

## Digital Self-Regulation, Workplace Agility, and Technostress: A Sequential Pathway to Employee Productivity in Emerging Economies

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### ABSTRACT

This study aims to examine how self-regulation influences employee productivity in digitally intensive work environments by incorporating workplace agility and technostress as mediating mechanisms. Extending the Job Demands–Resources framework, this study contributes by conceptualizing self-regulation as a dual-function personal resource that enhances adaptive capacity while simultaneously increasing exposure to technostress, thereby challenging linear assumptions in digital workforce research. Using a quantitative explanatory design, data were collected from 183 employees in technology-driven settings and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results show that self-regulation significantly increases workplace agility and technostress, while workplace agility further enhances both technostress and productivity. Technostress also exerts a positive effect on productivity, indicating the presence of functional strain. Mediation analysis confirms complementary and sequential pathways linking self-regulation to productivity. These findings imply that organizations should cultivate self-regulation and agility while managing technostress as a productive, yet controlled, pressure.

**Keywords:** Self-regulation; Workplace agility; Technostress; Employee productivity; Digital work environment

## INTRODUCTION

The accelerating digitalization of work has fundamentally reshaped how organizations structure tasks, coordinate employees, and evaluate productivity. Globally, the rapid expansion of digital platforms, artificial intelligence (AI), and data-driven systems has intensified expectations for employees to adapt quickly while maintaining high performance under technologically mediated conditions. Reports on the future of work indicate that digital technologies are now deeply embedded in everyday organizational processes, transforming both the opportunities and pressures experienced by workers in knowledge-intensive sectors (OECD, 2023; International Labour Organization, 2023). In Indonesia, this transformation is particularly visible. The 2024 Work Trend Index reported that 92% of Indonesian knowledge workers already use AI tools in their work activities, and 76% bring their own AI-based tools to the workplace, signaling a rapid integration of digital technologies into daily work routines (Microsoft & LinkedIn, 2024). At the regional level, Makassar represents one of the most dynamic urban economies in eastern Indonesia, with gross regional domestic product reaching approximately Rp 62.17 trillion in the third quarter of 2024 and annual economic growth exceeding 5%, driven partly by expanding digital services and technology-enabled industries (Badan Pusat Statistik Kota Makassar, 2024). These developments highlight a growing organizational challenge: while digital technologies promise higher efficiency and productivity, they simultaneously increase cognitive demands, technological complexity, and pressure for continuous adaptation among employees. Understanding how workers manage these competing demands has therefore become a critical issue for organizations operating within rapidly digitalizing urban economies such as Makassar.

Recent scholarship has increasingly shown that digital transformation is not merely a technical upgrade but a reconfiguration of how work is structured, coordinated, and experienced. Employee roles are being reshaped by virtual collaboration, digital platforms, algorithmic routines, and fast-moving task interdependence, which together alter both the opportunities and burdens of work. (Blanka et al., 2022) argue that employee competency is not a peripheral consequence of digital transformation but one of its central microfoundations, while (Vuchkovski et al., 2023) show that the shift from conventional to virtual teamwork demands new individual and collective capabilities to preserve effectiveness. At the same time, algorithmic and platform-mediated work may weaken traditional relational cues, alter expectations of autonomy and fairness, and intensify psychological strain in ways that standard productivity models fail to capture (Tomprou & Lee, 2022). These developments make the Job Demands-Resources (JD-R) perspective especially relevant because digital work simultaneously expands job resources such as flexibility, speed, and access to information, while also amplifying job demands such as overload, constant responsiveness, and technological complexity. In this sense, digital workplaces do not simply change where work happens. They fundamentally alter the balance between resource activation and demand intensification that underpins employee performance.

Within that debate, self-regulation deserves more explicit attention than it has typically received in digital work research. Self-regulation refers to the ability to direct attention, control effort, and adjust behavior in line with task goals. In digitally intensive environments, this capacity is likely to matter more, not less, because employees must manage interruptions, shifting priorities, and ambiguous expectations without constant supervisory scaffolding. Yet prior research has often privileged technological capability or organizational design over the employee's internal capacity to govern behavior under digital pressure. This omission is costly because adaptation at work is rarely spontaneous. It depends on the capacity to sustain focus, reorganize action, and respond flexibly to change. Recent studies on readiness for change, working-from-home

engagement, and employee job performance indicate that adaptive effectiveness is strengthened when workers possess the psychological and environmental conditions needed to regulate behavior and stay engaged under fluid work arrangements (Alqudah et al., 2022; Lee, 2023; López-Cabarcos et al., 2022). Theoretically, this suggests that self-regulation should be positioned not as a background trait but as an activating personal resource within JD-R logic, capable of shaping how employees convert digital demands into workplace agility and, ultimately, productivity.

However, the relationship between digital adaptation and performance is not linear because greater agility may come with greater exposure to technostress. This is where the literature becomes genuinely interesting, instead of repeating the usual managerial fairy tale that more technology automatically means better work. Evidence increasingly shows that digital systems may both enable and burden employees. (Umair et al., 2023) demonstrate that technology-enabled work conditions can intensify overload and insecurity, thereby shaping worker well-being in consequential ways. (Andrulli & Gerards, 2023) similarly show that digitally mediated work arrangements can affect employee well-being through technostress and recovery-related mechanisms. More recent research suggests that digital transformation may have dual effects, simultaneously creating enabling conditions for resilience while also generating burdening pressures that erode employee capacity if left unmanaged (Liu et al., 2024). This duality is reinforced by prevention-oriented technostress scholarship, which increasingly focuses not only on technostress creators but also on inhibitors and organizational safeguards that can prevent digital strain from undermining sustainable performance (Berger et al., 2024). Accordingly, technostress should not be treated as a uniformly negative byproduct of technology use. Within JD-R reasoning, it may function as a strain pathway when demands overwhelm resources, but it may also operate as a challenge condition when employees possess sufficient self-regulatory and adaptive capacity to manage digital intensity productively.

