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Digital transformation in human resource management and work experience on digital efficacy: The mediating role of the generational gap

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Abstract
This study aims to analyze the influence of digital transformation and work experience on employees' digital efficacy, considering the mediating role of the generational gap. The research was conducted at PT Besmindo Materi Sewatama, an energy-sector company currently implementing digitalization in its human resources management functions. Using a quantitative approach and the SEM-PLS 4 method, data were collected from 110 employees through a total sampling technique. The findings indicate that both digital transformation and work experience significantly influence digital efficacy. Among these, work experience emerged as the dominant factor shaping employees' confidence in using technology, while the generational gap did not exhibit a significant mediating effect. The novelty of this study lies in integrating the four variables into a single comprehensive structural model. These findings offer practical implications for organizations in designing cross-generational training strategies and HR management practices to support inclusive and sustainable digital transformation.
Keywords: Digital Transformation, Work Experience, Generational Gap, Digital Efficacy, Human Resource Management.

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INTRODUCTION

Modern organizations are undergoing a significant wave of change driven by the integration of digital technologies across various operational dimensions, particularly within human resource management (HRM) practices. Digital transformation is no longer viewed merely as a supporting tool but as a strategic element that determines organizational sustainability in the era of Industry 5.0. In this context, employees' digital efficacy has become a critical indicator of readiness and success in digital adaptation, especially in industrial sectors such as PT Besmindo Materi Sewatama in Riau. Digital transformation in HRM encompasses the use of digital platforms for recruitment, e-learning-based competency development, data-driven performance management, and even artificial intelligence (AI) for predicting employee behavior. These advancements demand HR personnel who are not only technically proficient but also confident and efficacious in utilizing such technologies (Suvarna, 2025). However, this transformation process introduces intergenerational challenges regarding technology adoption and perceptions. The challenge arises when there is a gap in digital skills and readiness between generations, where younger employees tend to be more adaptive. In contrast, senior employees often exhibit resistance or anxiety toward new technologies.

Digital efficacy levels among employees are not uniform and are significantly influenced by both generational cohort and work experience. Younger generations (Gen Z and Millennials) tend to be more open to and adaptable with new technologies. In comparison, older generations (Gen X and Baby Boomers) often exhibit resistance or discomfort in adopting new digital platforms (Eger et al., 2023). This phenomenon illustrates a generational gap within the digital workplace ecosystem, which in turn affects the overall digital transformation process. In addition to generational differences, work experience plays a critical role in shaping employees' perceptions and readiness toward digital adoption. Employees with extensive work experience may possess deep knowledge of business processes but lack confidence in using emerging technologies. Conversely, younger employees, who are often digital natives, may feel more at ease with technology but lack organizational intuition or mature structural work habits (Matin, 2025).

Several studies have identified a direct relationship between digital transformation and digital efficacy (Chen & Zhang, 2024), yet few have explored how the generational gap mediates this relationship. Likewise, the role of work experience as a predictor of digital efficacy is often overlooked or insufficiently analyzed in comprehensive models that include digital transformation. This constitutes the research gap that the present study aims to address. Gao et al. (2023) emphasized that intergenerational team dynamics play a critical role in the success of organizational digitalization. When generational differences are not effectively managed, friction can emerge in teamwork, technology adoption, and overall productivity. This suggests that the generational gap is not merely a demographic variable, but also a psychosocial factor that indirectly influences digital efficacy.

In the study by Eger et al. (2023), levels of technological uncertainty and digital efficacy varied significantly across generational groups. Generation Z tends to feel comfortable experimenting with new technologies, whereas older generations require more structured support and intensive training. These differences highlight the need for tailored approaches in managing digital human resources across generations. Many previous studies have treated digital transformation and work experience as independent variables, without examining their interaction through the mediating role of the generational gap. This gap in the literature undermines the effectiveness of organizational strategies for developing an inclusive digital work culture. Therefore, this study seeks to build a new understanding of how these four variables, digital transformation, work experience, generational gap, and digital efficacy, interact within a comprehensive framework.

PT Besmindo Materi Sewatama, based in Riau, is progressively implementing a digital transformation across its human resources management functions. The company has begun adopting technology-based systems for digital recruitment, online training, and app-based

performance evaluation. However, during implementation, the organization has encountered challenges related to generational gaps and varying levels of work experience among employees. Long-tenured employees tend to be slower to adopt new technologies due to limited digital proficiency. Conversely, younger employees, though more technologically fluent, often lack a deep understanding of organizational procedures and work structures. This friction has led to an imbalance in digital adoption, potentially hindering the overall effectiveness of newly introduced systems. These conditions make PT Besmindo a highly relevant setting to investigate the relationships among digital transformation, work experience, generational gap, and digital efficacy.

Table 1. General and Specific Phenomena in the Context of Digital Transformation

Aspect	General Phenomena	Specific Phenomena (PT Besmindo Materi Sewatama)
Adoption of Digital HR	Organizations worldwide are integrating digital platforms in HR for recruitment, training, and appraisal.	Besmindo has adopted app-based systems for recruitment, online training, and performance evaluation.
Generational Gap	Digital-native generations (Gen Z, Millennials) adapt quickly; older generations are more resistant.	Senior employees are slower in adopting technology; younger staff are tech-savvy but lack procedural depth.
Digital Efficacy	Variations in digital confidence affect the speed of adaptation across employee groups.	Long-serving employees show lower digital efficacy; newer employees show high efficacy but limited comprehension of structure.
Work Experience Dynamics	Experience improves contextual understanding but may not align with digital fluency.	Experienced employees understand business processes but lack confidence in tech; younger employees face the reverse.
Organizational Readiness	Varies based on culture, training investment, and leadership support.	Challenges in balancing training needs across generations due to differing learning curves.
Transformation Barriers	Include resistance to change, digital literacy gaps, and resource constraints.	Intergenerational friction leads to an imbalance in digital adoption, affecting system effectiveness.

