



The Role of Digital Leadership in Managing ERP Transformation Challenges in Mining Contractor Companies

Bambang Winanto¹, Galah Ramadhan^{2*}, Oktafinaldo Syafza³, Sekar Wulan Prasetyaningtyas⁴

Universitas Bina Nusantara, Indonesia

Email: Galah.ramadhan@binus.ac.id*

Abstract

This study examines the role of digital leadership in managing Enterprise Resource Planning (ERP) transformation challenges in mining contractor companies. In the era of digital transformation, organizations are required to integrate advanced technologies to enhance competitiveness and operational efficiency. However, ERP implementation often faces significant obstacles, including resistance to change, limited digital competencies, and misalignment of organizational culture. Therefore, effective digital leadership is essential to align technology adoption with organizational strategy and to foster a supportive digital culture. The objective of this research is to analyze the influence of digital leadership on competitive performance, as well as to investigate the mediating roles of digital culture and affective commitment in the context of ERP transformation. This study employs a quantitative approach, using survey data collected from 143 employees involved in ERP implementation within mining contractor companies. The data were analyzed using Structural Equation Modeling (SEM) with SmartPLS to examine both direct and indirect relationships among variables. The results indicate that digital leadership has a significant positive effect on competitive performance, both directly and indirectly through digital culture and affective commitment. Digital culture was found to be the strongest mediating variable, highlighting its critical role in enhancing organizational performance. In conclusion, successful ERP transformation is not solely dependent on technology but also on leadership capability, organizational culture, and employee commitment, which collectively drive sustainable competitive advantage.

Keywords:

Digital Leadership, ERP Transformation, Digital Culture, Affective Commitment, Competitive Performance, Mining

INTRODUCTION

The Fourth Industrial Revolution has accelerated the push for digital transformation, urging organizations to adopt digital technologies for better performance and competitiveness (Westerman et al., 2014). For mining contractor companies, implementing Enterprise Resource Planning (ERP) systems is a crucial step, integrating functions such as finance, logistics, and human resources into a unified system (Hasanudin, 2024; Seshan & Gorain, 2016; Singh & Lai, 2026; Sishi & Telukdarie, 2020). However, ERP adoption often encounters challenges such as resistance to change, limited digital skills, and the need for an innovation-driven culture (Kane et al., 2015; Monk & Wagner, 2012).

Enterprise Resource Planning (ERP) systems integrate key business functions—finance, logistics, human resources (HR), and supply chain—to enhance efficiency and decision-making (Al-Omush et al., 2023). In an increasingly data-driven market, ERP

systems are vital for sustaining competitiveness (Mollah et al., 2024). However, implementation is often hindered by resistance to change, limited digital competencies, and cultural misalignment (Kane et al., 2015). As Venkatraman (1994) notes, effective transformation requires not only technological adoption but also organizational shifts in culture, structure, and leadership.

Digital leadership plays a key role in overcoming these barriers by aligning technology with strategy, fostering a digital culture, and enhancing employees' emotional connection to the organization (Mollah et al., 2024). This connection is essential for ensuring transformation success. Digital leadership is pivotal in driving ERP transformation by fostering technology integration, cultural change, and employee engagement (Shin et al., 2023). Leaders set strategic direction, promote innovation, and cultivate digital learning (Mollah et al., 2024). Aligned with New Institutional Theory (DiMaggio & Powell, 1983), digital transformation reshapes organizational values and structures. Effective leadership mitigates resistance to change, builds a collaborative digital culture, and enhances employee commitment (Petrucci & Rivera, 2018).

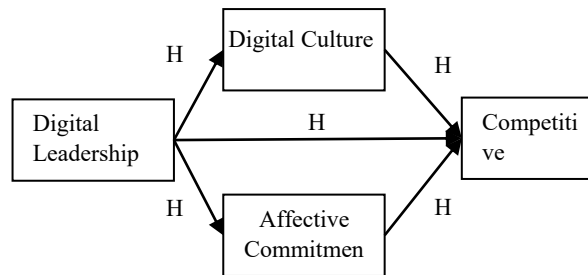
Competitive performance reflects an organization's ability to sustain market advantage through efficiency, innovation, and adaptability (Mollah et al., 2024), increasingly driven by technology adoption and data utilization (Shin et al., 2023). Porter (1985) outlines three key strategies: cost leadership, differentiation, and focus. In the digital era, these strategies rely on ERP systems for integration, automation, and faster decision-making (Al-Omush et al., 2023). Digital leadership drives competitive advantage by ensuring strategic ERP adoption, supported by digital culture and employee engagement.

