The Effect of Digital Competence and Work-Life Balance on Employee Performance Through Work Engagement Among Working Students at Universitas Pembangunan Panca Budi Medan

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Abstract

This study examines the effects of digital competence and work-life balance on employee performance, with work engagement positioned as a mediating variable, among working students at Universitas Pembangunan Panca Budi (UNPAB) Medan. Adopting a quantitative causal-associative design, primary data were collected via a structured five-point Likert-scale questionnaire from 32 cross-sector working students enrolled in undergraduate working-class (S1) and postgraduate (S2) programs. Data were analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4 with 5,000 bootstrap subsamples (two-tailed, $\alpha = 0.05$). The findings reveal that work-life balance positively and significantly influences work engagement ($\beta = 0.495$; $p = 0.029$), while both digital competence ($\beta = 0.404$; $p = 0.038$) and work engagement ($\beta = 0.394$; $p = 0.023$) exert positive and significant direct effects on employee performance. The structural model accounts for 67.9% of the variance in employee performance ($R^2 = 0.679$; $Q^2 = 0.448$). Conversely, the direct effect of digital competence on work engagement, the direct effect of work-life balance on employee performance, and both mediating pathways were not statistically significant at the 5% level. These results indicate that digital competence and work engagement directly drive job performance, whereas work-life balance primarily sustains employees' psychological engagement.

Keywords: *digital competence; work-life balance; work engagement; employee performance; PLS-SEM; working students.*

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INTRODUCTION

Digital transformation has reshaped workplace expectations, requiring employees to demonstrate strong digital competence alongside the ability to balance professional responsibilities and personal commitments. This dual pressure is particularly evident among working students at Universitas Pembangunan Panca Budi (UNPAB) Medan, who simultaneously fulfill full-time organizational duties and pursue higher academic qualifications.

Employee performance serves as a core benchmark of organizational effectiveness, reflected in work quality, output quantity, and adherence to deadlines [1]. In digitally mediated workplaces, digital competence equips employees to utilize information technologies effectively to streamline tasks and sustain productivity [2]. Equally important, work-life balance enables individuals to allocate time and energy proportionally across work, coursework, and personal life, thereby reducing inter-role conflict and emotional exhaustion [3].

Beyond direct effects, both digital competence and work-life balance are theorized to enhance performance through work engagement—a positive, fulfilling work-related state characterized by vigor, dedication, and absorption [4]. Recent empirical evidence likewise underscores the relevance of digital competence and work balance in supporting employee performance [5]. Against this backdrop, the present study investigates the effects of digital competence and work-life balance on employee performance, with work engagement as a mediating variable, among working students at Universitas Pembangunan Panca Budi Medan.

LITERATURE REVIEW

This study draws on Job Demands–Resources (JD-R) theory, which posits that dual-role demands—such as concurrent workplace targets and academic obligations—can be managed through personal and boundary-management resources that foster work engagement and drive employee performance [1], [6].

2.1 Digital Competence and Work Engagement

Digital competence encompasses information and data literacy, online communication and collaboration, digital content creation, information security, and technical problem solving [2], [7]. Viewed as a personal resource within the JD-R framework, technological proficiency helps working students reduce administrative friction so that mental energy for active, enthusiastic involvement at work is preserved [4], [8].

H1: Digital competence has a positive and significant effect on work engagement.

2.2 Work-Life Balance and Work Engagement

Work-life balance reflects an individual's effectiveness in minimizing negative interference between work and non-work domains—including university schedules and family life—while fostering mutual enhancement across roles [3], [9]. Maintaining this equilibrium mitigates chronic fatigue and sustains employees' vigor, dedication, and absorption at work [10], [11].

H2: Work-life balance has a positive and significant effect on work engagement.

2.3 Digital Competence, Work-Life Balance, and Employee Performance

Employee performance is assessed through work quality, quantity, timeliness, resource effectiveness, and independence in task execution [1]. Digital proficiency directly accelerates data handling, reporting, and technical troubleshooting [5], [12]. Concurrently, alignment among work hours, coursework, and rest preserves focus and supports consistent target attainment [13], [14].

H3: Digital competence has a positive and significant effect on employee performance.