Source: Adapted from research literature (2023–2025), Chen & Zhang (2024); Eger et al. (2023); Matin (2025); Suvarna (2025), and preliminary observations at PT Besmindo Materi Sewatama (2025).

Table 1 illustrates that digital transformation in human resource management poses challenges, including generational gaps and varying levels of technology experience. Younger generations are generally more adaptive to digital systems but often lack a comprehensive understanding of organizational structures. Conversely, senior employees possess deep organizational experience but tend to lack confidence in using new technologies. This phenomenon is also evident at PT Besmindo Materi Sewatama, where the digitalization of HR functions faces similar obstacles. These differences impact the effectiveness of technology adoption and underscore the importance of understanding the interactions between digital transformation, work experience, and generational gaps in shaping employees' digital efficacy. This condition underscores the importance of a research approach that not only examines the direct relationship between digital transformation and digital efficacy but also considers underlying factors influencing internal employee dynamics, such as work experience and generational differences. The imbalance in technology adaptation across age groups and

experience levels suggests that digitalization strategies cannot adopt a one-size-fits-all model. Therefore, systematically mapping the interactions among these variables becomes a critical step in formulating human resource management policies that are both inclusive and responsive to digital challenges. Such an approach also enables organizations to more precisely identify cultural and psychological barriers that may arise during the digital transformation process.

The novelty of this study lies in examining digital transformation, work experience, generational gap, and digital efficacy within a single structural model. In addition to testing direct relationships, this research explores the mediating role of the generational gap. This area has been empirically underexplored, particularly within the organizational context of Indonesia's energy and heavy equipment sectors. The practical contribution of this study is to provide strategic insights for organizations in designing targeted interventions based on generational profiles and work experience levels. This is especially crucial given that the success of digital transformation heavily depends on employees' psychological and cognitive readiness to engage with new systems independently and confidently. Therefore, this study is expected not only to enrich the academic literature on digital human resource management but also to serve as an evidence-based foundation for decision-making in developing training strategies, technology support mechanisms, and cross-generational talent management in an increasingly digitized work environment.

Digital transformation is an integrative process involving the utilization of digital technologies to restructure business models, work procedures, and interpersonal relationships within organizations. From the perspective of the Technology-Organization-Individual (TOI) framework, digital transformation is not merely technology adoption; it also emphasizes alignment among technology, organizational structures, and individual readiness as end-users (Alqahtani & Daghestani, 2023). The Indonesian Ministry of Manpower (Kemnaker, 2022) also highlights that digital transformation in the labor sector encompasses process digitalization, system integration, and technological adaptation to meet industrial demands. Accordingly, digital transformation is viewed as a strategic factor influencing organizational effectiveness, productivity, and competitiveness in the era of Industry 5.0. In this study, digital transformation is operationalized through several indicators that reflect the organization's capacity to leverage technology. These indicators include: (1) the adoption of digital technologies across various work processes, (2) the digitalization of previously manual procedures, (3) the alignment between implemented technologies and organizational structures, and (4) the organization's ability to adapt to technological advancements in the industry. These four indicators are considered complementary in explaining the degree of digital transformation within an organization, particularly in the context of human resource management.

Work experience is understood as the accumulation of knowledge, skills, and insights gained through direct involvement in professional tasks. According to Exsti (2025), work experience enhances efficiency and accuracy in task completion, as individuals become accustomed to handling various workplace situations. Employees with extensive experience typically possess a deep understanding of organizational procedures, technical skills, and broad insights into work dynamics. However, this group's adaptation to digital technology is often slower than that of younger generations, who are more familiar with technological developments. This makes work experience a crucial factor influencing employees' readiness to face digital transformation within organizations. It is important to clarify that this study focuses on work experience as the accumulation of professional knowledge, tenure, and task involvement over time, rather than employee experience, which in HRM literature refers to the holistic employee journey within the organization (Singh et al., 2023). Therefore, the construct examined in this research strictly relates to experiential accumulation in job roles. In this study, work experience is measured by several indicators that reflect employees' level of engagement and competence in their job roles. These indicators include: (1) tenure, measured by the number of years of experience; (2) direct involvement in technical tasks related to core job functions; (3) understanding of organizational work procedures; and (4) employee efficiency in completing

assigned tasks. These four indicators provide a comprehensive representation of how work experience contributes to employee quality and readiness in navigating the challenges of the digital era.

The generational gap refers to differences in characteristics, attitudes, and competencies among age groups in the workplace, particularly in the context of technological change. Antasya et al. (2025) explain that younger generations adapt more quickly to digital technologies due to their upbringing in digitized environments. In contrast, older generations are more likely to experience technostress, which may hinder technology adoption. Sureni (2025) adds that this gap often creates barriers to intergenerational collaboration, potentially leading to disharmony within teams. Nugraha (2025) emphasizes that the generational gap is not merely about chronological age, but also encompasses attitudes toward innovation, communication styles, and adaptability to change. As such, the generational gap becomes a critical factor in the success of digital transformation within organizations. In this study, the generational gap is operationalized through indicators that reflect generational dynamics in the digital context. These indicators include: (1) differences in digital competencies across generations; (2) more favorable attitudes toward technology among younger employees compared to their senior counterparts; (3) relatively higher levels of technostress among older age groups; and (4) intergenerational work barriers that may slow down the integration of new systems. Together, these four indicators illustrate how generational differences can impact workplace relationships, technology adaptation, and ultimately, employees' digital efficacy within organizations.

