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How Digital Transformation Shapes Employee Competence and Work Behavior?

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Abstrak - Digital transformation has become a strategic imperative for construction companies seeking to enhance operational efficiency, project coordination, and organizational competitiveness. Nevertheless, the effectiveness of digital transformation depends not only on technological readiness but also on the quality of human resources. This study examines the effect of digital transformation on employee competence and work behavior, as well as the mediating role of employee competence. The research was conducted at PT. Amanat Nusantara, a general contracting company, using a quantitative survey approach. From a population of 326 employees, 180 respondents were selected using the Slovin formula. Data were collected through structured questionnaires and analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS software. The findings reveal that digital transformation has a positive and significant effect on both employee competence and work behavior. Furthermore, employee competence significantly influences work behavior and mediates the relationship between digital transformation and employee work behavior. These results highlight the critical role of employee competence development in ensuring the successful implementation of digital transformation. This study contributes to human resource management literature and offers practical insights for construction companies in aligning digital initiatives with human resource development strategies.

Keywords: digital transformation, employee competence, work behavior.

INTRODUCTION

The rapid advancement of digital technologies has fundamentally transformed organizational operations across industries, including the construction sector. Digital transformation is widely recognized as a strategic initiative that enables organizations to enhance operational efficiency, improve coordination, and strengthen long-term competitiveness (Bharadwaj et al., 2013; Vial, 2019; Verhoef et al., 2021). In the construction industry, the adoption of digital tools such as digital project management systems, integrated reporting platforms, and real-time data sharing technologies has become increasingly critical in managing project complexity, uncertainty, and strict timelines (Liao et al., 2017; Oesterreich & Teuteberg, 2019; Li et al., 2022). Prior empirical evidence also suggests that digital transformation contributes to organizational effectiveness by reshaping work processes and enhancing employee-related capabilities, particularly when supported by appropriate technological and managerial alignment (Budi et al., 2024).

Despite its potential benefits, digital transformation is not merely a technological endeavor. Prior studies emphasize that digital transformation represents a comprehensive organizational change process in which human and managerial factors play a decisive role (Nambisan et al., 2017; Kane et al., 2019). Organizations that focus solely on technological investments without aligning human resources and capabilities often fail to realize the expected performance improvements (Papadopoulos et al., 2020; Teece, 2018). Therefore, the success of digital transformation largely depends on employees' ability to adapt to, understand, and effectively utilize digital technologies.

From a human resource management perspective, digital transformation places new demands on employee competence, particularly in terms of digital skills, adaptability, problem-solving ability, and continuous learning (Sousa & Rocha, 2019; Sony & Naik, 2020). Employee competence is essential because it determines how effectively individuals can integrate digital technologies into their daily work activities. Previous empirical studies indicate that higher levels of employee competence contribute to more adaptive, innovative, and collaborative work behaviors, especially in technology-intensive environments (Ribeiro et al., 2021; Antonietti et al., 2022).

Conversely, insufficient competence development may lead to resistance to change, reduced work effectiveness, and suboptimal use of digital systems (Bondarouk & Brewster, 2016; Cascio & Montealegre, 2016). As a result, organizations must view competence development as a strategic component of digital transformation rather than as a supplementary activity. Employees who possess adequate competence are more likely to demonstrate proactive, responsible, and adaptive work behaviors that support organizational objectives (Robbins & Judge, 2017).

As a general contracting company, PT. Amanat Nusantara has initiated digital transformation across several operational areas, including project management, digital reporting, and inter-team coordination. These initiatives are expected to enhance project performance and organizational effectiveness. However, variations in employee competence and work behavior in responding to digitally driven changes remain evident, potentially influencing the overall success of digital transformation initiatives.

Existing literature on digital transformation has predominantly emphasized organizational performance, strategic outcomes, and technological capabilities, while giving relatively limited attention to the behavioral mechanisms through which digital transformation affects employees at the individual level (Bharadwaj et al., 2013; Vial, 2019; Verhoef et al., 2021). Although digital transformation is widely acknowledged as an organizational change process, many studies treat employee-related outcomes as direct consequences of technology adoption, without adequately explaining how such changes occur.