This study examines how digital leadership addresses ERP transformation challenges in mining contractor companies, drawing on Dynamic Capability Theory (Teece, 2007) and the Resource-Based View (RBV). It focuses on how digital leadership enhances performance through digital culture and affective commitment.

METHOD

This study adopted a quantitative approach using surveys and inferential statistical analysis to explore the relationships among digital leadership, digital culture, affective commitment, and competitive performance within ERP implementation. The research was based on the Resource-Based View (RBV) and Dynamic Capability Theory (DCT), which highlight the role of digital leadership in technological transformation and organizational competitiveness.

To test the proposed model, Structural Equation Modeling (SEM) was used, allowing for the analysis of causal relationships and mediating or moderating effects. This method supported a comprehensive understanding of both direct and indirect impacts throughout the ERP transformation process.



The study focused on employees of mining companies undergoing ERP transformation, considering the sector's high implementation complexity and the strategic role of digital leadership in driving organizational change. A purposive sampling technique was employed, with criteria including employment in a company currently implementing ERP, a minimum of two years of work experience, and direct involvement in the ERP process, such as managers, supervisors, or operational staff. Based on these criteria, 143 respondents were selected to ensure a valid and representative sample.

Data were collected through both online and offline surveys using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire consisted of three sections: a screening section to confirm eligibility; a demographic section capturing gender, age, work location, experience, job title, and role; and a research variables section measuring digital leadership, digital culture, affective commitment, and competitive performance. The measurement of each variable was based on established scales adapted from prior studies to ensure construct validity and reliability, enabling the analysis of both direct and indirect relationships among the study variables within the context of ERP transformation.

Table 1. Variable Measurement Framework

Variable	Operational Definition	Reference	Indicators
Digital Leadership (DL)	The leader's ability to utilize digital technology to drive innovation and manage digital transformation.	Mollah et al. (2024), Sainger (2018)	1) Digital strategy 2) Digital collaboration 3) Data-driven decision-making 4) Technology adaptation
Digital Culture (DC)	The values, norms, and organizational practices that support digitalization and technology-driven innovation.	Al-Omush et al. (2023), Shin et al. (2023)	1) Readiness for innovation 2) Technology collaboration 3) Digital mindset 4) Digital transformation
Affective Commitment (AC)	Employees' emotional attachment to the organization, influencing their loyalty in facing technological changes.	Li et al. (2025), Petrucci & Rivera (2018)	1) Organizational loyalty 2) Motivation in technology change 3) Job satisfaction in a digital environment 4) Support for ERP implementation

Competitive Performance (CP)	The organization's ability to sustain competitive advantage by optimizing digital technology implementation.	Shin et al. (2023), Al-Omush et al. (2023)	1) Operational efficiency 2) Decision-making speed 3) Market adaptability 4) Technology-based competitiveness
------------------------------	--	--	--

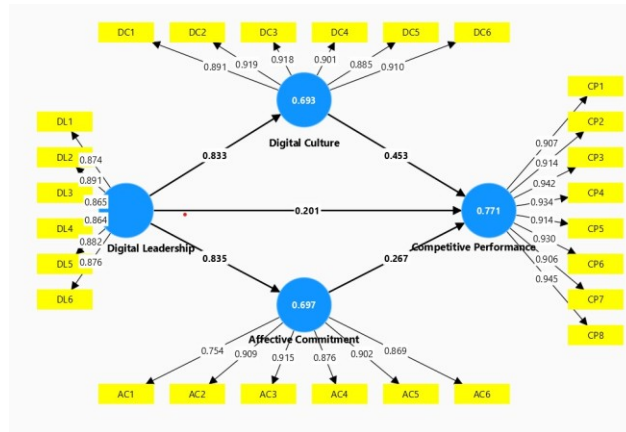
Source: Primary data processed from research questionnaires, adapted from

The collected data were analyzed using both descriptive and inferential statistical techniques to examine the relationships among the research variables. Descriptive analysis was applied to provide an overview of respondent characteristics and the distribution of questionnaire responses. The quality of the research instrument was assessed through validity and reliability testing, in which construct validity was evaluated using Confirmatory Factor Analysis (CFA), while reliability was measured using Cronbach's alpha with a minimum threshold of 0.70, indicating acceptable internal consistency.