H4: Work-life balance has a positive and significant effect on employee performance.

2.4 Work Engagement and Employee Performance

Highly engaged employees view job demands as meaningful challenges and invest sustained cognitive and physical effort into task completion [4]. Empirical studies in North Sumatra confirm that work engagement contributes directly to higher work quality and timely target achievement [15], [16].

H5: Work engagement has a positive and significant effect on employee performance.

2.5 The Mediating Role of Work Engagement

Consistent with the motivational pathway of JD-R theory [6] and contemporary mediation logic [17], technical and role-balance resources may influence job performance indirectly by cultivating employees' psychological engagement before translating into observable output [8], [11]. Accordingly, the mediating role of work engagement is tested separately across both pathways:

H6: Work engagement mediates the effect of digital competence on employee performance.

H7: Work engagement mediates the effect of work-life balance on employee performance.

RESEARCH METHODS

3.1 Research Design, Population, and Sample

This study employed a quantitative causal-associative approach using a cross-sectional survey design [18]. The target population comprised active working students at Universitas Pembangunan Panca Budi (UNPAB) Medan—enrolled in both Master's (S2) and undergraduate working-class (S1) programs—who are employed across private companies, state-owned enterprises (SOEs), plantations, and government institutions in Medan. Respondents were selected through purposive sampling based on three inclusion criteria: (1) active enrollment at UNPAB Medan, (2) active employment in an organization or institution, and (3) a minimum tenure of one year. Applying these criteria yielded 32 valid respondents (n = 32) with no missing data.

3.2 Measurement of Variables

Primary data were gathered through a structured online questionnaire (Google Form) rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The instrument consisted of 18 items adapted from established conceptual frameworks: five items measuring digital competence (X1.1–X1.5) [2], four items for work-life balance (X2.1–X2.4) [3], four items for work engagement (Z.1–Z.4) [4], and five items for employee performance (Y.1–Y.5) [1].

3.3 Data Analysis Procedure

Data were analyzed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4 [19]. Measurement model (outer model) evaluation covered convergent validity (outer loadings ideally ≥ 0.70, with 0.60–0.70 retained when AVE ≥ 0.50 and content validity is preserved) [19], [20], [21], discriminant validity (Fornell–Larcker criterion and HTMT < 0.90) [22], and internal consistency reliability (Cronbach's alpha, rho_A, and composite reliability ≥ 0.70). Structural model (inner model) assessment included collinearity (Inner VIF < 3.3), coefficients of determination (R^2), effect sizes (f^2), predictive relevance (blindfolding Q^2, D = 7), and hypothesis testing via 5,000 bootstrap subsamples (two-tailed, $\alpha = 0.05$; $t > 1.960$).

RESULTS AND DISCUSSION

4.1 Respondent Characteristics

Table 1. Demographic Characteristics of Respondents (n = 32)

Characteristic	Category	Frequency	Percentage
Gender	Male	17	53.1%
	Female	15	46.9%
Age Group	21–26 Years (Gen Z)	12	37.5%
	27–32 Years	12	37.5%
	> 32 Years	8	25.0%
Academic Level	Postgraduate (Master's / S2)	18	56.2%
	Undergraduate (Working-Class / S1)	14	43.8%
Length of Service	1–3 Years	17	53.1%
	4–6 Years	5	15.6%
	> 6 Years	10	31.2%
Employment Sector	Private Sector (Services, Retail, IT, Manufacturing, etc.)	17	53.1%
	SOEs / Plantations / Government Institutions	15	46.9%

Table 1 shows a balanced distribution between male (53.1%) and female (46.9%) respondents, as well as between private-sector employees (53.1%) and employees in state-owned enterprises, plantations, or government institutions (46.9%). Postgraduate (S2) students constituted the majority (56.2%), while 43.8% were enrolled in the undergraduate working-class program (S1). Three-quarters of respondents (75.0%) were aged 21–32 years, with the largest tenure group having 1–3 years of service (53.1%).

