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EXTENDING THE TECHNOLOGY ACCEPTANCE MODEL THROUGH TECHNO-EUSTRESS: A COMPREHENSIVE ANALYSIS OF DIGITAL TRANSFORMATION IN INDONESIAN BANKING

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ABSTRACT

Purpose – This study extends the Technology Acceptance Model (TAM) by introducing techno-eustress as a crucial mediating mechanism explaining how technology perceptions translate into work engagement. We examine both direct and indirect pathways through which perceived usefulness, perceived ease of use, supervisory support, and digital training satisfaction influence work engagement among millennial and Generation Z banking employees in Indonesia.

Design/methodology/approach – Using Partial Least Squares Structural Equation Modeling (PLS-SEM), we analyzed data from 307 banking employees. The study integrates TAM, UTAUT, and Job Demands-Resources (JD-R) theory to develop a comprehensive model testing 13 hypotheses including direct effects, indirect effects through techno-eustress, and mediation mechanisms.

Findings – Techno-eustress significantly mediates relationships between technology perceptions and work engagement. Perceived usefulness ($\beta = 0.248$, $p < 0.001$), perceived ease of use ($\beta = 0.293$, $p < 0.001$), and supervisory support ($\beta = 0.300$, $p < 0.001$) positively influence techno-eustress, which strongly drives work engagement ($\beta = 0.320$, $p < 0.001$). Direct effects on work engagement are significant for PU ($\beta = 0.270$, $p < 0.001$), PEOU ($\beta = 0.188$, $p < 0.001$), and SS ($\beta = 0.212$, $p < 0.001$). The model explains 25.3% of variance in techno-eustress and 38.7% in work engagement. Digital training satisfaction shows no significant effects.

Research implications – This study extends TAM beyond adoption behaviors to well-being outcomes through dual pathways. Technology acceptance factors predict usage and generate positive psychological states enhancing employee engagement through multiple mechanisms, addressing TAM's limited scope critiques.

Practical implications – Organizations should implement user-friendly technologies with clear performance benefits and ensure strong supervisory support during digital transformation. Techno-eustress's partial mediation suggests managers should frame technology challenges as growth opportunities while ensuring direct support pathways. Resources may be better invested in system design and leadership development than extensive formal training for younger employees.

Originality/value – This research introduces techno-eustress to TAM with a comprehensive 13-hypothesis model testing both direct and mediated effects, providing the missing link between technology perceptions and employee well-being. We demonstrate that technology stress can be positive and energizing when properly managed through multiple pathways.

Keywords: Technology Acceptance Model, Techno-eustress, Work engagement, Digital transformation, Banking, PLS-SEM, Mediation analysis

1. INTRODUCTION

The Technology Acceptance Model (TAM) remains the dominant framework for understanding technology adoption, demonstrating that perceived usefulness and perceived ease of use predict technology usage. However, TAM faces persistent criticism for its narrow focus on adoption while neglecting broader impacts on employee well-being and performance (Cao et al., 2021). As organizations invest heavily in digital transformation, understanding how technology affects psychological states and work engagement becomes critical

This study addresses this gap by extending TAM through techno-eustress positive, energizing stress from technology use as both a mediating mechanism and examining direct pathways to work engagement. While research has documented technology's potential to create stress (Li and Wang, 2021; Molino et al., 2020) recent developments recognize that technology demands can generate positive stress enhancing motivation. By incorporating techno-eustress into TAM with 13 hypotheses, we provide a complete picture of how technology acceptance factors influence employee well-being through multiple pathways.

Indonesia's banking sector offers an ideal context. With mandatory digital transformation driven by regulatory requirements and fintech competition, Indonesian banks experience rapid technological change (Bank Indonesia, 2024; Susanto and Aljoza, 2015). The workforce increasingly comprises millennials and Generation Z who bring different technology expectations, potentially experiencing technology stress differently (Deloitte, 2023; Gümüsay et al., 2020). Understanding how younger employees transform technology demands into positive challenges is crucial for successful digital transformation.