Digital efficacy refers to an individual's belief in their ability to effectively adopt, utilize, and manage digital technologies in the workplace. Alqahtani and Daghestani (2023) emphasize that digital efficacy goes beyond technical skills; it also involves self-confidence in using technology as a tool to support work performance. Hoque and Alam (2023) further explain that individuals with high digital efficacy tend to adapt more quickly to change, whereas those with low efficacy are more likely to resist innovation. Yulando et al. (2024) also found that digital efficacy significantly enhances individual resilience to technological disruption. In this study, digital efficacy is measured using several indicators: (1) employees' self-confidence in using digital technology; (2) their ability to adopt new technologies introduced by the organization; (3) their competence in managing various digital tools efficiently in daily tasks; and (4) their resilience in facing digital challenges, such as sudden changes in work systems or demands to use new applications. These indicators suggest that digital efficacy encompasses not only technical capability but also psychological readiness and an adaptive attitude toward rapid technological advancement.

Unlike prior studies that implicitly assume generational differences as structural mediators in digital adaptation processes, this study empirically tests and re-evaluates that assumption within an integrated structural framework. The novelty of this research lies not merely in confirming mediation effects, but in critically examining whether generational segmentation truly functions as a transmission mechanism in digital HRM contexts. By demonstrating the limited mediating role of generational gap, this study contributes to refining theoretical models of digital transformation and human capital dynamics in emerging economies.

RESEARCH METHOD

This study was conducted at PT Besmindo Materi Sewatama, located on Jalan Duri–Dumai Km 09, Balai Makam Subdistrict, Bathin Solapan District, Bengkalis Regency, Riau. The data collection process was conducted between August and October 2025, using structured questionnaires distributed directly to employees of PT Besmindo Materi Sewatama. The site was selected because the organization's ongoing digital transformation in human resource management makes it highly relevant to the study's focus. This research employs an explanatory research design with a quantitative approach. The explanatory nature of the study aims to examine the relationships among variables, both direct and indirect, in accordance with the

developed conceptual model. The research data consist of both primary and secondary sources. Primary data were collected by distributing questionnaires to employees at PT Besmindo Materi Sewatama in Riau. Secondary data were collected through literature reviews, academic references, and company documents related to the research topic. The population in this study consists of all employees of PT Besmindo Materi Sewatama who reside and work in the Riau region, totaling 110 individuals. This population includes employees from various divisions, age groups, and work experience backgrounds. Given the relatively small population size, under 200 individuals, the study employed a total sampling (or census) technique, in which the entire population was used as the research sample. Consequently, the sample size in this study comprises 110 respondents, representing the entire population.

Data collection in this study was carried out through observation, document analysis, and the distribution of questionnaires. The questionnaire instrument was developed based on indicators derived from each research variable, including digital transformation, work experience, generational gap, and digital efficacy. Data were collected directly through the physical distribution of questionnaires to ensure full reachability of employees at PT Besmindo Materi Sewatama and to improve the response rate. Prior to the full-scale distribution, the questionnaire instrument was pilot-tested with 30 employees to assess clarity, reliability, and construct validity. The preliminary reliability test showed Cronbach's Alpha values above 0.70 for all constructs, indicating acceptable internal consistency. Feedback from pilot respondents was used to refine wording and improve item clarity before distributing the instrument to all 110 respondents. The collected data were then analyzed using inferential statistics with the Structural Equation Modeling-Partial Least Squares 4 (SEM-PLS4) method. The analysis was conducted using SmartPLS software, which is well-suited for examining complex models involving latent variables and mediation effects. This method integrates factor analysis and multivariate regression, allowing for the testing of both direct and indirect relationships among the study's variables. Based on the research methodology outlined above, the relationships among the study variables are illustrated in a conceptual model. This research model depicts the interactions between the independent variables, digital transformation (X1) and work experience (X2), and the dependent variable, digital efficacy (Y), as well as the mediating role of the generational gap (Z). Visually, these relationships are presented in the following conceptual model diagram:

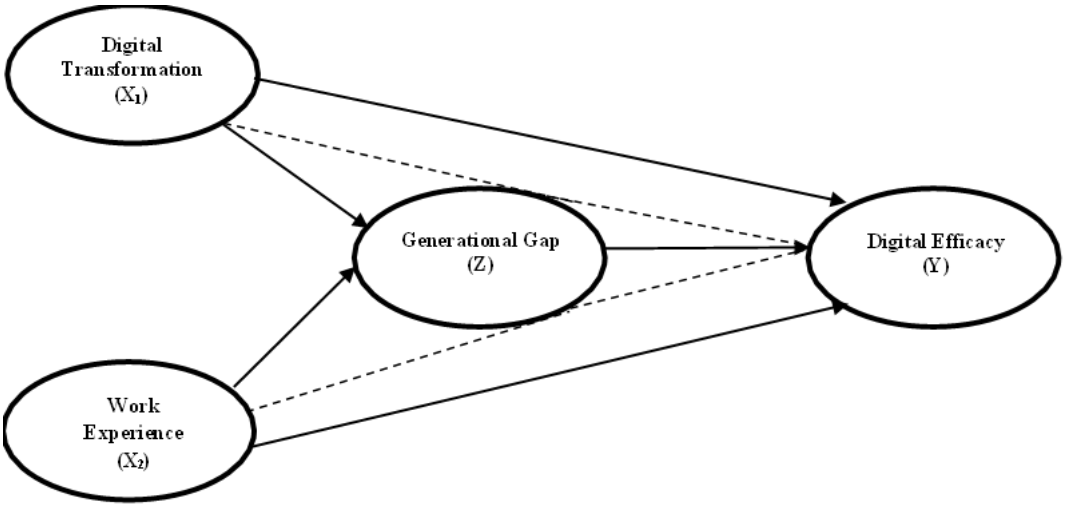

Figure 1. Research Model

Digital transformation is expected to influence employees' digital efficacy. This aligns with previous findings suggesting that the higher the level of digitalization in organizational work processes, the greater employees' confidence in effectively managing technology. In addition, work experience also plays a significant role in enhancing digital efficacy. Employees with longer tenure tend to have a deeper understanding of organizational procedures, which, in turn, can strengthen their confidence in adapting to new technologies. However, the relationship

between digital transformation and work experience with digital efficacy is not always direct. The generational gap is presumed to mediate these relationships. Differences in digital competence, attitudes toward technology, and levels of technostress across generations may influence the extent to which digital transformation and work experience contribute to enhancing employees' digital efficacy.