The present study addresses a more specific theoretical and empirical gap as to the valuable insights into digital work, employee competency, virtual collaboration, and technostress, wherein these streams remain insufficiently integrated. In particular, the literature has not adequately explained how self-regulation as a personal resource translates into productivity through the combined pathways of workplace agility and technostress, especially in an emerging-city context where digital adoption is accelerating faster than institutional support structures may mature. This study therefore develops and tests a JD-R-grounded model in which self-regulation is positioned as an antecedent of workplace agility and technostress, workplace agility is modeled as both a productive capability and a source of digital strain, and technostress is examined not only as a cost but also as a potential mechanism linking digital adaptation to performance. Empirically, the study contributes by focusing on technology workers in Makassar, Indonesia, a context that is economically dynamic but still underrepresented in the digital work literature. Theoretically, it contributes by moving beyond the dominant binary in which agility is assumed to be beneficial, and technostress is assumed to be harmful, and instead examines how both may jointly shape productivity in digitally demanding workplaces.

## **LITERATURE REVIEW**

Digital transformation has fundamentally reshaped modern work environments, particularly within technology-intensive organizations where employees interact continuously with digital systems, collaborative platforms, and data-driven workflows. These changes have increased both the complexity and pace of work, creating new forms of job demands while simultaneously requiring employees to develop adaptive

capabilities. The Job Demands–Resources (JD-R) theory provides an appropriate theoretical lens to understand this dynamic because it explains how employee outcomes emerge from the interaction between job demands and personal or organizational resources (Demerouti, 2025). Job demands represent aspects of work that require sustained psychological effort and may produce strain, whereas resources enable individuals to cope with these demands and achieve performance goals. In digital workplaces, technological complexity, information overload, and constant connectivity constitute important job demands, while personal resources such as self-regulation and behavioral adaptability allow employees to manage these pressures effectively. At the same time, socio-technical systems theory suggests that performance in technology-enabled organizations results from the joint optimization of human capabilities and technological infrastructures. Thus, employee productivity in digital contexts is not determined solely by technology but also by individuals' capacity to regulate behavior and adapt to evolving work systems (Cosa & Torelli, 2024; Ahmad et al., 2023).

Self-regulation represents a critical personal resource in this context. It refers to the ability of individuals to control their behavior, regulate effort, and adjust actions to achieve desired goals (Carey et al., 2004). Employees with strong self-regulatory capacity are better able to manage attention, prioritize tasks, and maintain focus when facing demanding work conditions. Research in organizational psychology shows that self-regulation supports adaptive performance because it enables employees to continuously monitor and adjust their behavior in response to changing environmental conditions (Schlaegel et al., 2023; Tang et al., 2023). In digital workplaces, where tasks evolve rapidly and technological systems change frequently, this capacity becomes particularly valuable. Self-regulated employees are more capable of coordinating multiple tasks, learning new digital tools, and adjusting work strategies when encountering unexpected challenges. Consequently, self-regulation serves as a foundational psychological resource that facilitates adaptive workplace behavior.

One important manifestation of adaptive behavior is workplace agility. Workforce agility refers to an employee's ability to respond quickly and effectively to changing work conditions, demonstrating flexibility, learning orientation, and proactive problem solving (Petermann & Zacher, 2022). Agile employees continuously adjust their work strategies, integrate new knowledge, and respond constructively to technological and organizational change. From the JD-R perspective, agility functions as a behavioral resource that enables employees to cope with dynamic job demands. Individuals who possess strong self-regulation are more likely to develop agile behaviors because they can maintain goal-directed behavior while adapting to evolving work conditions. Empirical studies have demonstrated that employees with strong self-regulatory capabilities show greater adaptability and performance in complex work environments (Jundt & Shoss, 2023). Therefore, self-regulation is expected to enhance workplace agility.

H1: Self-regulation positively influences workplace agility.

While self-regulation and agility function as personal resources, digital workplaces also generate significant psychological demands in the form of technostress. Technostress refers to the stress experienced by individuals due to the use of information technologies in work contexts, often arising from factors such as information overload, technological complexity, and constant digital connectivity (Inoue et al., 2014). Research in information systems suggests that increased interaction with digital technologies can intensify cognitive load and create feelings of pressure or fatigue among employees (Marsh et al., 2022). Employees who are highly self-regulated often engage more intensively with technological systems in order to achieve performance goals, which may increase their exposure to technology-related stressors. Similarly, agile employees frequently interact with digital tools and organizational systems to adapt quickly to new tasks or workflows. As a result, both self-regulation and workplace agility may increase employees' exposure

to technostress within technology-driven work environments ([Salo et al., 2022](#); [Taser et al., 2022](#)).

H2: Self-regulation positively influences technostress.

H3: Workplace agility positively influences technostress.

Although technostress is often perceived as a negative experience, emerging research suggests that it may also function as a challenge stressor under certain conditions. Challenge stressors are demands that stimulate motivation and performance because employees perceive them as opportunities for learning or achievement. Within the JD-R framework, employees who possess sufficient resources may interpret technological demands as manageable challenges rather than overwhelming obstacles. Studies have shown that moderate levels of technostress may increase alertness, cognitive engagement, and problem-solving effort when employees believe they have the capacity to cope with digital demands ([Califf et al., 2020](#); [Pflügner et al., 2024](#)). Consequently, technostress may contribute positively to productivity when employees possess adequate personal resources such as self-regulation and agility.