Our research makes several theoretical contributions. First, we extend TAM by demonstrating its core constructs influence not just technology acceptance but also positive psychological states driving work engagement through both direct and indirect pathways. Second, we introduce techno-eustress as a partial mediating mechanism, explaining how cognitive technology perceptions translate into affective-motivational outcomes Third, we integrate TAM with JD-R theory and UTAUT to provide a comprehensive framework (Bakker and de Vries, 2021). Finally, we offer empirical evidence from a non-Western, developing country context (Nurhas et al., 2022)

The practical implications are significant. By identifying factors fostering techno-eustress and demonstrating its positive impact while revealing direct pathways also exist, we provide nuanced guidance for organizations. Our findings suggest focusing on technology design, supportive leadership, and understanding multiple influence pathways may be more effective than extensive training programs for younger, digitally fluent employees (Momani, 2020).

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Technology Acceptance Model and Its Extensions

TAM posits that perceived usefulness and perceived ease of use determine attitudes toward technology, influencing behavioral intention and usage (Cao et al., 2021; Momani, 2020). Despite extensive validation, TAM's focus on adoption behaviors is increasingly recognized as limiting Recent critiques argue TAM research needs to address more fundamental questions about technology's organizational role (Wang and Galloway, 2021).

The Unified Theory of Acceptance and Use of Technology (UTAUT) represents comprehensive extension, identifying performance expectancy, effort expectancy, social influence, and facilitating conditions as key determinants (Dwivedi et al., 2019). Despite these extensions, TAM variants remain primarily focused on predicting usage rather than understanding technology's impact on employee well-being (Scherer et al., 2019). In mandatory use contexts like banking, the critical question is not whether employees use technology but how it affects their motivation and engagement (von Terzi et al., 2021).

Our study extends TAM by incorporating techno-eustress as a partial mediating mechanism while examining direct effects of technology perceptions on work engagement. We propose perceived usefulness and ease of use influence engagement through two pathways: directly by facilitating effective performance, and indirectly by generating positive psychological states.

2.2 Techno-Eustress: Positive Technology Stress

Technostress research has extensively documented negative consequences of technology use (Li & Wang, 2021). However, this overlooks stress theory's fundamental distinction between distress and eustress. Eustress occurs when demands are appraised as challenges offering growth opportunities, generating positive emotions and enhanced performance

Tarafdar et al (2024) conceptualized techno-eustress as positive stress when using ICT, where technology demands are appraised as challenges promoting personal growth rather than threats. Empirical research is expanding rapidly. (Califf et al., 2020) found healthcare workers experiencing techno-eustress showed increased satisfaction and performance. (Zielonka & Rothlauf, 2021) demonstrated techno-eustress mediated relationships between digital competence and innovative behavior among knowledge workers. (Zhang et al., 2024) showed techno-eustress associated with increased learning agility among younger employees. Recent meta-analyses confirm positive relationships between challenge stressors and employee outcomes.

2.3 Job Demands-Resources Theory Integration

The Job Demands-Resources (JD-R) model provides a framework for understanding how workplace factors influence employee well-being. JD-R theory proposes dual processes: health impairment where excessive demands lead to burnout, and motivational processes where resources foster engagement. Recent revisions acknowledge challenge demands can activate motivational processes when sufficient resources exist.

In technology contexts, JD-R theory explains why technological changes can energize some employees while exhausting others. Technology functions as a demand requiring learning and adaptation, and simultaneously as a resource enabling efficient task completion (Adisa et al., 2023). The JD-R framework supports both direct and mediated effects resources can directly enhance engagement while also buffering demands and transforming them into challenges, creating positive psychological states driving engagement.

2.4 Hypothesis Development

2.4.1 Effects on Techno-Eustress (H1-H4)

H1: Perceived usefulness is positively related to techno-eustress.

Perceived usefulness reflects beliefs about technology's instrumental value for performance enhancement. When employees perceive technology as useful, they view associated demands as investments in capability development rather than burdensome requirements, aligning with challenge appraisal. Research demonstrates usefulness

perceptions generate positive emotions and approach behaviors. For younger employees valuing efficiency, useful technology aligns with intrinsic motivations, facilitating positive arousal associated with techno-eustress.