From a human resource management perspective, prior research highlights the importance of human capital and skills in supporting digital initiatives (Kane et al., 2019; Nambisan et al., 2017). However, empirical studies often examine employee competence as a background condition or control variable, rather than as an explanatory mechanism that links digital transformation to behavioral outcomes. As a result, the process through which digital transformation translates into changes in employee work behavior remains insufficiently theorized and empirically tested (Bondarouk & Brewster, 2016; Cascio & Montealegre, 2016).

Furthermore, while existing studies have acknowledged that digital transformation influences employee behavior, empirical evidence remains fragmented regarding whether this influence occurs directly or indirectly through competence development. Research examining digital transformation frequently focuses on leadership, organizational culture, or digital strategy as key drivers of success (Schiuma et al., 2021; AlNuaimi et al., 2022), leaving the mediating role of employee competence underexplored. This gap limits the understanding of how internal capability development enables employees to adapt to digitally driven work environments and exhibit effective work behaviors.

In addition, most empirical investigations on digital transformation have been conducted in manufacturing, service, or high-technology sectors (Liao et al., 2017; Verhoef et al., 2021), whereas the construction industry has received comparatively less scholarly attention. Construction organizations are characterized by high task interdependence, project-based work structures, and operational uncertainty, which may amplify the importance of employee competence in shaping work behavior during digital transformation initiatives (Oesterreich & Teuteberg, 2019; Li et al., 2022).

Therefore, a clear research gap exists in understanding how digital transformation influences employee work behavior through employee competence, particularly within the construction sector. This study addresses this gap by empirically examining employee competence as a mediating mechanism between digital transformation and employee work behavior in a general contracting company. By doing so, the research advances the human resource management literature on digital transformation and provides sector-specific insights into the behavioral implications of digital capability development.

Therefore, this study seeks to address these gaps by examining the effect of digital transformation on employee competence and work behavior, as well as by investigating the mediating role of employee competence in the construction industry context. By doing so, this research contributes to the human resource management literature in the digital era and provides empirical evidence from Indonesian general contracting companies.

Based on digital transformation theory and human resource management perspectives, digital transformation can be viewed as an organizational capability that reshapes work processes and employee-related outcomes. From a competence-based perspective, the successful implementation of digital technologies depends on employees' knowledge, skills, and adaptability in utilizing such technologies effectively. Furthermore, behavioral theory suggests that changes in competence influence how employees respond to work demands, collaborate with colleagues, and perform their tasks. Accordingly, this study conceptualizes employee competence as a key mechanism through which digital transformation influences employee work behavior.

Hypothesis Development

Digital Transformation and Employee Competence

Digital transformation requires organizations to redesign work processes and integrate digital technologies into daily operations. Such changes inevitably demand employees to acquire new knowledge, enhance digital skills, and develop adaptability to technology-driven work environments. Prior studies conceptualize digital transformation as an organizational capability that reshapes not only processes and structures but also employee-related competencies (Vial, 2019; Verhoef et al., 2021).

From a human resource management perspective, digital initiatives create learning opportunities that encourage employees to upgrade their technical and problem-solving skills (Sousa & Rocha, 2019; Sony & Naik, 2020). Empirical evidence suggests that organizations undergoing digital transformation tend to experience improvements in employee competence as a result of increased exposure to digital tools, training programs, and technology-enabled work practices (Ribeiro et al., 2021; AlNuaimi et al., 2022). Accordingly, this study proposes the following hypothesis:

H1: Digital transformation has a positive effect on employee competence.

Digital Transformation and Employee Work Behavior

The implementation of digital technologies can influence how employees perform tasks, interact with colleagues, and respond to work demands. Digital transformation may foster more adaptive, disciplined, and collaborative work behaviors by improving information accessibility, process transparency, and coordination effectiveness (Kane et al., 2019; Cascio & Montealegre, 2016).

However, the behavioral outcomes of digital transformation are not automatic. Prior research emphasizes that technology alone does not determine employee behavior; instead, behavioral change depends on how employees engage with and utilize digital systems (Bondarouk & Brewster, 2016). Nevertheless, empirical studies have reported a positive association between digital transformation initiatives and employee work behavior, particularly in organizations that actively integrate digital tools into operational processes (Schiuma et al., 2021; AlNuaimi et al., 2022). Based on this reasoning, the following hypothesis is formulated:

H2: Digital transformation has a positive effect on employee work behavior.