H4: Technostress positively influences productivity.

In addition to its indirect effects through technostress, workplace agility is expected to influence productivity directly. Productivity reflects the effectiveness with which employees perform their work tasks and achieve organizational objectives ([Koopmans et al., 2014](#)). Agile employees are able to adjust quickly to changing job requirements, integrate new technological knowledge, and maintain performance under uncertain conditions. Research indicates that adaptive performance and agility are strongly associated with improved work outcomes because they enable employees to respond effectively to dynamic work environments ([Petermann & Zacher, 2022](#); [Milani et al., 2024](#)). Therefore, workplace agility is expected to contribute directly to employee productivity.

H5: Workplace agility positively influences productivity.

Finally, the JD-R framework suggests that personal resources often influence performance through mediation mechanisms. Self-regulation may enhance productivity indirectly by fostering workplace agility, which enables employees to adapt their work strategies and maintain effectiveness. Similarly, self-regulation may influence productivity through technostress by shaping how employees engage with digital technologies. Workplace agility may also act as a mediator between self-regulation and technostress because agile employees tend to interact more intensively with technological systems. These mediation processes reflect the socio-technical nature of digital work environments, where psychological capabilities interact with technological demands to shape performance outcomes ([Chatterjee et al., 2023](#)). Accordingly, several mediation relationships are proposed.

H6: Workplace agility mediates the relationship between self-regulation and productivity.

H7: Technostress mediates the relationship between self-regulation and productivity.

H8: Workplace agility and technostress sequentially mediate the relationship between self-regulation and productivity.

H9: Workplace agility mediates the relationship between self-regulation and technostress.

## **RESEARCH METHOD**

This study employed a quantitative cross-sectional survey design to examine the relationships among self-regulation, workforce agility, job stress, and employee productivity among technology workers in Makassar, Indonesia. The research context focuses on employees working in technology-intensive companies operating in sectors such as digital services, software development, data analytics, and other technology-enabled business operations. Technology workers represent an appropriate empirical context because their work requires continuous adaptation, self-directed behavioral regulation, and sustained performance under dynamic digital conditions. Examining these constructs within a technology workforce therefore allows the investigation of how psychological regulatory mechanisms and workplace pressures jointly influence employee productivity in modern digital organizations.

The population of this study consisted of employees working in leading technology-oriented companies located in Makassar, Indonesia. Respondents were selected using purposive sampling with specific inclusion criteria to ensure the relevance of participants to the research context. Participants were required to be actively employed in technology-related roles and have a minimum of six months of organizational tenure to ensure sufficient familiarity with the organization's work processes and demands. Such tenure requirements are commonly used in organizational research to ensure that respondents possess adequate experience to evaluate their workplace conditions. Data were collected through a structured online questionnaire distributed through professional networks and organizational contacts within Makassar's technology sector. Participation in the survey was voluntary and anonymous, and respondents were informed that the collected information would be used solely for academic research purposes. A total of 183 usable responses were obtained and included in the final dataset. This sample size is considered adequate for Partial Least Squares Structural Equation Modeling because PLS-SEM is designed for prediction-oriented research and performs reliably with moderate sample sizes and complex structural relationships among latent constructs (Hair et al., 2022).

All constructs in the study were operationalized using reflective measurement models and measured using a five-point Likert scale ranging from strongly disagree to strongly agree. Survey items were adapted from validated measurement instruments published in international peer-reviewed research to ensure construct validity and theoretical consistency. Self-regulation was measured using four items adapted from the Short Self-Regulation Questionnaire developed by (Carey et al., 2004). This scale captures individuals' ability to regulate behavior, plan work activities, monitor progress toward goals, and adjust actions when encountering challenges. Self-regulation has been widely recognized as an important psychological mechanism that enables employees to maintain goal-directed behavior and performance under demanding work conditions (Carey et al., 2004). Workforce agility was measured using three items adapted from the workforce agility scale developed by (Petermann & Zacher, 2022). Their framework conceptualizes agility as an employee's capacity to adapt quickly to change, respond proactively to emerging work demands, and maintain effectiveness in dynamic organizational environments. Workforce agility has become increasingly important in technology-driven workplaces where employees must continuously update skills and respond to rapidly evolving digital systems (Petermann & Zacher, 2022).

Job stress was measured using two items adapted from the New Brief Job Stress Questionnaire developed by (Inoue et al., 2014). The scale measures employees' perceptions of psychological strain arising from workload pressure and work demands. Job stress has been extensively studied in occupational health research and is known to

influence employee well-being and performance outcomes in organizational settings (Inoue et al., 2014). Employee productivity was measured using four items adapted from the Individual Work Performance Questionnaire developed by (Koopmans et al., 2014). This instrument measures task performance and individual work effectiveness and has been widely validated across different occupational contexts. The scale captures employees' ability to complete tasks efficiently, achieve work goals, and maintain consistent work performance (Koopmans et al., 2014). To ensure measurement equivalence, survey items were translated into Indonesian using a translation and back-translation procedure to maintain semantic accuracy between the original English items and the localized questionnaire. A pilot test involving a small group of technology employees was conducted before the main data collection to evaluate clarity, relevance, and comprehension of the questionnaire items.