H2: Perceived ease of use is positively related to techno-eustress.

Perceived ease of use influences techno-eustress through multiple mechanisms. It reduces cognitive load, freeing mental resources for engaging with challenging rather than frustrating aspects (Sweller et al., 2019). Ease of use builds self-efficacy when technology is intuitive, employees develop confidence approaching advanced features as exciting challenges (Chatterjee et al., 2024). Third, ease of use facilitates flow experiences where basic operation is effortless, enabling engagement with progressively complex challenges (Marikyan and Papagiannidis, 2025).

H3: Supervisory support is positively related to techno-eustress.

Supervisory support provides instrumental and emotional resources shaping technology experiences. Supportive supervisors provide time, training access, and problem-solving assistance, reducing objective difficulty. Emotionally, they offer encouragement and psychological safety for experimentation. Research confirms supervisory support's importance during technological change (Zheng et al., 2025) . The sense-making role is especially important by framing technology as opportunity rather than threat, supervisors influence cognitive appraisals (Sadiq et al., 2023).

H4: Digital training satisfaction is positively related to techno-eustress.

Digital training satisfaction reflects evaluation of training quality and effectiveness. Training theoretically provides knowledge necessary for confident technology use, building self-efficacy enabling challenge appraisal (Chatterjee et al., 2024). However, for digital natives who developed technology skills through lifelong informal learning, formal training may be less relevant (Gümüsay et al., 2020). Nevertheless, specialized training on banking-specific systems may contribute to techno-eustress by reducing uncertainty.

2.4.2 Techno-Eustress Effect (H5)

H5: Techno-eustress is positively related to work engagement.

Techno-eustress represents technology demands experienced as positive challenges energizing rather than depleting. This positive arousal manifests as vigor, dedication, and absorption characterizing work engagement. From JD-R theory, techno-eustress represents challenge demands activating motivational processes toward engagement. Positive emotions associated with techno-eustress broaden thought-action repertoires and build psychological resources sustaining engagement. Successfully managing techno-eustress generates resource gains creating upward spirals fueling engagement.

2.4.3 Direct Effects on Work Engagement (H6-H9)

H6: Perceived usefulness is positively related to work engagement.

Perceived usefulness directly enhances work engagement by enabling effective task performance and facilitating achievement of work goals. Useful technology removes obstacles, streamlines processes, and amplifies capabilities, allowing workers to focus energy on meaningful aspects. Research on work design demonstrates job resources enhancing performance directly predict engagement. Useful technology supports autonomy by providing effective tools to exercise discretion, directly fueling intrinsic motivation.

H7: Perceived ease of use is positively related to work engagement.

Perceived ease of use directly influences work engagement by reducing frustration, enabling smooth task execution, and freeing cognitive resources for meaningful work. Easy-to-use technology creates positive user experiences generating satisfaction and positive affect that generalize to overall work attitudes. Seamless technology integration allows employees to enter flow states where engagement naturally emerges (Khoza et al., 2024).

H8: Supervisory support is positively related to work engagement.

Supervisory support directly enhances work engagement through well-established mechanisms beyond fostering techno-eustress. Supportive supervisors provide recognition, feedback, and encouragement fulfilling employees' needs for competence and relatedness, directly fueling intrinsic motivation. Meta-analytic evidence demonstrates positive relationships between supervisory support and employee engagement. Support signals organizational value for employees' contributions, enhancing psychological safety and encouraging discretionary effort (Kissi et al., 2024).

H9: Digital training satisfaction is positively related to work engagement.

Digital training satisfaction may directly influence work engagement by building confidence, providing mastery experiences, and demonstrating organizational investment in development (Chatterjee et al., 2024). Training perceived as high-quality signals organizational value for employee development, fostering psychological contract fulfillment enhancing commitment and engagement. However, the relevance of formal digital training for younger, digitally native employees may be limited.

2.4.4 Mediation Effects (H10-H13)

H10: Techno-eustress mediates the relationship between perceived usefulness and work engagement.