This study formulates several hypotheses to be tested empirically. First, digital transformation is hypothesized to influence the generational gap (H1), and employee work experience is also expected to affect it (H2). Furthermore, digital transformation is presumed to have a direct effect on digital efficacy (H3), as is work experience, which is also expected to impact digital efficacy (H4). In addition to these direct effects, the study also investigates the mediating role of the generational gap. Digital transformation is hypothesized to influence digital efficacy through the generational gap (H5), and similarly, work experience is expected to affect digital efficacy through the same mediating mechanism (H6). Finally, the generational gap itself is proposed to have a direct effect on employees' digital efficacy (H7). Thus, this research aims not only to examine direct relationships among variables but also to explore indirect effects mediated by the generational gap.

RESULTS AND DISCUSSION

RESULT

The demographic profile of respondents is presented to provide contextual understanding of generational composition and distribution of work experience. A total of 110 employees participated in this study, representing various age groups and tenure levels within the organization.

Table 2. Respondent Demographic Profile

Category	Frequency	Percentage
Gender		
Male	82	74.5%
Female	28	25.5%
Generational Cohort		
Generation Z (1997–2006)	18	16.4%
Millennials (1981–1996)	46	41.8%
Generation X (1965–1980)	32	29.1%
Baby Boomers (1946–1964)	14	12.7%
Length of Service		
0–4 years	30	27.3%
5–10 years	42	38.2%
11–20 years	38	34.5%

Source: Primary data processed by the authors (2025)

The majority of respondents belong to the Millennial (41.8%) and Gen X (29.1%) cohorts, which is particularly relevant given the study's focus on generational differences in digital adaptation. In terms of tenure, most employees have between 5 and 10 years of work experience (38.2%), indicating a workforce with moderate organizational familiarity and accumulated professional exposure. This demographic composition provides a meaningful foundation for examining generational dynamics and experiential effects on digital efficacy.

The measurement model was assessed to evaluate the convergent validity of each indicator in representing its respective latent construct. This evaluation was conducted by analyzing outer loadings, which indicate the extent to which each indicator contributes to measuring the construct. According to the criteria established by Hair et al. (2021), an indicator is considered valid if its loading value is$\geq$ 0.70. Indicators falling below this threshold should be carefully reviewed and may be removed from the model. Figure 2 presents the study's

measurement model, while Table 3 displays the outer loading results for each analyzed construct.

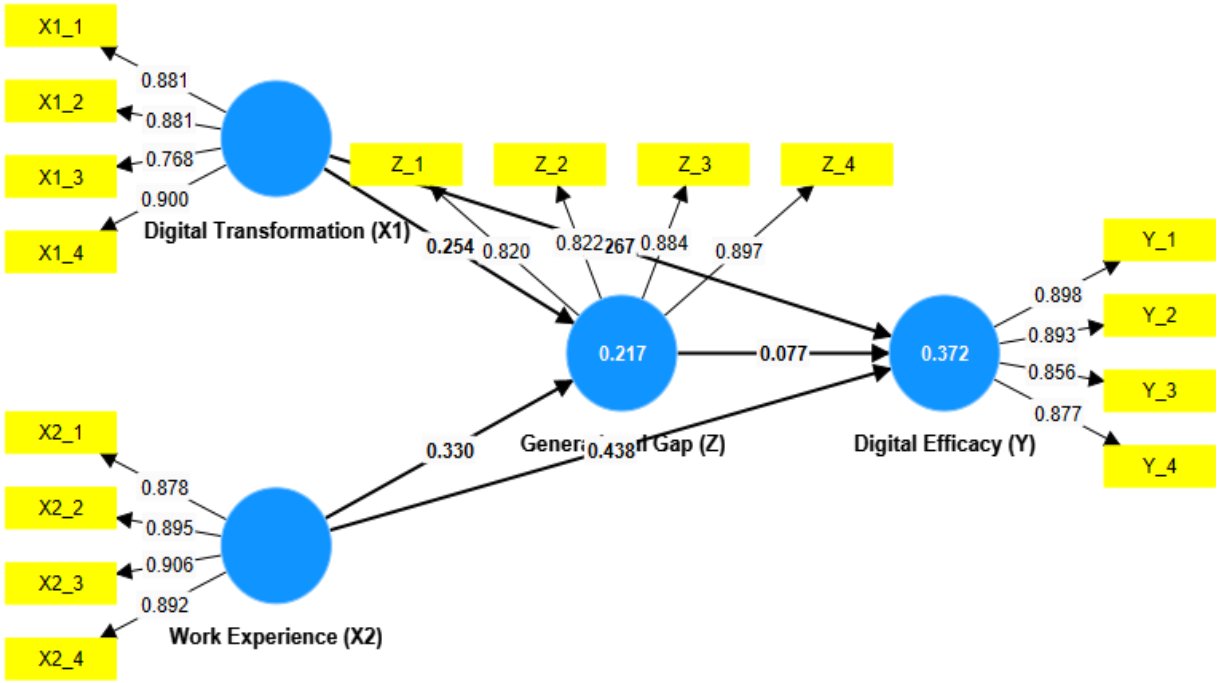

Figure 2. Measurement Model

Figure 2 displays the measurement model comprising four main constructs: Digital Transformation, Work Experience, Generational Gap, and Digital Efficacy. All indicators for these constructs exhibit outer loadings above the threshold of 0.70, thereby meeting the criteria for convergent validity. The Digital Transformation indicators show loading values ranging from 0.768 to 0.900, indicating strong consistency in representing the construct. Similarly, Work Experience demonstrates high, relatively homogeneous loading values (0.878–0.906), further strengthening the construct's reliability. The Generational Gap construct is supported by indicators with loadings ranging from 0.820 to 0.897, while the Digital Efficacy indicators range from 0.856 to 0.898. Overall, these findings suggest that the research instrument is both valid and reliable in measuring each construct, providing a sound basis for proceeding to the structural model assessment. The outer model test (outer loadings) in this study demonstrates the contribution of each indicator to its respective construct. Table 3 presents the outer loading values for each indicator along with their interpretations.