The collected data were analyzed using Partial Least Squares Structural Equation Modeling with SmartPLS software. PLS-SEM was selected because the research aims to examine predictive relationships among multiple latent constructs within a complex structural framework. Compared with covariance-based structural equation modeling, PLS-SEM is particularly appropriate for exploratory and prediction-oriented research designs and performs effectively with moderate sample sizes (Hair et al., 2022). The analysis followed the recommended two-stage approach consisting of measurement model evaluation followed by structural model evaluation. The measurement model assessment focused on indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Indicator reliability was examined through outer loadings, while internal consistency reliability was assessed using Cronbach's alpha and composite reliability. Convergent validity was evaluated through the average variance extracted to ensure that each construct explains more than half of the variance of its indicators. Discriminant validity was assessed using the heterotrait-monotrait ratio to confirm that each construct is empirically distinct from the others.

After establishing the adequacy of the measurement model, the structural model was evaluated to test the hypothesized relationships among the constructs. The significance of the structural relationships was assessed using a bootstrapping procedure with 5,000 resamples, which generated standardized path coefficients, t-statistics, and confidence intervals. The explanatory power of the model was examined through the coefficient of determination to evaluate the variance explained in the endogenous variables. Additional evaluation included the examination of effect sizes to assess the relative impact of each exogenous construct on endogenous variables and predictive relevance using the blindfolding procedure. Overall model fit was examined using the standardized root mean square residual to assess the consistency between the observed data and the estimated model. These analytical procedures follow the recommended guidelines for PLS-SEM reporting and ensure the robustness and replicability of the empirical findings (Hair et al., 2022).

## **RESULTS**

The analysis begins with an evaluation of the measurement model to ensure that the constructs used in this study demonstrate adequate reliability and validity before examining the structural relationships. In Partial Least Squares Structural Equation Modeling, measurement assessment is a critical preliminary step because the accuracy of the structural paths depends on the quality of the latent construct measurements. The measurement model was evaluated by examining indicator loadings, collinearity through variance inflation factor (VIF), internal consistency reliability using Cronbach's alpha and composite reliability, and convergent validity through the average variance extracted (AVE). The results of this assessment are presented in Table 1, which reports the

measurement statistics for the constructs of workplace agility, productivity, self-regulation, and technostress. Overall, the indicators demonstrate satisfactory statistical properties, with most factor loadings exceeding the recommended threshold of 0.70 and VIF values remaining well below the conservative limit of 5.00, indicating that multicollinearity among indicators is not a concern.

Table 1. Measurement Model Evaluation

Constructs	Items	VIF	Loading	alpha	CR (rho <sub>a</sub> )	CR(rho <sub>c</sub> )	AVE
Workplace Agility	Ag1	1.261	0.711	0.731	0.746	0.849	0.654
	Ag2	1.967	0.888				
	Ag3	1.739	0.817				
Productivity	PD1	1.588	0.809	0.733	0.742	0.832	0.554
	PD2	1.459	0.712				
	PD3	1.379	0.715				
	PD4	1.308	0.737				
Self-regulation	SR1	1.347	0.745	0.719	0.724	0.825	0.542
	SR2	1.421	0.762				
	SR3	1.421	0.702				
	SR4	1.415	0.733				
Technostress	ST1	1.108	0.649	0.476	0.626	0.774	0.639
	ST2	1.108	0.925				

Note: VIF = variance inflation factor; CR = composite reliability; AVE = average variance extracted.

Source: Adapted Smartpls 4 output (2025)

Table 1 shows that the constructs exhibit acceptable levels of internal consistency reliability. Workplace agility demonstrates a Cronbach's alpha of 0.731 and composite reliability ( $\rho_c$ ) of 0.849, indicating strong reliability among its three indicators. Productivity also demonstrates adequate reliability with a Cronbach's alpha of 0.733 and composite reliability of 0.832, suggesting that the four productivity indicators consistently capture the underlying performance construct. Similarly, the self-regulation construct exhibits a Cronbach's alpha of 0.719 and composite reliability of 0.825, indicating satisfactory internal consistency among the behavioral regulation indicators. Convergent validity is also supported across the constructs, as the AVE values exceed the recommended threshold of 0.50, indicating that each construct explains more than half of the variance of its indicators. Although the technostress construct reports a relatively lower Cronbach's alpha due to the limited number of indicators, its composite reliability and AVE remain within acceptable levels, and the outer loadings demonstrate that the indicators sufficiently represent the latent construct. Taken together, these results confirm that the measurement model satisfies the recommended criteria for reliability and convergent validity.

After establishing the adequacy of indicator reliability and convergent validity, the next step involves assessing discriminant validity to ensure that each construct captures a unique conceptual domain and does not excessively overlap with other constructs in the model. Discriminant validity is particularly important in structural equation modeling because insufficient separation among constructs can bias path estimates and compromise the interpretation of structural relationships. Following current methodological recommendations in PLS-SEM, discriminant validity was evaluated using two complementary approaches: the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT). The Fornell–Larcker criterion assesses whether the square root of the AVE for each construct exceeds its correlations with other constructs, while the HTMT ratio provides a more sensitive test of discriminant validity by comparing heterotrait and monotrait correlations. The results of these assessments are presented

in Table 2, which provides the Fornell–Larcker matrix and HTMT values for all constructs included in the model. Together, these analyses confirm whether workplace agility, self-regulation, technostress, and productivity represent empirically distinct constructs prior to the evaluation of the structural relationships.