Hypothesis testing was conducted using Structural Equation Modeling (SEM) to analyze direct and indirect relationships, including mediating and moderating effects within the proposed research model (Alsheikh et al., 2021; Sardeshmukh & Vandenberg, 2017; Turulja & Bajgoric, 2020). Model fit was evaluated using the Goodness of Fit Index (GFI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA) to ensure model adequacy, with SmartPLS utilized for SEM estimation and hypothesis testing. The research procedure consisted of questionnaire preparation and pretesting, electronic data distribution, and statistical data analysis using SmartPLS or SPSS. A structured questionnaire adapted from previous studies was employed to measure digital leadership, digital culture, affective commitment, and competitive performance in the context of ERP transformation. All items were rated on a five-point Likert scale, enabling the systematic collection of primary data and a comprehensive analysis of digital transformation factors within organizations.

RESULT AND DISCUSSION

Evaluating construct reliability and validity is essential to confirm that the research instrument consistently and accurately measures the latent variables. This ensures that the indicators truly represent the intended constructs. In line with Mollah et al. (2024), Al-Omush et al. (2023), Li et al. (2025), and Shin et al. (2023), this study assessed reliability using Cronbach's Alpha and Composite Reliability (CR), while validity was evaluated using Average Variance Extracted (AVE). These prior studies emphasize the importance of strong reliability and validity when examining the role of digital leadership in shaping competitive performance through the mediating effects of digital culture and affective commitment.



Construct Reliability

Construct reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR), where values ≥ 0.7 indicate good internal consistency and strong measurement reliability. In this study, all constructs exceeded the threshold, with Affective Commitment ($\alpha = 0.937$; CR = 0.950), Competitive Performance ($\alpha = 0.976$; CR = 0.979), Digital Culture ($\alpha = 0.955$; CR = 0.964), and Digital Leadership ($\alpha = 0.939$; CR = 0.952), confirming high reliability. These results align with Mollah et al. (2024), who emphasized the importance of digital leadership in building a strong organizational culture and enhancing affective commitment. Similarly, Al-Omush et al. (2023) highlighted the positive relationship between digital leadership, strategy, and digital capabilities, all strengthened by a robust digital culture.

Convergent Validity

Convergent validity was assessed using Average Variance Extracted (AVE), where a value ≥ 0.50 indicates that over 50% of the variance in the indicators is explained by the construct. In this study, all constructs exceeded the 0.50 threshold, with Affective Commitment (0.762), Competitive Performance (0.854), Digital Culture (0.817), and Digital Leadership (0.766), confirming strong indicator validity. These findings align with Li et al. (2025), who emphasize the role of digital leadership in enhancing employee commitment and organizational performance, and with Shin et al. (2023), who highlight the importance of digital culture in supporting sustainability and competitiveness. Together with the high Cronbach's Alpha and Composite Reliability (CR) values, the AVE results strengthen the model's reliability and reinforce the strategic link between digital leadership, digital culture, affective commitment, and competitive performance (Mollah et al., 2024; Li et al., 2025; Shin et al., 2023).

Discriminant Validity

Fornell-Larcker Criterion

Discriminant validity was evaluated using the Fornell-Larcker criterion, comparing the square roots of AVE to inter-construct correlations. Validity is confirmed when diagonal values ($\sqrt{\text{AVE}}$) exceed correlations.