Perceived usefulness influences techno-eustress, which affects work engagement. This indirect pathway complements the direct effect (H6). Perceived usefulness shapes cognitive appraisals determining whether technology demands are experienced as positive challenges, generating techno-eustress that activates motivational processes toward engagement. Mediation is expected to be partial because useful technology also directly facilitates task performance.

H11: Techno-eustress mediates the relationship between perceived ease of use and work engagement.
Perceived ease of use influences work engagement directly (H7) and indirectly through techno-eustress (H2→H5). The indirect pathway reflects how ease of use shapes confidence enabling employees to appraise advanced features as exciting challenges. This confidence-building generates techno-eustress, with resulting positive arousal fueling engagement. Partial mediation is expected because ease of use also directly reduces cognitive load.
H12: Techno-eustress mediates the relationship between supervisory support and work engagement.
Supervisory support influences work engagement directly (H8) through providing resources, and indirectly (H3→H5) by shaping how employees experience technology demands. The mediation pathway reflects supervisors' role in framing technology as opportunity, providing psychological safety, and offering encouragement. Supportive supervisors help transform objective demands into subjectively experienced positive challenges generating techno-eustress that drives engagement.
H13: Techno-eustress mediates the relationship between digital training satisfaction and work engagement.
Digital training satisfaction theoretically influences work engagement directly (H9) through building competence, and indirectly (H4→H5) by preparing employees to experience technology demands as manageable challenges. However, given potential generational differences, this mediation may be weak or non-significant for digital natives.

3. RESEARCH METHODOLOGY

3.1 Research Context and Sample
This study was conducted in Indonesia's banking sector, experiencing rapid digital transformation driven by regulatory mandates and fintech competition. The Financial Services Authority's (OJK) Digital Financial Innovation Roadmap requires comprehensive digitalization including AI implementation and open banking APIs (OJK, 2020).
Our target population consisted of millennial (born 1981-1996) and Generation Z (born 1997-2012) employees in operational banking roles requiring daily technology use. We focused on younger employees representing the future workforce who may experience technology differently than older generations (Deloitte, 2023).
Data were collected through online surveys distributed via banking associations from August-September 2025. After removing incomplete responses, the final sample comprised 307 participants. The sample included 61% millennials and 39% Generation Z employees, with mean age 28.7 years (SD = 4.9). Gender distribution was balanced (54% female, 46% male). Participants averaged 4.2 years banking experience (SD = 2.8) and represented various commercial banks across Indonesia.
3.2 Measures
All constructs were measured using established scales adapted to Indonesian banking context. Items were translated to Bahasa Indonesia using back-translation procedures. Responses used 5-point Likert scales (1 = strongly disagree, 5 = strongly agree).
Perceived Usefulness (7 items): Adapted from established TAM scales (Teo, 2009). Example: "Using digital banking tools improves my job performance." ($\alpha = 0.986$, CR = 0.988, AVE = 0.924)
Perceived Ease of Use (5 items): Adapted from TAM literature (Teo, 2009) Example: "My interaction with digital banking systems is clear and understandable." ($\alpha = 0.982$, CR = 0.986, AVE = 0.932)
Digital Training Satisfaction (4 items): Adapted from training effectiveness literature (Otoo, 2024)Example: "Digital training programs meet my needs." ($\alpha = 0.973$, CR = 0.980, AVE = 0.924)
Supervisory Support (6 items): Adapted from supervisor support scales (Kissi et al., 2023b; Otoo, 2024). Example: "My supervisor strongly supports my use of new banking technologies." ($\alpha = 0.986$, CR = 0.988, AVE = 0.933)
Techno-Eustress (8 items): Adapted from Techno-eustress scale (Nascimento et al., 2024). Example: "Technology-related challenges at work energize me." ($\alpha = 0.993$, CR = 0.993, AVE = 0.950)
Work Engagement (9 items): Work Engagement Scale(Moisoglou et al., 2024). Measuring vigor, dedication, and absorption. ($\alpha = 0.988$, CR = 0.990, AVE = 0.914)
3.3. Common Method Bias
To address concerns about common method bias inherent in single-source, self-report data, we employed several procedural remedies during survey design and administration to mitigate potential common method bias. First, we guaranteed respondent anonymity to reduce evaluation apprehension and social desirability concerns. Second, we ensured clear and straightforward item wording to minimize item ambiguity and interpretation biases. Third, we separated items measuring independent variables from those measuring dependent variables throughout the questionnaire to reduce proximity effects. These procedural controls represent best practices for minimizing common method variance in cross-sectional survey research and help minimize artificial covariation among variables attributable to measurement method rather than construct relationships.
3.4 Data Analysis
We employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4.0. PLS-SEM is appropriate for complex models, theory extension, and does not require multivariate normality (Sarstedt et al., 2021).
Analysis followed systematic two-stage approach:
Stage 1: Measurement Model Assessment