Table 2. Discriminant Validity Test

HTMT				
	Productivity	Self-regulation	Technostress	Workplace Agility
Productivity				
Self-regulation	0.849			
Technostress	0.833	0.850		
Workplace Agility	0.801	0.832	0.729	
Fornell-Larcker				
	Productivity	Self-regulation	Technostress	Workplace Agility
Productivity	0.744			
Self-regulation	0.629	0.736		
Technostress	0.557	0.525	0.799	
Workplace Agility	0.594	0.68	0.469	0.809

Note: Diagonal values represent the square root of the Average Variance Extracted (AVE). HTMT values below 0.90 indicate acceptable discriminant validity.

Source: Adapted Smartpls 4 output (2025)

The results presented in Table 2 provide evidence regarding the discriminant validity of the constructs included in the model. According to the Fornell–Larcker criterion, the square root of the AVE for each construct exceeds its correlations with other constructs in the model, indicating that each latent variable shares more variance with its indicators than with other constructs. This finding suggests that the constructs of productivity, self-regulation, technostress, and workplace agility capture distinct conceptual domains within the proposed research framework. The HTMT ratios further support the discriminant validity of the measurement model, as most values remain below the recommended threshold. These results indicate that the constructs demonstrate sufficient empirical separation, allowing the structural relationships among the variables to be interpreted with greater confidence in the subsequent structural model analysis.

The model fit indices generated by SmartPLS indicate that the proposed model demonstrates an acceptable, though not perfect, level of global fit. The SRMR values of 0.090 for the saturated model and 0.096 for the estimated model suggest that the discrepancy between the observed correlation matrix and the model-implied matrix remains within a tolerable range for PLS-SEM, particularly because values below 0.10 are generally considered acceptable in exploratory and prediction-oriented models. The discrepancy measures  $d_{ULS}$  and  $d_G$  are relatively low in both the saturated and estimated models, indicating that the residual differences between the empirical data and the model are not excessive. Although SmartPLS does not emphasize chi-square as a primary fit criterion in the same way covariance-based SEM does, the reported chi-square values still provide supplementary evidence regarding model-data discrepancy, with the estimated model showing a slightly higher value than the saturated model, as expected. The NFI values of 0.705 and 0.691 indicate moderate model fit, suggesting that the model improves substantially over a null model.

Once the measurement model demonstrated adequate reliability, convergent validity, and discriminant validity, the next step involved evaluating the structural model in order to test the hypothesized relationships among the constructs. Structural model assessment focuses on examining the magnitude and significance of the path coefficients, as well as the explanatory power of the endogenous variables. The significance of the structural paths was assessed using the bootstrapping procedure in

SmartPLS with resampling to obtain standardized path coefficients, t-values, and p-values. In addition, the coefficient of determination ( $R^2$ ) was examined to evaluate the predictive capability of the model for each endogenous construct. The results of the structural model analysis are presented in Table 3, which reports the estimated path coefficients, t-statistics, and significance levels for each hypothesized relationship. To provide a clearer visualization of the relationships among the constructs, the structural model with standardized path coefficients is also illustrated in Figure 1. Together, Table 3 and Figure 1 present the empirical findings of the study and allow for a comprehensive interpretation of how self-regulation, workplace agility, and technostress interact in explaining variations in employee productivity within technology-driven work environments.

Table 3. Structural Model Results: Path Coefficients and Coefficient of Determination

Paths	Effect	t-value	p-value
H1 Self-regulation -> Workplace Agility	0.680	14.877	0.000
H2 Self-regulation -> Technostress	0.384	3.696	0.000
H3 Workplace Agility -> Technostress	0.208	2.155	0.031
H4 Workplace Agility -> Productivity	0.427	6.237	0.000
H5 Technostress -> Productivity	0.357	4.711	0.000
H6 Self-regulation -> Workplace Agility -> Productivity	0.290	5.127	0.000
H7 Self-regulation -> Technostress -> Productivity	0.137	2.545	0.011
H8 Self-regulation -> Workplace Agility -> Technostress -> Productivity	0.050	2.040	0.041
H9 Self-regulation -> Workplace Agility -> Technostress	0.142	2.059	0.040
R2 Productivity		0.452	
R2 Technostress		0.299	
R2 Workplace Agility		0.462	

Note. Path coefficients were estimated using Partial Least Squares Structural Equation Modeling with bootstrapping procedures in SmartPLS. Reported t-values and p-values were obtained from bootstrapping with resampling to test the significance of the hypothesized relationships.  $R^2$  values indicate the proportion of variance explained in each endogenous construct by its predictor variables in the structural model.

Source: Smartpls 4 adapted Output (2025)

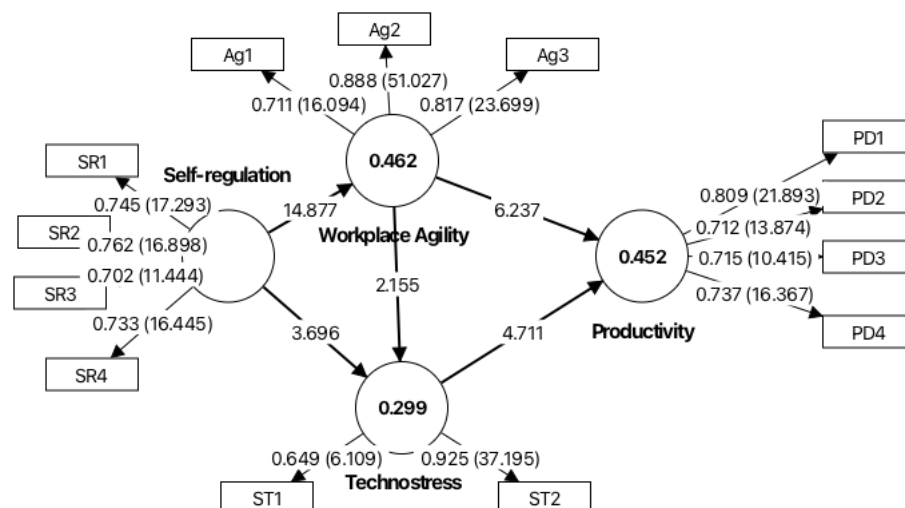


Figure 1. Path Model Result  
 Source: Smartpls 4 Output (2025)