4.2 Descriptive Statistics

Table 2. Descriptive Statistics of Research Indicators (5-Point Likert Scale, n = 32)

Code	Indicator Summary	Min–Max	Mean	SD
X1.1	Ease of locating and managing digital work data and files	4–5	4.469	0.507
X1.2	Proficiency in workplace coordination apps (WhatsApp, Email, Zoom, Drive)	4–5	4.750	0.440
X1.3	Ability to prepare work reports, data tables, and presentation slides	4–5	4.625	0.492
X1.4	Maintaining password confidentiality and corporate data security	3–5	4.719	0.581

Code	Indicator Summary	Min–Max	Mean	SD
X1.5	Speed in troubleshooting technical issues on workplace applications	3–5	4.375	0.707
X2.1	Completing work on time without disrupting classes or personal rest	3–5	4.500	0.718
X2.2	Managing academic assignments without interfering with office duties	3–5	4.406	0.560
X2.3	Work experience enhances understanding of university coursework	3–5	4.094	0.734
X2.4	Academic knowledge and family support boost workplace productivity	3–5	4.406	0.615
Z.1	Feeling energetic and enthusiastic at work while studying (Vigor)	3–5	4.281	0.683
Z.2	Remaining resilient and persistent when facing difficult tasks (Vigor)	2–5	4.156	0.767
Z.3	Feeling proud and enthusiastic about one's current job (Dedication)	3–5	4.438	0.564
Z.4	Feeling immersed and comfortable so work time passes quickly (Absorption)	3–5	4.375	0.660
Y.1	Completing tasks neatly, accurately, and to organizational quality standards	3–5	4.438	0.564
Y.2	Consistently achieving the work volume targets set by supervisors	3–5	4.438	0.564
Y.3	Submitting office assignments on schedule without procrastination	3–5	4.406	0.615
Y.4	Using workplace technology and time effectively for optimal outcomes	3–5	4.438	0.619
Y.5	Performing job responsibilities independently without constant supervision	3–5	4.562	0.669

Digital competence (X1) recorded the highest construct mean (4.587), led by proficiency in workplace coordination apps (X1.2 = 4.750) and data security awareness (X1.4 = 4.719). By contrast, the lowest mean scores and widest dispersion appeared in work-to-study enhancement (X2.3 = 4.094; SD = 0.734) and task persistence under difficulty (Z.2 = 4.156; SD = 0.767).

4.3 Measurement and Structural Model Assessment

Table 3. Comparison of Initial and Final Outer Loadings

Latent Construct	Item	Initial	Final	Status
Digital Competence (X1)	X1.1	0.844	0.886	Valid (≥ 0.70)
	X1.2	0.703	0.690	Retained (> 0.60)

Latent Construct	Item	Initial	Final	Status
	X1.3	0.733	0.756	Valid (≥ 0.70)
	X1.4	0.484	–	Removed (< 0.50)
	X1.5	0.835	0.835	Valid (≥ 0.70)
Work-Life Balance (X2)	X2.1	0.810	0.810	Valid (≥ 0.70)
	X2.2	0.747	0.747	Valid (≥ 0.70)
	X2.3	0.773	0.773	Valid (≥ 0.70)
	X2.4	0.769	0.769	Valid (≥ 0.70)
Work Engagement (Z)	Z.1	0.862	0.862	Valid (≥ 0.70)
	Z.2	0.735	0.733	Valid (≥ 0.70)
	Z.3	0.787	0.787	Valid (≥ 0.70)
	Z.4	0.639	0.641	Retained (> 0.60)
Employee Performance (Y)	Y.1	0.853	0.852	Valid (≥ 0.70)
	Y.2	0.842	0.842	Valid (≥ 0.70)
	Y.3	0.820	0.822	Valid (≥ 0.70)
	Y.4	0.895	0.897	Valid (≥ 0.70)
	Y.5	0.786	0.785	Valid (≥ 0.70)