- Internal consistency reliability: Cronbach's alpha and composite reliability
- Convergent validity: Average Variance Extracted (AVE)
- Discriminant validity: Fornell-Larcker criterion and HTMT ratio

Stage 2: Structural Model Assessment

- Path coefficients through bootstrapping (5,000 subsamples)
- R^2 for endogenous constructs
- Effect sizes (f^2)
- Predictive relevance (Q^2)
- Mediation analysis following contemporary best practices (Nitzl et al., 2016).

4. RESULTS

4.1 Measurement Model Assessment

All constructs demonstrated excellent reliability and validity, exceeding recommended thresholds (Hair et al., 2022).

Table 1: Measurement Model Assessment

Construct	Items	Cronbach's α	CR	AVE
Perceived Usefulness (PU)	7	0.986	0.988	0.924
Perceived Ease of Use (PEOU)	5	0.982	0.986	0.932
Digital Training Satisfaction (DTS)	4	0.973	0.980	0.924
Supervisory Support (SS)	6	0.986	0.988	0.933
Techno-Eustress (TE)	8	0.993	0.993	0.950
Work Engagement (WE)	9	0.988	0.990	0.914

All Cronbach's alpha values exceed 0.97, indicating exceptional internal consistency. Composite reliability values range from 0.980 to 0.993, well above 0.70 threshold. AVE values range from 0.914 to 0.950, substantially exceeding 0.50 criterion, demonstrating strong convergent validity.

4.2 Discriminant Validity

Discriminant validity was confirmed using Fornell-Larcker criterion square root of AVE for each construct exceeded all correlations with other constructs. All HTMT ratios were below 0.85 (range: 0.413 to 0.651), well below the conservative threshold, providing additional evidence of discriminant validity (Sarstedt et al., 2021).

4.3 Structural Model Results

The structural model demonstrated strong explanatory and predictive power:

- R^2 for Techno-Eustress = 0.253 (weak to moderate)
- R^2 for Work Engagement = 0.387 (moderate)
- Q^2 for Techno-Eustress = 0.237 (medium predictive relevance)
- Q^2 for Work Engagement = 0.350 (large predictive relevance)

The model explains 25.3% of variance in techno-eustress and 38.7% in work engagement, indicating moderate explanatory power. Both Q^2 values exceed zero, confirming predictive relevance (Hair et al., 2022).

4.4 Hypothesis Testing Results

Table 2: Hypothesis Testing Results (Complete 13-Hypothesis Model)

Hypothesis	Path	β	t-value	p-value	95% CI	f^2	Decision
Effect of Techno-Eustress							
H1	PU → TE	**0.248**	**4.865**	0.000	**[0.146, 0.346]**	**0.082**	Supported
H2	PEOU → TE	**0.293**	**6.517**	0.000	**[0.205, 0.379]**	**0.115**	Supported
H3	SS → TE	**0.300**	**6.067**	0.000	**[0.199, 0.394]**	**0.120**	Supported
H4	DTS → TE	**-0.066**	**1.256**	0.209	**[-0.161, 0.044]**	**0.006**	Not Supported
H5	TE → WE	**0.320**	**6.163**	0.000	**[0.216, 0.422]**	**0.125**	Supported
Direct Effects on Work Engagement							
H6	PU → WE	**0.270**	**5.681**	0.000	**[0.173, 0.360]**	**0.110**	Supported
H7	PEOU → WE	**0.188**	**4.094**	0.000	**[0.097, 0.278]**	**0.052**	Supported