## DISCUSSION

The structural equation modeling (SEM) results provide robust empirical support for the hypothesized framework, with all nine hypotheses (H1–H9) being accepted. The significant relationship between Self-regulation and Workplace Agility (H1) positions internal cognitive control as the primary driver of behavioral flexibility in modern HRM contexts. This finding is deeply situated within the Conservation of Resources (COR) Theory, which suggests that individuals with high self-regulatory strength are better positioned to protect and deploy psychological resources necessary for adaptive responses (Demerouti, 2025; Demerouti et al., 2024). In the current digital landscape, high self-regulation allows employees to manage shifting priorities and maintain focus amidst organizational turbulence, confirming that self-regulation serves as a critical antecedent for both behavioral and digital agility (Jundt & Shoss, 2023; Milani et al., 2024; Petermann & Zacher, 2022). Interestingly, the positive path from Self-regulation to Technostress (H2) suggests that highly self-regulated individuals do not avoid technological complexity but rather engage more intensively with digital tools, thereby increasing their exposure to perceived techno-demands (Marsh et al., 2022; Orhan et al., 2021; Tang et al., 2023). For managers, this implies that the most "disciplined" employees are paradoxically at the highest risk for digital strain, requiring managerial discretion in implementing "digital boundaries" to prevent resource depletion (Benlian, 2020; Ertiö et al., 2024; Salo et al., 2022).

The results for H3, H4, and H5 reveal a sophisticated dual-pathway to Productivity. While Workplace Agility directly drives productivity (H4), it also positively influences Technostress (H3), which subsequently acts as a driver for productivity (H5). This supports the Transactional Theory of Stress, where technostress—specifically dimensions like techno-overload and techno-uncertainty—can function as a "Challenge Stressor" that enhances alertness and output when employees feel they have the resources to cope (Califf et al., 2020; Pflügner et al., 2024; Shi et al., 2023). Within the Job Demands-Resources (JD-R) model, agility represents a personal resource that allows employees to navigate technological demands, yet the speed of adaptation creates a "techno-pressure" that keeps individuals in a high-arousal state (Demerouti, 2025; Marsh et al., 2022; Taser et al., 2022). This "stress-fueled productivity" underscores a shift in HRM from stress elimination to stress optimization, where managers use their discretion to frame digital tools as instruments for professional growth rather than purely as sources of workload (Bourlakis et al., 2023; Ertiö et al., 2024; Salo et al., 2022).

The mediation analysis (H6–H9) provides a deeper look into the socio-technical mechanics of the model. The significant serial mediation (H8) illustrates a complex chain where psychological traits are transformed into performance through behavioral and technological conduits. This is consistent with Socio-Technical Systems Theory, suggesting that performance in the digital era is a "co-determined" process of individual psychological readiness and technological appraisal (Ahmad et al., 2023; Chatterjee et al., 2023; Cosa & Torelli, 2024). The high values for Productivity (0.452) and Workplace Agility (0.462) indicate that the model explains nearly half of the variance in these critical outcomes. Managers should therefore apply discretion by fostering "Agile Capacity Building"—ensuring that the rapid implementation of digital systems does not outpace the development of employee self-regulatory resources, as excessive technostress without sufficient regulation eventually leads to techno-exhaustion (Demerouti et al., 2024; Milani et al., 2024; Schlaegel et al., 2023).

Furthermore, the theoretical tension between the need for speed (Agility) and the cost of connectivity (Technostress) is highlighted by the mediation of Agility between Self-regulation and Technostress (H9). This indicates that agility is the "price" of digital engagement; however, its ultimate positive impact on productivity suggests a state of "Dynamic Stability." In this state, managers must reward agile behaviors while providing "technostress inhibitors" such as digital training and flexible work-rest cycles (Benlian, 2020; Ertiö et al., 2024; Salo et al., 2022). Upholding this "Digital Self-Efficacy," organizations can ensure that the technostress generated by agile workflows remains a catalyst for innovation rather than a precursor to burnout (Tang et al., 2023; Shi et al., 2023). This holistic approach integrates individual psychological strength with organizational agility, positioning technostress as a manageable variable within a high-performance HRM paradigm (Jundt & Shoss, 2023; Petermann & Zacher, 2022).

## **CONCLUSION**

This study concludes that self-regulation plays a foundational role in shaping employee adaptability and performance within digitally intensive workplaces. The findings demonstrate that self-regulation significantly enhances workplace agility while simultaneously increasing exposure to technostress, highlighting the complex behavioral dynamics of technology-driven work environments. Workplace agility emerges as a critical mechanism linking individual psychological capacity to productivity outcomes, confirming that agile employees are better positioned to translate technological demands into performance gains. At the same time, technostress appears not solely as a detrimental factor but as a conditional performance driver when employees possess sufficient psychological and behavioral resources to cope with digital pressures. These results reinforce the importance of integrating psychological capabilities with digital work systems in contemporary HRM strategies. For organizations, the practical implication is clear: investments in digital technologies must be accompanied by initiatives that strengthen employee self-regulation, adaptive capacity, and digital competence. Managerial practices such as structured digital training, flexible work-rest cycles, and supportive leadership can help ensure that technostress remains a manageable challenge rather than a pathway toward burnout, thereby sustaining productivity in technology-intensive work environments.