In the initial 18-item specification, the data-security item X1.4 yielded an outer loading of 0.484 (< 0.50) due to narrow response variance and was removed, whereas X1.2 (0.690) and Z.4 (0.641) were retained to preserve construct content validity [19]. In the revised 17-item model, all constructs satisfied reliability and convergent validity thresholds: Cronbach's alpha ranged from 0.755 to 0.896, composite reliability from 0.844 to 0.923, and AVE from 0.578 to 0.706 (> 0.50). Discriminant validity met the Fornell–Larcker criterion across all four constructs (√AVE: X1 = 0.795; X2 = 0.775; Z = 0.760; Y = 0.840, each exceeding all inter-construct correlations), while five of six HTMT ratios fell below 0.90 (X1–X2 = 0.924, reflecting small-sample sensitivity at n = 32). Structural evaluation confirmed the absence of collinearity (Inner VIF = 2.329–2.950 < 3.3), moderate-to-substantial explanatory power (R^2 Z = 0.571; R^2 Y = 0.679), and solid predictive relevance (Q^2 Z = 0.286; Q^2 Y = 0.448).

4.4 Hypothesis Testing (5,000 Bootstrap Subsamples)

Direct effects (H1–H5), specific indirect effects (H6–H7), and total effects were tested via 5,000 bootstrap subsamples (two-tailed, $\alpha = 0.05$; $t > 1.960$; $p < 0.050$), as summarized in Table 4 and illustrated in Figure 1.

Table 4. Hypothesis Testing Results for Direct, Mediating, and Total Effects (5,000 Bootstrap Subsamples)

Hypothesis / Path	Original (O)	Mean (M)	STDEV	t-Stat	p-Value	Decision
H1: Digital Competence (X1) → Work Engagement (Z)	0.308	0.322	0.239	1.288	0.198	Not Supported
H2: Work-Life Balance (X2) → Work Engagement (Z)	0.495	0.496	0.227	2.178	0.029	**Supported**
H3: Digital Competence (X1) → Employee Performance (Y)	0.404	0.390	0.194	2.078	0.038	**Supported**
H4: Work-Life Balance (X2) → Employee Performance (Y)	0.110	0.112	0.203	0.543	0.587	Not Supported
H5: Work Engagement (Z) → Employee Performance (Y)	0.394	0.403	0.173	2.272	0.023	**Supported**
H6 (Mediation): X1 → Work Engagement (Z) → Performance (Y)	0.121	0.137	0.125	0.967	0.333	Not Supported
H7 (Mediation): X2 → Work Engagement (Z) → Performance (Y)	0.195	0.197	0.128	1.519	0.129	Not Supported
Total Effect: Digital Competence (X1) → Performance (Y)	0.525	0.527	0.186	2.815	0.005	**Significant ($p < 0.05$)**
Total Effect: Work-Life Balance (X2) → Performance (Y)	0.305	0.309	0.201	1.517	0.129	Not Significant

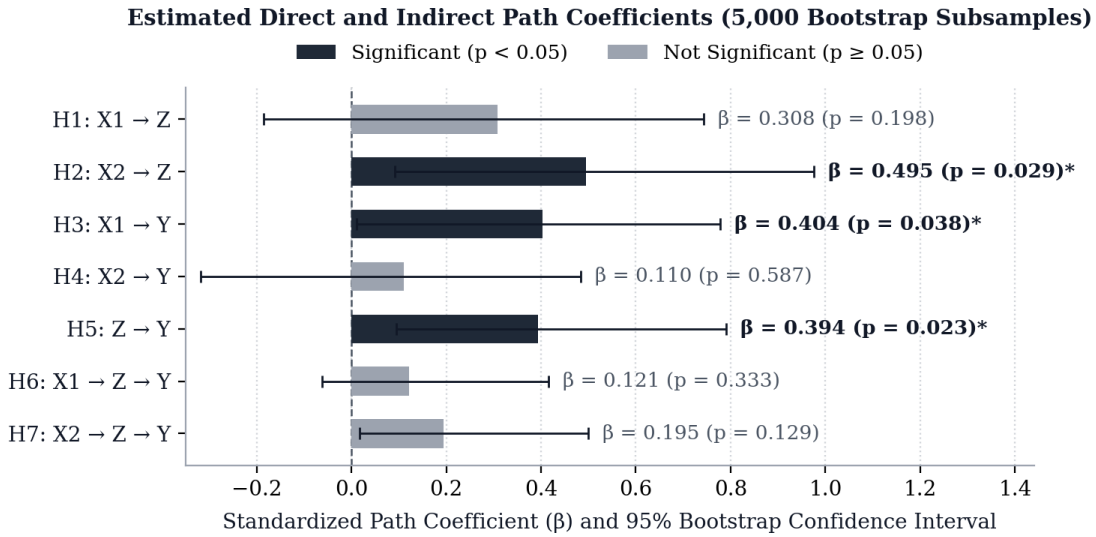


Figure 1. Standardized Path Coefficients (β) and 95% Bootstrap Confidence Intervals (5,000 Subsamples).