H8	SS → WE	**0.212**	**5.062**	0.000	**[0.131, 0.295]**	**0.065**	Supported
H9	DTS → WE	**0.014**	**0.308**	0.758	**[-0.076, 0.101]**	**0.000**	Not Supported
Mediation Effect							
H10	PU → TE → WE	**0.079**	**3.685**	0.000	**[0.041, 0.125]**	-	Supported (Partial)
H11	PEOU → TE → WE	**0.094**	**4.223**	0.000	**[0.054, 0.141]**	-	Supported (Partial)
H12	SS → TE → WE	**0.096**	**4.228**	0.000	**[0.054, 0.144]**	-	Supported (Partial)
H13	DTS → TE → WE	**-0.021**	**1.215**	0.224	**[-0.055, 0.014]**	-	Not Supported

Note: *** $p < 0.001$; β = standardized path coefficient; f^2 = effect size

4.5 Key Findings

Effects on Techno-Eustress: Supervisory support emerged as the strongest predictor (β = 0.300), followed by perceived ease of use (β = 0.293) and perceived usefulness (β = 0.248). Digital training satisfaction showed no significant effect (β = -0.066, p = 0.209).

Techno-Eustress to Engagement: Techno-eustress demonstrated strong positive effect on work engagement (β = 0.320, $f^2 = 0.125$), validating it as a meaningful psychological state energizing employees.

Direct Effects: Perceived usefulness showed strongest direct effect (β = 0.270), followed by supervisory support (β = 0.212) and perceived ease of use (β = 0.188). Digital training satisfaction showed no significant direct effect (β = 0.014, p = 0.758).

Mediation Effects: Techno-eustress significantly mediated relationships for PU→WE (β = 0.079), PEOU→WE (β = 0.094), and SS→WE (β = 0.096), all showing partial mediation. DTS→TE→WE mediation was not significant (β = -0.021, p = 0.224).

Total Effects on Work Engagement:

- Perceived Usefulness: 0.349 (0.270 direct + 0.079 indirect)
- Supervisory Support: 0.308 (0.212 direct + 0.096 indirect)
- Perceived Ease of Use: 0.282 (0.188 direct + 0.094 indirect)
- Digital Training Satisfaction: -0.007 (non-significant)

5. DISCUSSION

5.1 Theoretical Contributions

5.1.1 Extending TAM to Well-Being Outcomes

Our fundamental contribution is successfully extending TAM to encompass employee well-being through comprehensive dual-pathway model. The significant relationships between TAM's core constructs and both techno-eustress and work engagement demonstrate that technology perceptions shape not just usage intentions but also psychological states and motivational outcomes addresses longstanding critiques that TAM's narrow focus limits its relevance.

The partial mediation patterns are particularly theoretically significant. Partial mediation indicates technology factors influence engagement through dual processes: cognitive-affective (via techno-eustress) and instrumental (direct performance facilitation). This dual-process understanding enriches TAM by recognizing that technology acceptance involves both rational evaluation and emotional experience (Marikyan and Papagiannidis, 2025).

5.1.2 Validating Techno-Eustress as Motivational Construct

Our results provide strong empirical support for techno-eustress as meaningful psychological construct driving positive outcomes. The substantial path coefficient from techno-eustress to work engagement (β = 0.320, explaining 10.2% of engagement variance independently) demonstrates that technology stress can indeed be positive and energizin (Fan et al., 2021).

This finding challenges the dominant technostress paradigm focusing almost exclusively on harmful effects (Molino et al., 2020). Our study demonstrates that under appropriate conditions useful technology, ease of use, supervisory support—technology demands can generate positive challenge experiences fueling motivation and engagement. The validation of techno-eustress extends stress theory frameworks into technology domain (Tarafdar et al., 2024).