## **LIMITATION**

Despite these contributions, several limitations should be acknowledged. First, the study relies on cross-sectional survey data, which restricts causal inference and does not capture the dynamic evolution of technostress and agility over time. Second, the data were collected from technology workers in Makassar, which may limit the generalizability of the findings to other cultural or industrial contexts. Third, the reliance on self-reported measures may introduce perceptual bias, although established scales and statistical validation procedures were employed to mitigate this concern. Future research should therefore consider longitudinal designs to examine how self-regulation, technostress, and agility evolve throughout digital transformation processes. Comparative studies across industries or countries may also provide a broader understanding of how organizational context shapes the interaction between psychological resources and digital work demands. Additionally, future models may benefit from incorporating variables such as digital leadership, psychological safety, or digital self-efficacy to further explain how organizations can maintain high productivity while managing the inevitable pressures of technologically mediated work.

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## DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest concerning the study, authorship, and/or publication of this article.

## REFERENCES

- Ahmad, M. O., Ahmad, I., Rana, N. P., & Khan, I. S. (2023). An empirical investigation on business analytics in software and systems development projects. *Information Systems Frontiers*, 25(2), 917–927. <https://doi.org/10.1007/s10796-022-10253-w>
- Alqudah, I. H. A., Carballo-Penela, A., & Ruza-Sanmartín, E. (2022). High-performance human resource management practices and readiness for change: An integrative model including affective commitment, employees' performance, and the moderating role of hierarchy culture. *European Research on Management and Business Economics*, 28(1), 100177. <https://doi.org/10.1016/j.iedeen.2021.100177>
- Andrulli, R., & Gerards, R. (2023). How new ways of working during COVID-19 affect employee well-being via technostress, need for recovery, and work engagement. *Computers in Human Behavior*, 139, 107560. <https://doi.org/10.1016/j.chb.2022.107560>
- Badan Pusat Statistik Kota Makassar. (2024). *Economic growth of Makassar city in the third quarter of 2024*. <https://makassarkota.bps.go.id/en/pressrelease/2024/12/16/84/economic-growth-of-makassar-city-in-the-third-quarter-of-2024.html>
- Benlian, A. (2020). A daily field investigation of technology-driven spillovers from work to home. *MIS Quarterly*, 44(3), 1259–1300. <https://doi.org/10.25300/MISQ/2020/14911>
- Berger, M., Schäfer, R., Schmidt, M., Regal, C., & Gimpel, H. (2024). How to prevent technostress at the digital workplace: A Delphi study. *Journal of Business Economics*, 94(7-8), 1051-1113. <https://doi.org/10.1007/s11573-023-01159-3>
- Blanka, C., Krumay, B., & Rueckel, D. (2022). The interplay of digital transformation and employee competency: A design science approach. *Technological Forecasting and Social Change*, 178, 121575. <https://doi.org/10.1016/j.techfore.2022.121575>
- Bourlakis, M., Nisar, T. M., & Prabhakar, G. (2023). How technostress may affect employee performance in educational work environments. *Technological Forecasting and Social Change*, 193, 122674. <https://doi.org/10.1016/j.techfore.2023.122674>
- Califf, C. B., Sarker, S., & Sarker, S. (2020). The bright and dark sides of technostress: A mixed-methods study involving healthcare IT. *MIS Quarterly*, 44(2), 809–856. <https://doi.org/10.25300/MISQ/2020/14818>
- Carey, K. B., Neal, D. J., & Collins, S. E. (2004). A psychometric analysis of the self-regulation questionnaire. *Addictive Behaviors*, 29(2), 253–260. <https://doi.org/10.1016/j.addbeh.2003.08.001>
- Chatterjee, S., Chaudhuri, R., Vrontis, D., & Giovando, G. (2023). Digital workplace and organization performance: Moderating role of digital leadership capability. *Journal of Innovation & Knowledge*, 8, 100334. <https://doi.org/10.1016/j.jik.2023.100334>
- Cosa, M., & Torelli, R. (2024). Digital transformation and flexible performance management: A systematic literature review of the evolution of performance measurement systems. *Global Journal of Flexible Systems Management*, 25(3), 445–466. <https://doi.org/10.1007/s40171-024-00409-9>
- Demerouti, E. (2025). Job demands-resources and conservation of resources theories: How do they help to explain employee well-being and future job design? *Journal*