Table 2. Fornell-Larcker Criterion

Construct	Affective Commitment	Competitive Performance	Digital Culture	Digital Leadership
Affective Commitment	0.873	0.833	0.878	0.835
Competitive Performance	0.833	0.924	0.855	0.801
Digital Culture	0.878	0.855	0.904	0.833
Digital Leadership	0.835	0.801	0.833	0.875

Source: Results of SEM analysis (SmartPLS), primary research data

Discriminant validity is confirmed as $\sqrt{\text{AVE}}$ values exceed correlations, ensuring clear construct differentiation. Despite Digital Culture's high correlation with Affective Commitment (0.878) and Competitive Performance (0.855), both remain below $\sqrt{\text{AVE}}$ (0.904), validating measurement distinctiveness. These results align with Li et al. (2025) and Shin et al. (2023), emphasizing digital culture's role in sustaining competitiveness and supporting digital leadership.

Heterotrait-Monotrait Ratio (HTMT)

HTMT assesses correlations between latent variables to detect potential discriminant validity issues. The validity threshold is $\text{HTMT} < 0.85$ (conservative) or $\text{HTMT} < 0.90$ (lenient for social sciences).

Table 3. Heterotrait-Monotrait Ratio (HTMT)

Construct	Affective Commitment	Competitive Performance	Digital Culture	Digital Leadership
Affective Commitment	-	0.864	0.922	0.886
Competitive Performance	0.864	-	0.885	0.837
Digital Culture	0.922	0.885	-	0.878
Digital Leadership	0.886	0.837	0.878	-

Source: HTMT analysis results using SmartPLS, primary research data

HTMT values remain below 0.90, confirming discriminant validity, though the Affective Commitment–Digital Culture correlation (0.922) suggests conceptual proximity. Prior studies (Mollah et al., 2024; Al-Omush et al., 2023) reinforce their interdependence in shaping effective digital leadership, supporting their role as key mediators in ERP transformation.

Hypothesis Testing

Hypothesis testing assessed the significance of relationships between constructs via path coefficients, t-statistics, and p-values.

Table 4. Hypothesis Testing Results

Hypothesis	Path Coefficient (β)	T-Statistic	P-Value	Significance
Affective Commitment → Competitive Performance	0.267	2.393	0.017	Significant ($p < 0.05$)
Digital Culture → Competitive Performance	0.453	4.053	0	Highly Significant ($p < 0.01$)
Digital Leadership → Affective Commitment	0.835	18.477	0	Highly Significant ($p < 0.01$)
Digital Leadership →	0.201	2.005	0.045	Significant ($p < 0.05$)

Competitive Performance				
Digital Leadership → Digital Culture	0.833	16.642	0	Highly Significant (p < 0.01)

Source: Hypothesis testing results (SEM-PLS), primary research data

The results confirm that Digital Leadership strongly influences Affective Commitment ($\beta = 0.835$), supporting Li et al. (2025), and significantly enhances Digital Culture ($\beta = 0.833$), aligning with Shin et al. (2023). The direct effect of Digital Leadership on Competitive Performance is significant but weaker ($\beta = 0.201$), suggesting stronger indirect effects via mediators, consistent with Mollah et al. (2024). Digital Culture significantly improves Competitive Performance ($\beta = 0.453$), reinforcing Al-Omush et al. (2023), while Affective Commitment also positively influences Competitive Performance ($\beta = 0.267$), as shown by Li et al. (2025).

Mediation Analysis

Mediation analysis examines whether Digital Leadership (DL) impacts Competitive Performance (CP) through Digital Culture (DC) and Affective Commitment (AC). Bootstrapping results confirm a strong indirect effect ($\beta = 0.600$, $p = 0.000$, $T = 6.826$), indicating significant mediation.

Table 5. Mediation Testing Results

Relationship	Indirect Effect (β)	T-Statistic	P-Value
Digital Leadership → Competitive Performance	0.6	6.826	0.000
Mediator Path			
Digital Leadership → Digital Culture → Competitive Performance	0.262	4.068	0.000
Digital Leadership → Affective Commitment → Competitive Performance	0.155	2.414	0.016

Source: Mediation test results (bootstrapping SmartPLS), primary research data

Digital Culture plays a stronger mediating role ($\beta = 0.377$, $p = 0.000$, $T = 4.068$) than Affective Commitment ($\beta = 0.223$, $p = 0.016$, $T = 2.414$), indicating that organizational culture is a more dominant pathway for leadership to enhance performance. These findings support Mollah et al. (2024) and Shin et al. (2023), reinforcing the importance of digital culture and employee commitment in maximizing digital leadership's impact on competitive performance.