Table 3. Outer Model Test Results

Construct	Indicator	Outer Loading	Status
Digital Transformation	Adoption of digital technology in work processes	0.881	Valid
	Digitalization of work procedures	0.881	Valid
	Technology–organization alignment	0.768	Valid
	Adaptation to industrial technology	0.900	Valid
Work Experience	Years of experience	0.878	Valid
	Involvement in technical tasks	0.895	Valid
	Understanding of work procedures	0.906	Valid
	Efficiency in task completion	0.892	Valid
Digital Efficacy	Confidence in using technology	0.898	Valid
	Ability to adopt new technology	0.893	Valid

Construct	Indicator	Outer Loading	Status
	Ability to manage digital tools efficiently	0.856	Valid
	Resilience to digital challenges	0.877	Valid
Generational Gap	Differences in digital competence across generations	0.820	Valid
	Generational attitudes toward technology	0.822	Valid
	Technostress among senior employees	0.884	Valid
	Intergenerational work barriers	0.897	Valid

Source: SmartPLS 4 output (processed by the researcher, 2025)

Based on Table 3, all indicators used in the research model exhibit outer loading values greater than 0.70, which is the minimum threshold for indicating good indicator validity. In fact, most indicators exceed 0.80, indicating a very strong contribution to their respective latent constructs. Each construct, Digital Transformation, Work Experience, Generational Gap, and Digital Efficacy, is measured by multiple indicators that exhibit high consistency and measurability, in line with the principles of convergent validity. This indicates that all indicators empirically represent their intended constructs well, and therefore, no indicators need to be eliminated from the model. The following presents the results for AVE (Average Variance Extracted) and Composite Reliability (CR), which are essential components for assessing the model's convergent validity and construct reliability.

Table 4. AVE and Composite Reliability Results

Construct	Cronbach's Alpha	rho_A	CR (rho_C)	AVE
Digital Efficacy	0.9039	0.9073	0.9327	0.7762
Generational Gap	0.8789	0.8896	0.9166	0.7336
Work Experience	0.9152	0.9183	0.9401	0.7969
Digital Transformation	0.8822	0.9136	0.9183	0.7383

Source: SmartPLS 4 output (processed by the researcher, 2025)

Based on Table 4, all constructs in the research model meet the criteria for reliability and convergent validity. The Composite Reliability (CR) values are all above 0.90, indicating excellent internal consistency among the items measuring each construct. Additionally, all Average Variance Extracted (AVE) values exceed 0.50, indicating that the indicators significantly explain the variance in their respective constructs. Therefore, the measurement of constructs in this model can be considered both statistically reliable and valid, in accordance with PLS-SEM standards as outlined by Hair et al. (2021).

Discriminant validity aims to ensure that each construct in the model is truly distinct from the others and that there is no overlap in measurement. One of the recommended methods to assess discriminant validity is the Heterotrait–Monotrait Ratio (HTMT), as proposed by Henseler et al. (2015). A commonly accepted threshold for HTMT values is below 0.85, which indicates that the constructs in the model are sufficiently distinct. Therefore, HTMT values can serve as a reliable reference for evaluating the degree of empirical differentiation among constructs in this study.

Table 5. HTMT Results – Discriminant Validity

Construct 1	Construct 2	HTMT Value
Generational Gap	Digital Efficacy	0.373
Work Experience	Digital Efficacy	0.593
Work Experience	Generational Gap	0.436
Digital Transformation	Digital Efficacy	0.442

Construct 1	Construct 2	HTMT Value
Digital Transformation	Generational Gap	0.377
Digital Transformation	Work Experience	0.274

Source: SmartPLS 4 output (processed by the researcher, 2025)

Discriminant validity was assessed using the Heterotrait–Monotrait Ratio (HTMT) approach. As shown in the table above, all HTMT values between constructs fall below the conservative threshold of 0.85. This indicates that each construct in the model is conceptually distinct and that there is no significant overlap between constructs. Thus, the measurement model meets the criteria for discriminant validity according to the HTMT analysis. In addition to HTMT, discriminant validity was also evaluated using the Fornell–Larcker criterion. This test ensures that a construct explains more variance in its own indicators than it shares with other constructs. According to Hair et al. (2021), discriminant validity is confirmed when the square root of the AVE (displayed on the diagonal of the table) is greater than the correlations between constructs in the corresponding rows and columns. Therefore, the Fornell–Larcker criterion provides further empirical evidence supporting the distinctiveness of the constructs used in this study.

Table 6. Fornell–Larcker Criterion Results

Construct	Digital Efficacy	Generational Gap	Work Experience	Digital Transformation
Digital Efficacy	**0.881**	0.342	0.540	0.410
Generational Gap	0.342	**0.857**	0.397	0.341
Work Experience	0.540	0.397	**0.893**	0.265
Digital Transformation	0.410	0.341	0.265	**0.859**

Source: SmartPLS 4 output (processed by the researcher, 2025)

Discriminant validity was also assessed using the Fornell–Larcker criterion. The results show that the square root of AVE for each construct (0.881, 0.857, 0.893, and 0.859) exceeds the correlations between constructs. This indicates that each construct is conceptually unique and does not overlap with any other construct in the model, thereby reinforcing the overall discriminant validity.