5.1.3 Identifying Antecedents of Techno-Eustress

By explaining 25.3% of variance in techno-eustress, our model identifies key factors determining whether employees experience technology demands as positive challenges. The critical role of supervisory support (β = 0.300, strongest predictor) extends UTAUT's facilitating conditions construct and JD-R theory's emphasis on job resources Our findings demonstrate supervisors function not just as providers of technical assistance but as shapers of psychological experiences through framing, encouragement, and psychological safety.

The comparable effects of ease of use and supervisory support (β = 0.293 vs. 0.300) suggest technological and social factors are equally important. This challenges technology-deterministic perspectives and supports socio-technical approaches recognizing that technology's impact depends on social context.

5.1.4 Challenging Training Assumptions for Digital Natives

Perhaps our most provocative theoretical finding is the complete non-significance of digital training satisfaction in predicting either techno-eustress or work engagement. This challenges fundamental assumptions in human resource development theory.

For millennials and Generation Z employees, formal digital training appears irrelevant to their psychological states and work engagement. This suggests traditional training theory may not apply to digital natives who developed technology competence through lifelong informal learning. The negative (though non-significant) path coefficient to techno-eustress (β = -0.066) even hints that formal training might be perceived as condescending by digitally fluent employees.

This finding aligns with recent research suggesting younger employees prefer self-directed, experiential learning over formal instruction. Future theory development should incorporate alternative learning pathways relevant for digital natives.

5.2 Practical Implications

5.2.1 Prioritize Useful, User-Friendly Technology

The strong effects of both perceived usefulness and ease of use on techno-eustress and work engagement (total effects β = 0.349 and 0.282) emphasize that technology characteristics fundamentally shape employee experiences. Organizations should invest in user experience design, clearly communicate performance benefits, involve end users in technology selection, and avoid technology for technology's sake (Scherer et al., 2019).

5.2.2 Develop Digital Leadership Capabilities

Supervisory support's status as strongest predictor of techno-eustress (β = 0.300) and second-strongest total effect on work engagement (β = 0.308) highlights that digital transformation success depends critically on frontline leadership. Organizations should train supervisors in digital change leadership, ensure supervisor competence with new systems, create supportive performance management, and empower supervisors with resources.

Digital leadership development should focus on: (1) framing technology as opportunity rather than threat, (2) creating psychological safety for experimentation, (3) providing timely assistance with technical problems, and (4) recognizing adaptation efforts.

5.2.3 Reconsider Digital Training for Younger Employees

The complete non-significance of digital training satisfaction challenges conventional practices. For millennial and Generation Z employees, organizations should minimize mandatory formal training, shift to just-in-time microlearning, facilitate peer learning, focus training on domain-specific applications, and reallocate training budgets to technology UX improvement or supervisory support capabilities.

Organizations should recognize that younger employees often learn technology more effectively through: exploratory learning, online resources, peer knowledge sharing, and trial-and-error experimentation. Training resources might be better directed toward developing supervisory support capabilities or improving technology usability.

5.2.4 Frame Technology as Challenge and Growth Opportunity

The critical mediating role of techno-eustress (explaining 10.2% of engagement variance) demonstrates that how employees experience technology psychologically determines its impact. Organizations should use positive growth-oriented communication, celebrate technology mastery, create psychological safety for experimentation, and set stretch goals for technology use (Zhao et al., 2024).

Change communication should emphasize: learning opportunities, capability enhancement, career development, and competitive advantages. Avoid threat-focused messaging about efficiency requirements or job displacement.

5.2.5 Adopt Multi-Pathway Approach to Enhancing Engagement

The partial mediation patterns demonstrate engagement can be fostered through multiple mechanisms. Organizations should simultaneously address direct and indirect pathways, recognize individual differences, and monitor both instrumental and psychological indicators.

A comprehensive approach includes: (1) selecting technology that directly facilitates performance, (2) ensuring supportive supervision that frames challenges positively, (3) creating conditions for techno-eustress through appropriate challenge levels, and (4) providing flexibility for employees to craft their own technology experiences.