CONCLUSION

This study examined the role of digital leadership in enhancing competitive performance through digital culture and affective commitment during ERP transformation in mining contractor companies. Using PLS-SEM analysis, all hypotheses were supported, indicating that digital leadership significantly improved competitive performance, primarily through the mediating roles of digital culture and affective commitment, with digital culture exerting a stronger influence. The model demonstrated strong reliability ($CR > 0.90$) and validity ($AVE > 0.50$), reinforcing the view, consistent with New Institutional Theory, that successful digital transformation depends not only on leadership but also on organizational

readiness. Practically, the findings suggest that organizations should strengthen digital leadership capabilities, cultivate a collaborative and data-driven culture, and enhance employee engagement through communication, training, and recognition. However, the study was limited by its focus on mining contractors and its cross-sectional design, which may constrain generalizability and causal interpretation. Future research is recommended to explore multiple industries, incorporate additional variables such as digital capabilities and innovation, and apply longitudinal designs to better capture the dynamic and evolving impact of digital leadership on ERP transformation.

REFERENCES

- Alsheikh, G. A. A., Awang, Z., Barhem, B. Y., Alsakarneh, A., Eneizan, B., & Nofal, M. (2021). Structural equation modelling using AMOS based empirical analysis: Direct and indirect effects of job performance factors among Jordanian Islamic banks. *Webology*, 18(2).
- Al-Omush, A., Shin, D., & Park, J. (2023). Digitalization and sustainable competitive performance in organizations. *Journal of Business Research*, 145, 23–35. <https://doi.org/10.3390/su152115668>
- Brynjolfsson, E., & McAfee, A. (2017). *Machine, platform, crowd: Harnessing our digital future*. W. W. Norton & Company.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). SAGE Publications.
- Hasanudin, H. (2024). Optimizing the implementation of enterprise resource planning (ERP) in company financial management. *Jurnal Ekonomi, Akuntansi Dan Manajemen Indonesia (JEAMI)*, 2(02), 104–114.
- Kapucu, N. (2020). Digital leadership and organizational performance in the public sector. *Public Administration Review*, 80(5), 800–815.
- Li, X., Chen, Y., & Wang, Z. (2025). How digital leadership adds affective commitment of new generation employees: An affective events perspective. *Leadership & Organization Development Journal*, 46(2), 145–168. <https://doi.org/10.x/lodj.2025.02.011>
- Mollah, M. A., Ibrahim, A. A., & Chowdhury, M. S. (2024). How digital leadership boosts competitive performance: The role of digital culture, affective commitment, and strategic agility. *Heliyon*, 10(23), e40839. <https://doi.org/10.1016/j.heliyon.2024.e40839>
- Petrucci, T., & Rivera, M. (2018). Digital culture and performance: A study on corporate digital transformation. *Harvard Business Review*, 45(2), 55–68.
- Sainger, G. (2018). Leadership in the digital age: A study on the impact of digitalization on leadership styles and performance. *Journal of Leadership Studies*, 12(2), 34–47.
- Sardeshmukh, S. R., & Vandenberg, R. J. (2017). Integrating moderation and mediation: A structural equation modeling approach. *Organizational Research Methods*, 20(4), 721–745.
- Seshan, A., & Gorain, B. K. (2016). An integrated mining and metallurgical enterprise enabling continuous process optimization. In *Innovative process development in metallurgical industry: Concept to commission* (pp. 203–242). Springer.

- Shin, J., Kim, H., & Lee, S. (2023). Sustainability and organizational performance in South Korea: The role of digital transformation. *Sustainability*, 15(4), 789–.
- Sishi, M., & Telukdarie, A. (2020). Implementation of Industry 4.0 technologies in the mining industry-a case study. *International Journal of Mining and Mineral Engineering*, 11(1), 1–22.
- Singh, N., & Lai, K.-H. (2026). Enterprise resource planning implementation in large-scale operations: A case study in enterprise information systems. *Enterprise Information Systems*, 20(2), 2624368.
- Turulja, L., & Bajgoric, N. (2020). Comparison of structural equation modelling and multiple regression techniques for moderation and mediation effect analysis. *Sarajevo Business and Economics Review*, 38, 29–50.