In addition to the Fornell–Larcker test, discriminant validity was further evaluated through cross-loadings analysis. This test aims to ensure that each indicator correlates more strongly with its designated construct than with other constructs in the model. Discriminant validity is considered satisfactory when an indicator's loading on its own construct is higher than its cross-loadings on other constructs. Therefore, the cross-loadings analysis provides additional empirical evidence supporting the distinctiveness of each construct and the clarity of the relationship between indicators and their intended latent variables.

Table 7. Cross Loadings Results

Indicator	Digital Efficacy	Generational Gap	Work Experience	Digital Transformation
Adoption of digital technology in work processes	0.366	0.326	0.288	0.881
Digitalization of work procedures	0.322	0.202	0.174	0.881
Technology–organization alignment	0.242	0.263	0.053	0.768

Indicator	Digital Efficacy	Generational Gap	Work Experience	Digital Transformation
Adaptation to industrial technology	0.436	0.351	0.327	0.900
Years of experience	0.479	0.384	0.878	0.210
Involvement in technical tasks	0.442	0.339	0.895	0.300
Understanding of work procedures	0.486	0.433	0.906	0.225
Efficiency in task completion	0.519	0.247	0.892	0.218
Confidence in using technology	0.898	0.313	0.513	0.328
Ability to adopt new technology	0.893	0.383	0.454	0.466
Ability to manage digital tools efficiently	0.856	0.218	0.446	0.332
Resilience to digital challenges	0.877	0.278	0.489	0.308
Differences in digital competence across generations	0.268	0.820	0.318	0.295
Generational attitudes toward technology	0.208	0.822	0.304	0.277
Technostress among senior employees	0.355	0.884	0.369	0.314
Intergenerational work barriers	0.321	0.897	0.361	0.281

Source: SmartPLS 4 output (processed by the researcher, 2025)

Discriminant validity at the indicator level was assessed using cross-loadings analysis, by comparing the loading of each indicator on its assigned construct with its loadings on other constructs within the model. The results indicate that all indicators exhibit their highest loading on the construct they are intended to measure, compared to their loadings on other constructs. This suggests that there is no conceptual overlap between constructs. Each primary loading consistently exceeds its corresponding cross-loadings, demonstrating that each indicator uniquely represents its designated construct and does not reflect other constructs in the model. This pattern confirms that there is no construct leakage and that each construct stands independently and discretely. Therefore, the measurement model exhibits a clear, distinct, and unambiguous indicator structure, providing strong evidence that discriminant validity at the indicator level has been convincingly established.

The structural model illustrates the relationships between latent constructs, represented by blue circles, and their corresponding manifest indicators, depicted as yellow rectangles. Each indicator is associated with a loading value that reflects its contribution to the latent construct it represents. Additionally, path coefficients are shown between latent constructs, indicating both the direction and strength of the relationships among variables. The R^2 values displayed on endogenous constructs represent the proportion of variance explained by the exogenous constructs. Overall, this figure provides a visual overview of the strength and direction of relationships among the research variables, thereby serving as a foundational reference for evaluating the proposed hypotheses.

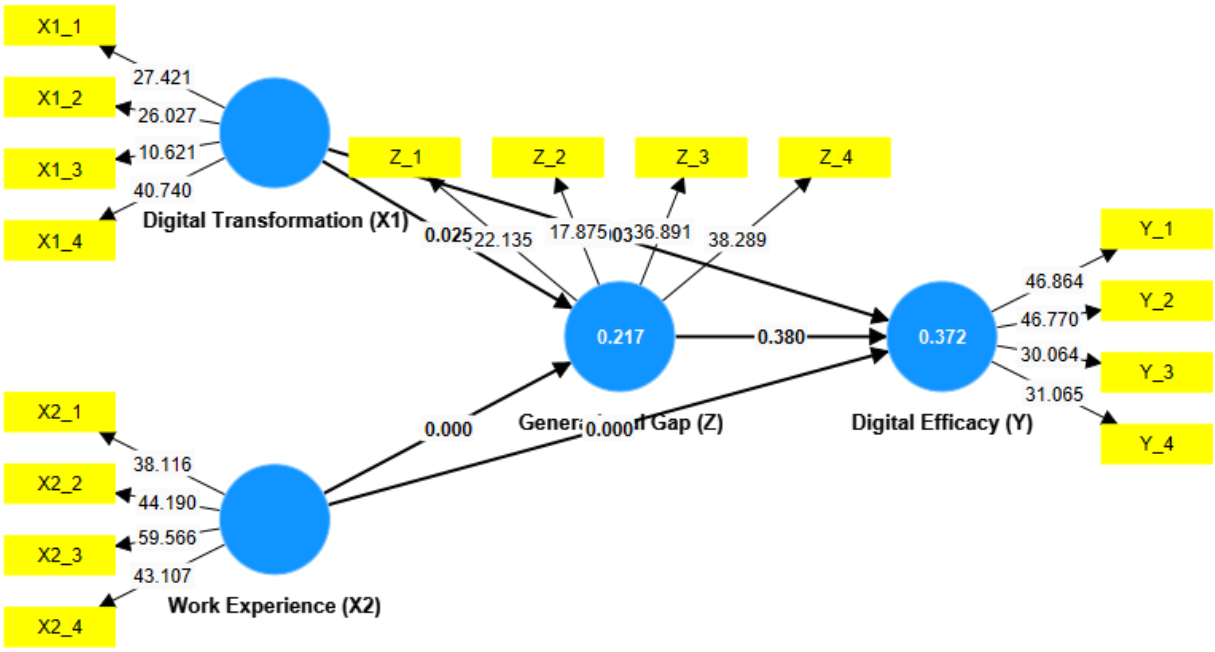

Figure 3. Model Structural

Figure 3 presents the results of the PLS-SEM model estimation, illustrating the relationships among Digital Transformation, Work Experience, Generational Gap, and Digital Efficacy. Each construct is measured by indicators with adequate loading values, confirming the validity of the research instrument. The analysis reveals that Digital Transformation has a significant effect on Digital Efficacy, and Work Experience exerts the strongest direct influence on Digital Efficacy among all predictors. Furthermore, Work Experience also has a significant effect on the Generational Gap, whereas the Generational Gap does not significantly affect Digital Efficacy. The R^2 values for Generational Gap and Digital Efficacy suggest that the model demonstrates a moderate explanatory power. Therefore, this study highlights the critical roles of Work Experience and Digital Transformation in shaping employees' digital efficacy. At the same time, the Generational Gap does not appear to function as a strong mediating variable.