4.5 Discussion

Antecedents of Work Engagement (H1 and H2). The paths predicting work engagement reveal a clear contrast: digital competence did not exert a statistically significant

effect (H1 not supported; β = 0.308; *p* = 0.198), whereas work-life balance emerged as the strongest and most significant predictor (H2 supported; β = 0.495; *p* = 0.029; f^2 = 0.239). Because 75.0% of working students in the sample were aged 21–32 with very high baseline digital literacy (mean X1 = 4.587), routine digital proficiency [2] operates largely as a baseline hygiene skill rather than a catalyst for deeper emotional attachment. By contrast, consistent with [3] and [11], effectively containing time conflicts across office duties, S1/S2 coursework, and personal rest safeguards psychological energy and sustains vigor, dedication, and absorption.

Direct Determinants of Employee Performance (H3, H4, and H5). Employee performance was positively and significantly driven by both digital competence (H3 supported; β = 0.404; *p* = 0.038; total effect = 0.525; *p* = 0.005) and work engagement (H5 supported; β = 0.394; *p* = 0.023), whereas the direct path from work-life balance was non-significant (H4 not supported; β = 0.110; *p* = 0.587). Echoing [1], [4], and [12], digital skills act instrumentally to improve output quality, volume, timeliness, and autonomy, while work engagement sustains precision and perseverance on demanding tasks. Work-life balance instead serves as an enabling condition that prevents burnout without directly raising work output on its own.

Evaluation of Mediating Pathways (H6 and H7). Neither mediating hypothesis reached statistical significance at the 5% two-tailed threshold. For H6 (X1 → Z → Y; β = 0.121; *p* = 0.333), the pattern reflects direct-only non-mediation [17], confirming that digital competence enhances performance directly rather than through work engagement. For H7 (X2 → Z → Y; β = 0.195; *t* = 1.519; *p* = 0.129), both constituent paths (X2 → Z and Z → Y) were individually significant and the indirect component accounted for 63.9% of the total effect (0.305). The non-significant bootstrap test reflects limited statistical power at *n* = 32, warranting re-examination in larger multi-faculty samples.

CONCLUSION

Based on PLS-SEM analysis of 32 working students at Universitas Pembangunan Panca Budi (UNPAB) Medan, this study reaches the following conclusions:

5.1 Digital competence does not significantly influence work engagement (β = 0.308; p = 0.198), as workplace digital skills function primarily as baseline routine competencies among younger working students.

5.2 Work-life balance positively and significantly influences work engagement (β = 0.495; p = 0.029; f^2 = 0.239), serving as the primary driver of employees' vigor, dedication, and absorption.

5.3 Digital competence positively and significantly influences employee performance (β = 0.404; p = 0.038; total effect = 0.525; p = 0.005), underscoring the direct operational payoff of applied digital proficiency.

5.4 Work-life balance does not exert a significant direct effect on employee performance (β = 0.110; p = 0.587), operating instead as a psychological stabilizer that supports engagement.

5.5 Work engagement positively and significantly influences employee performance (β = 0.394; p = 0.023; f^2 = 0.207), with the full model explaining 67.9% of variance in employee performance (R^2 = 0.679; Q^2 = 0.448) and 57.1% in work engagement (R^2 = 0.571; Q^2 = 0.286).

5.6 Work engagement did not significantly mediate either digital competence (p = 0.333; direct-only non-mediation) or work-life balance (p = 0.129) at the 5% level, although the constituent paths of H7 were individually significant and accounted for 63.9% of the

total effect. Future studies should expand the sample size ($n \geq 70–100$) and integrate supervisor-rated performance measures.

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