5.3 Limitations and Future Research

Several limitations suggest future research directions. Our cross-sectional design precludes definitive causal claims longitudinal designs tracking employees before, during, and after technology implementations would strengthen causal inference and reveal how techno-eustress evolves over time (Sarstedt et al., 2021).

Our sample consisted exclusively of younger banking employees in Indonesia. Future research should examine age as moderator to test whether relationships differ across generational cohorts, investigate generalizability across industries with different technology demands, conduct cross-cultural research examining whether cultural values moderate relationships, and examine technology-specific effects for different system types (Nurhas et al., 2022).

All variables were measured through self-report surveys future research should incorporate objective performance data, supervisor ratings, behavioral indicators from system logs, and experience sampling methods (Kock, 2017).

While our model explains substantial variance (38.7%), over 60% remains unexplained. Future research should examine individual differences (growth mindset, technology self-efficacy, personality), job characteristics (task complexity, autonomy, workload), and organizational factors (change management quality, organizational culture, peer support).

Our model assumes linear relationships future research should investigate optimal levels of techno-eustress beyond which it becomes overwhelming, interaction effects between antecedents, and temporal dynamics of relationships over implementation stages.

Future research should also explore: (1) boundary conditions distinguishing when technology generates eustress versus distress, (2) individual traits predicting techno-eustress propensity, (3) team-level effects and social contagion processes, (4) long-term consequences of sustained techno-eustress, and (5) differential effects across technology types and implementation contexts.

6. CONCLUSION

This study successfully extends TAM beyond adoption behaviors to encompass employee well-being outcomes through a comprehensive 13-hypothesis model. By introducing techno-eustress as both a direct driver of work engagement and a partial mediator of technology perception effects, we provide a more complete understanding of how technology influences employees during digital transformation.

Our key empirical findings demonstrate that: (1) Technology perceptions matter for well-being, not just adoption perceived usefulness and ease of use significantly predict both techno-eustress and work engagement, extending TAM's relevance beyond usage prediction; (2) Techno-eustress is a powerful motivational state the strong effect on work engagement ($\beta = 0.320$) validates that technology stress can be positive and energizing; (3) Multiple pathways connect technology to engagement partial mediation patterns reveal technology influences engagement through dual processes; (4) Supervisory support is critical emerging as strongest predictor of techno-eustress and showing substantial effects on engagement highlights the importance of human leadership; (5) Digital training may be irrelevant for younger employees complete non-significance challenges conventional assumptions about formal training.

These findings carry important practical implications for organizations undergoing digital transformation. Success depends not on eliminating technology stress but transforming it into techno-eustress through: selecting useful, user-friendly technology; developing digital leadership capabilities; reconsidering training approaches for younger employees; framing technology as challenge; and addressing multiple pathways simultaneously.

Our theoretical contributions are equally significant. We demonstrate that TAM constructs predict well-being through both direct and mediated pathways, addressing critiques about TAM's narrow scope. We validate techno-eustress as meaningful construct that can be fostered through appropriate antecedents. We challenge assumptions about digital training's importance for digital natives. We integrate multiple theoretical perspectives—TAM, UTAUT, JD-R theory, stress appraisal theory into a coherent framework explaining how technology shapes employee experiences.

As organizations worldwide accelerate digital transformation, understanding how to foster techno-eustress becomes increasingly critical for employee well-being, engagement, and organizational success. Our extended TAM provides theoretical foundation and empirical evidence demonstrating that technology challenges can energize rather than exhaust employees when useful, user-friendly atechnology is implemented with strong supervisory support. This perspective shift from managing technostress to fostering techno-eustress represents a new paradigm for successful digital transformation that views technology demands as opportunities to enhance employee motivation, growth, and engagement.

The future of work is increasingly digital. How technology affects employees depends on both technology characteristics and organizational support, operating through direct performance facilitation and indirect psychological mechanisms. By thoughtfully attending to these factors, organizations can transform digital transformation from a source of stress and resistance into a driver of positive challenge experiences that energize employees and enhance organizational capability.

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