To test the research hypotheses, an analysis of path coefficients was conducted using the bootstrapping procedure in PLS-SEM. This analysis aims to assess both the strength and direction of relationships among latent variables, as well as their statistical significance. The path coefficient values (Original Sample, O) represent the magnitude of the contribution of exogenous variables to endogenous variables. At the same time, the T-statistics and p-values serve as the basis for deciding whether to accept or reject each hypothesis. The results of this analysis are presented in the following table.

Table 8. Path Coefficients Results

No	Path	Original Sample (O)	Sample Mean (M)	Std. Dev.	T-Statistic	p-Value	Significance
1	Generational Gap → Digital Efficacy	0.077	0.075	0.099	0.877	0.380	Not Significant
2	Work Experience → Digital Efficacy	0.438	0.441	0.078	5.642	0.000	Significant
3	Work Experience → Generational Gap	0.330	0.337	0.089	3.690	0.000	Significant

No	Path	Original Sample (O)	Sample Mean (M)	Std. Dev.	T-Statistic	p-Value	Significance
4	Digital Transformation → Digital Efficacy	0.267	0.275	0.091	2.940	0.003	Significant
5	Digital Transformation → Generational Gap	0.254	0.255	0.114	2.236	0.025	Significant

Source: SmartPLS 4 output (processed by the researcher, 2025)

Based on the inner model analysis in SmartPLS, four of the five tested structural paths demonstrate positive, statistically significant effects. Specifically, Work Experience → Digital Efficacy, Work Experience → Generational Gap, Digital Transformation → Digital Efficacy, and Digital Transformation → Generational Gap all show T-statistic values above 1.96 and p-values below 0.05. This indicates that both work experience and digital transformation are key factors that directly influence improvements in digital efficacy and the management of generational gaps in the workplace. Meanwhile, the path from Generational Gap → Digital Efficacy is not statistically significant, suggesting that generational differences, within the context of this study, do not directly affect employees' levels of digital efficacy. These findings emphasize the importance of strategies focused on enhancing work experience and supporting digital transformation as critical components in developing the digital capacity of human resources.

In PLS-SEM, structural model evaluation involves assessing R^2 and Adjusted R^2, which indicate the proportion of variance in the endogenous constructs explained by the exogenous constructs. The higher the R^2 value, the better the model's explanatory power for the dependent variables. The results of this analysis are presented in the following table.

Table 9. R^2 and Adjusted R^2 Values

Endogenous Variable	R^2	Adjusted R^2	Category
Digital Efficacy	0.372	0.354	Moderate
Generational Gap	0.217	0.203	Weak–Moderate

Source: SmartPLS 4 output (processed by the researcher, 2025)

The R^2 value of 0.372 indicates that approximately 37.2% of the variance in Digital Efficacy is explained by Digital Transformation, Work Experience, and Generational Gap. Meanwhile, the R^2 value of 0.217 for Generational Gap suggests that Digital Transformation and Work Experience explain 21.7% of its variance. These results indicate moderate explanatory power within the context of PLS-SEM analysis. Although the R^2 values do not indicate a high level of variance explanation, they are considered acceptable in behavioral and organizational research, where complex human factors often limit predictive strength. The Adjusted R^2 values (0.354 for Digital Efficacy and 0.203 for Generational Gap) further confirm the model's stability, given the number of predictors included in the structural model.

In addition to path coefficients and R^2 values, the evaluation of the PLS-SEM structural model also considers effect size (f^2) to assess each exogenous variable's contribution to the variance explained by the endogenous constructs. The f^2 value indicates the strength of influence of a given construct, with thresholds for interpretation categorized as small (0.02), medium (0.15), and large (0.35), as recommended by Hair et al. (2021). Accordingly, this analysis provides insight into the substantive contribution of each variable to the overall model. The results of the effect size analysis are presented in the following table.

Table 10. Effect Size (f^2) Results

No	Path	Effect Size (f^2)	Effect Category
1	Generational Gap → Digital Efficacy	0.077	Small
2	Work Experience → Digital Efficacy	0.463	Large
3	Work Experience → Generational Gap	0.330	Medium
4	Digital Transformation → Digital Efficacy	0.287	Medium
5	Digital Transformation → Generational Gap	0.254	Medium

Source: SmartPLS 4 output (processed by the researcher, 2025)

Based on the effect size (f^2) values, the relationship between Work Experience and Digital Efficacy demonstrates the strongest effect ($f^2 = 0.463$), indicating a substantial contribution to the dependent variable. In comparison, Digital Transformation shows moderate effects on both target variables, Digital Efficacy and Generational Gap. Likewise, the relationship between Work Experience and Generational Gap also yields a medium effect ($f^2 = 0.330$). Meanwhile, the effect of Generational Gap on Digital Efficacy is categorized as small ($f^2 = 0.077$). Overall, these findings suggest that Work Experience is the most dominant factor in enhancing digital efficacy, while Digital Transformation also contributes significantly, albeit to a lesser extent.

In addition to the coefficient of determination (R^2) and effect size (f^2), the structural model evaluation also includes predictive relevance (Q^2), which assesses the model's capability to predict the endogenous constructs. The Q^2 value is obtained via the blindfolding procedure and indicates how well the model reproduces the observed data. A Q^2 value greater than zero suggests that the model has predictive relevance. The greater the Q^2 value, the higher the model's predictive accuracy. The results of the predictive relevance test in this study are presented in the following table.