- of *Business Research*, 192, 115296. <https://doi.org/10.1016/j.jbusres.2025.115296>
- Demerouti, E., Roth, C., Ebner, K., Soucek, R., & Moser, K. (2024). Toward a better understanding of self-regulation promoting interventions: When performance management and job crafting meet. *Human Resource Management*, 63(5), 849–867. <https://doi.org/10.1002/hrm.22236>
- Ertiö, T., Eriksson, T., Rowan, W., & McCarthy, S. (2024). The role of digital leaders' emotional intelligence in mitigating employee technostress. *Business Horizons*, 67(4), 399–409. <https://doi.org/10.1016/j.bushor.2024.03.004>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N., & Ray, S. (2022). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 34(1), 1–27. <https://doi.org/10.1108/EBR-10-2021-0193>
- Inoue, A., Kawakami, N., Shimomitsu, T., Tsutsumi, A., Haratani, T., Yoshikawa, T., & Odagiri, Y. (2014). Development of a short version of the New Brief Job Stress Questionnaire. *Industrial Health*, 52(6), 535–540. <https://doi.org/10.2486/indhealth.2014-0114>
- Jundt, D. K., & Shoss, M. K. (2023). A process perspective on adaptive performance: Research insights and new directions. *Group & Organization Management*, 48(2), 405–435. <https://doi.org/10.1177/10596011231161404>
- Koopmans, L., Bernaards, C. M., Hildebrandt, V. H., De Vet, H. C. W., & Van der Beek, A. J. (2014). Construct validity of the Individual Work Performance Questionnaire. *Journal of Occupational and Environmental Medicine*, 56(3), 331–337. <https://doi.org/10.1097/JOM.000000000000113>
- Lee, Y. (2023). ICT use, internal communication satisfaction, and engagement of working-from-home employees: The moderating role of affiliative tendency. *Computers in Human Behavior*, 138, 107472. <https://doi.org/10.1016/j.chb.2022.107472>
- Liu, P., Zhang, F., Liu, Y., Liu, S., & Huo, C. (2024). Enabling or burdening? The double-edged sword impact of digital transformation on employee resilience. *Computers in Human Behavior*, 157, 108220. <https://doi.org/10.1016/j.chb.2024.108220>
- López-Cabarcos, M. Á., Vázquez-Rodríguez, P., & Quiñoá-Piñeiro, L. M. (2022). An approach to employees' job performance through work environmental variables and leadership behaviours. *Journal of Business Research*, 140, 361–369. <https://doi.org/10.1016/j.jbusres.2021.11.006>
- Marsh, E., Perez Vallejos, E., & Spence, A. (2022). The digital workplace and its dark side: An integrative review. *Computers in Human Behavior*, 128, 107118. <https://doi.org/10.1016/j.chb.2021.107118>
- Microsoft & LinkedIn. (2024). *Work Trend Index 2024: AI at work in Indonesia*. Microsoft News Center. <https://news.microsoft.com/id-id/2024/06/11/microsoft-and-linkedin-release-the-2024-work-trend-index-on-the-state-of-ai-at-work-in-indonesia/>
- Milani, R., Sommovigo, V., Ghirotto, L., & Setti, I. (2024). Individual differences in learning agility at work: A mixed methods study to develop and validate a new scale. *Human Resource Development Quarterly*, 35(4), 455–475. <https://doi.org/10.1002/hrdq.21528>
- Orhan, M. A., Castellano, S., Khelladi, I., Marinelli, L., & Monge, F. (2021). Technology distraction at work: Impacts on self-regulation and work engagement. *Journal of Business Research*, 126, 341–349. <https://doi.org/10.1016/j.jbusres.2020.12.048>
- Petermann, M. K. H., & Zacher, H. (2022). Workforce agility: Development and validation of a multidimensional measure. *Frontiers in Psychology*, 13, 841862. <https://doi.org/10.3389/fpsyg.2022.841862>

- Pflügner, K., Maier, C., Thatcher, J. B., Mattke, J., & Weitzel, T. (2024). Deconstructing technostress: A configurational approach to explaining job burnout and job performance. *MIS Quarterly*, 48(2), 679–698. <https://doi.org/10.25300/MISQ/2023/16978>
- Salo, M., Pirkkalainen, H., Chua, C. E. H., & Koskelainen, T. (2022). Formation and mitigation of technostress in the personal use of IT. *MIS Quarterly*, 46(2), 1073–1108. <https://doi.org/10.25300/MISQ/2022/14950>
- Schlaegel, C., Gunkel, M., & Taras, V. (2023). COVID-19 and individual performance in global virtual teams: The role of self-regulation and individual cultural value orientations. *Journal of Organizational Behavior*, 44(1), 102–131. <https://doi.org/10.1002/job.2671>
- Shi, S., Chen, Y., & Cheung, C. M. K. (2023). How technostressors influence job and family satisfaction: Exploring the role of work-family conflict. *Information Systems Journal*, 33(4), 953–985. <https://doi.org/10.1111/isj.12431>
- Tang, P. M., Koopman, J., Yam, K. C., De Cremer, D., Zhang, J. H., & Reynders, P. (2023). The self-regulatory consequences of dependence on intelligent machines at work: Evidence from field and experimental studies. *Human Resource Management*, 62(5), 721–744. <https://doi.org/10.1002/hrm.22154>
- Taser, D., Aydin, E., Ozer Torgaloz, A., & Rofcanin, Y. (2022). An examination of remote e-working and flow experience: The role of technostress and loneliness. *Computers in Human Behavior*, 127, 107020. <https://doi.org/10.1016/j.chb.2021.107020>
- Tomprou, M., & Lee, M. K. (2022). Employment relationships in algorithmic management: A psychological contract perspective. *Computers in Human Behavior*, 126, 106997. <https://doi.org/10.1016/j.chb.2021.106997>
- Umair, A., Conboy, K., & Whelan, E. (2023). Examining technostress and its impact on worker well-being in the digital gig economy. *Internet Research*, 33(4), 206–242. <https://doi.org/10.1108/INTR-03-2022-0214>
- Vuchkovski, D., Zalaznik, M., Mitreĝa, M., & Pfajfar, G. (2023). A look at the future of work: The digital transformation of teams from conventional to virtual. *Journal of Business Research*, 163, 113912. <https://doi.org/10.1016/j.jbusres.2023.113912>

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