement. In the context of the Class I TPI Immigration Office in Samarinda, these findings suggest that work stress can be effectively managed, turning it from a potential burden into a factor supporting work engagement.

However, the hypothesis testing shows that work engagement does not have a significant effect on organizational performance. This finding is consistent with Nzarubara et al. (2020) and Syahrul (2020), who found that work engagement does not always directly influence performance, particularly in public sector organizations. It indicates that organizational performance is more strongly affected by factors such as leadership, organizational support, employee resources, and personal characteristics. Thus, while work engagement is important for fostering positive work experiences, it cannot serve as a sole predictor of organizational performance.

The results further indicate that work-related stress significantly affects organizational performance. This is in line with prior studies reporting that work stress can reduce employee performance, job satisfaction, and engagement, ultimately affecting organizational outcomes (Holmberg et al., 2020; Akhter et al., 2025; Jain et al., 2025; Saputra & Putra, 2025). Nevertheless, employees at the Class I TPI Immigration Office in Samarinda are able to manage work stress effectively, demonstrating the importance of proactive stress management through psychological support, training, and employee development. Similarly, technology transformation has a significant impact on organizational performance. Previous research shows that integrating information technology with human resource management, along with effective IT governance practices, can improve efficiency, effectiveness, competitiveness, competencies, and employee autonomy, thereby positively affecting organizational performance (Kurniawan et al., 2021; Luthfia et al., 2022; Fortuna et al., 2023; Saraswaty & Pusparini, 2023; Alamsyah, 2024; Devi & Utamajaya, 2025).

The results demonstrate that work engagement does not mediate the effect of technology transformation or work stress on organizational performance. This suggests that both technology transformation and work stress influence performance directly, without mediation through work engagement. This finding is consistent with prior studies

showing that work engagement does not always act as a mediator between external factors and performance, as in some contexts it functions more as an outcome of organizational change rather than a connecting variable, and that the relationship between stress, engagement, and performance is affected by factors such as burnout, self-efficacy, and individual characteristics (Ayuningtyas, 2025). These findings imply that public organizations should focus on managing technological transformation and work stress directly through supportive leadership, adequate training, and effective stress management, rather than relying solely on work engagement to improve performance. A comprehensive approach that integrates organizational systems, employee resources, and well-being initiatives is essential to sustain organizational performance during periods of change.

CONCLUSION

Based on the results of this study, it can be concluded that technological transformation at the Class I Immigration Office of TPI Samarinda positively affects organizational performance and employee work engagement. Effective implementation of digital technology improves operational efficiency and strengthens employee engagement, creating a positive cycle that supports organizational outcomes. Work-related stress also significantly impacts organizational performance. However, at the Class I TPI Samarinda, stress is managed effectively, preventing it from hindering productivity or engagement. This highlights the importance of proactive stress management through psychological support, training, and employee development in maintaining a productive and committed workforce.

The study further shows that work engagement does not mediate the relationship between technological transformation and organizational performance, nor between work stress and organizational performance. This indicates that both technological transformation and stress management can directly enhance organizational performance without relying on work engagement as a mediating factor. These findings imply that organizational strategies should prioritize efficient technology adoption and structured stress management to optimize performance. Limitations of the study include its focus on a single public organization, which may limit the generalizability of the results to other contexts or sectors. For future research, it is recommended to investigate additional mediating or moderating factors in the relationships between technology transformation, work stress, and organizational performance, such as organizational culture, leadership, and individual characteristics. Further studies can provide deeper insights for developing effective managerial strategies. For the Class I Immigration Office of TPI Samarinda, it is recommended to continue emphasizing technological efficiency and stress management, supported by appropriate training and psychological assistance, to sustain employee productivity, engagement, and organizational performance.

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1142