Table 11. Predictive Relevance (Q^2) Results

No	Endogenous Variable	Q^2	Interpretation
1	Digital Efficacy	0.271	Predictive Relevance
2	Generational Gap	0.141	Predictive Relevance

Source: SmartPLS 4 output (processed by the researcher, 2025)

The blindfolding procedure was conducted to assess the model's predictive relevance using the cross-validated redundancy (Q^2) criterion. The Q^2 value for Digital Efficacy is 0.271, indicating moderate predictive relevance. Meanwhile, the Q^2 value for Generational Gap is 0.141, suggesting small to moderate predictive relevance. Since all Q^2 values are greater than zero, the structural model demonstrates adequate predictive capability.

Discussion

This study advances the discourse on digital human resource management by disentangling the structural relationships among digital transformation, work experience, generational gap, and digital efficacy. Rather than merely confirming direct associations, the findings refine the theoretical positioning of generational differences within digitally transforming organizations.

Digital Transformation and Intergenerational Dynamics (H1)

The significant relationship between digital transformation and generational gap ($\beta = 0.254$, $p < 0.05$) suggests that technological intensification may amplify perceived intergenerational disparities in digital readiness. Thus, H1 is supported. This finding aligns with the Technology–Organization–Individual (TOI) framework, where technological change interacts with individual-level characteristics, potentially exposing latent capability differences across age cohorts. However, the significance of this relationship does not imply structural fragmentation. Rather, digital transformation appears to surface adaptive contrasts that may otherwise remain embedded within routine operations. This supports Gao et al. (2023), who emphasize that

digitalization reconfigures managerial and employee heterogeneity rather than uniformly disrupting it.

Experiential Accumulation and Generational Structuring (H2)

Work experience significantly predicts the generational gap ($\beta = 0.330$, $p < 0.05$), supporting H2. Importantly, this finding suggests that generational differentiation in digital contexts is not solely age-driven but is partly constructed through accumulated professional routines and embedded work schemas. This challenges deterministic generational narratives in HRM literature. Instead of viewing generational cohorts as fixed categories, the results imply that experiential accumulation may reinforce structural work identities that influence perceptions of digital change.

Structural Drivers of Digital Efficacy (H3 & H4)

Digital transformation significantly enhances digital efficacy ($\beta = 0.267$, $p < 0.05$), confirming H3. This supports Xu and Zheng (2025), who argue that digitalization strengthens employee performance when institutionalized through structured systems. More notably, work experience exhibits the strongest direct effect on digital efficacy ($\beta = 0.438$, $p < 0.001$), strongly supporting H4. This finding repositions experiential accumulation as a dominant explanatory factor in the formation of digital confidence. Contrary to common assumptions that younger "digital natives" possess inherently superior digital efficacy, this study demonstrates that contextual organizational exposure may play a more decisive role than chronological age. Theoretically, this supports Bandura's self-efficacy theory in digital settings: mastery experiences accumulated over time reinforce confidence in managing technological challenges.

Reframing the Role of Generational Gap (H5–H7)

Although digital transformation and work experience significantly influence the generational gap, the latter does not significantly affect digital efficacy ($\beta = 0.077$, $p > 0.05$), thereby rejecting H7. Consequently, the mediation hypotheses (H5 and H6) are not supported. Rather than indicating theoretical weakness, this non-significant mediation provides an important refinement. The results suggest that generational difference may be perceptually salient but structurally non-determinant in shaping digital efficacy. In organizations with institutionalized digital systems, structural supports may neutralize generational disparities. This finding challenges generational determinism in digital HRM research. It implies that digital efficacy may be driven more strongly by organizational digital maturity and experiential capital than by demographic segmentation. Although the generational gap was hypothesized as a mediating variable, the statistical results indicate that it does not significantly transmit the effects of digital transformation or work experience to digital efficacy. This finding suggests that generational differences, while present, do not structurally weaken or strengthen employees' technological confidence. Therefore, the novelty of this study lies not in confirming mediation, but in empirically demonstrating the limited mediating power of generational differences within this organizational context.

Integrative Theoretical and Practical Implications

The findings imply that digital efficacy is predominantly shaped by experiential accumulation and organizational digital maturity rather than demographic segmentation. This challenges generational determinism in digital HRM research and suggests that structural and institutional factors may override age-based differentiation in shaping technological confidence. Theoretically, this study repositions the generational gap from a mediating structural mechanism to a contextual moderating characteristic that may require alternative modeling approaches in future research. Practically, organizations should prioritize digital infrastructure and competency development rather than overemphasizing generational differentiation strategies. Digital maturity (Shahiduzzaman, 2025) appears to reduce the structural relevance of generational divides.

CONCLUSION

This study concludes that digital transformation and work experience significantly influence employees' digital efficacy, with work experience emerging as the most dominant determinant. Digital transformation enhances an organization's technological capacity while strengthening employees' confidence in adopting and using digital tools. Importantly, the generational gap does not demonstrate a statistically significant direct or mediating effect on digital efficacy. These findings indicate that generational differences, although perceptible in the workplace, do not serve as structural determinants of digital confidence in this organizational context. The key novelty of this study lies in developing an integrated structural model that simultaneously examines digital transformation, work experience, the generational gap, and digital efficacy within a single empirical framework. Rather than assuming generational differences as inherent barriers to digital adaptation, this study empirically re-evaluates and refines that assumption, particularly within Indonesia's energy and heavy equipment sector. In practice, these findings suggest that organizations should prioritize experiential development and structured digital transformation strategies over demographic segmentation. Investments in continuous upskilling, experiential learning, and institutional digital maturity are likely to yield greater improvements in digital efficacy than generation-based differentiation policies. Although this study is limited to a single organization, the proposed conceptual model provides a foundation for comparative research across industries and broader emerging economy contexts.

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