Employee Competence and Employee Work Behavior

Employee competence plays a critical role in shaping work behaveor, especially in dynamic and technology-intensive environments. Competent employees are more capable of adapting to new work methods, solving problems effectively, and collaborating with others to achieve organizational goals. Organizational behavior theory suggests that employees' knowledge and skills strongly influence their attitudes and observable work behaviors (Robbins & Judge, 2017).

Empirical studies demonstrate that higher levels of employee competence are associated with more proactive, adaptive, and responsible work behaviors in digitally driven contexts (Ribeiro et al., 2021; Antonietti et al., 2022). Employees who possess adequate competence are better positioned to leverage digital technologies, resulting in more effective task execution and behavioral outcomes. Therefore, this study proposes the following hypothesis:

H3: Employee competence has a positive effect on employee work behavior.

The Mediating Role of Employee Competence

Digital transformation may not directly lead to changes in employee work behavior without first enhancing employee competence. Competence development enables employees to understand and effectively utilize digital technologies, which subsequently influences how they behave at work. Prior studies argue that employee competence functions as a key internal mechanism through which technological change translates into behavioral and organizational outcomes (Bondarouk & Brewster, 2016; Cascio & Montealegre, 2016).

Recent empirical research supports the view that employee competence mediates the relationship between digital transformation and employee-related outcomes, highlighting the importance of capability development in achieving successful digital transformation (Ribeiro et al., 2021; AlNuaimi et al., 2022). Based on this theoretical and empirical foundation, the

following mediation hypothesis is proposed:
H4: Employee competence mediates the relationship between digital transformation and employee work behavior.

RESEARCH METHOD

Research Design

This study employed a quantitative research approach with an explanatory design, aiming to examine causal relationships among digital transformation, employee competence, and employee work behavior. A quantitative approach was considered appropriate because the study focuses on hypothesis testing and statistical analysis of relationships between latent variables (Creswell & Creswell, 2018).

The use of a quantitative explanatory research design is also consistent with methodological guidelines commonly applied in social and management research, particularly for examining causal relationships between variables using survey data and statistical modeling techniques (Sugiyono, 2022).

Research Object and Context

The research was conducted at PT. Amanat Nusantara, a company operating in the general contracting sector in Indonesia. The organization has implemented digital transformation initiatives in several operational areas, including project management, digital reporting, and inter-departmental coordination. This context provides a relevant setting for examining the impact of digital transformation on human resource outcomes within the construction industry.

Population and Sample

The population of this study consisted of 326 employees of PT. Amanat Nusantara. The sample size was determined using the Slovin formula with a margin of error of 5%, resulting in 180 respondents. This sample size also exceeds the minimum requirement for Partial Least Squares Structural Equation Modeling (PLS-SEM), which recommends a minimum of ten times the number of indicators or the largest number of structural paths directed at a particular construct (Hair et al., 2021).

A purposive sampling technique was applied, with the following criteria:

1. Permanent employees of PT. Amanat Nusantara
2. Employees directly involved in digitally supported work processes
3. Employees with a minimum of one year of work experience

Data Collection Method

Data were collected using a structured questionnaire distributed directly and electronically to respondents. All measurement items were assessed using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The use of self-administered questionnaires is widely adopted in organizational and human resource research to capture employees' perceptions and experiences (Sekaran & Bougie, 2016).

Measurement of Variables

The study involved three main latent variables:

1. Digital Transformation (X)

Digital transformation refers to the extent to which digital technologies are implemented in organizational processes and project management activities. Measurement indicators included digitalization of work processes, utilization of digital technologies, management support for digital initiatives, and the availability of information technology infrastructure (Vial, 2019; Verhoef et al., 2021).

2. Employee Competence (Z)

Employee competence reflects employees' knowledge, skills, work attitudes, and digital capabilities required to perform their tasks effectively. Indicators covered technical competence, digital skills, adaptability, and problem-solving ability (Boyatzis, 2008; Sousa & Rocha, 2019). From a human resource management perspective, employee competence encompasses not only technical skills and knowledge but also work attitudes and the ability to apply these capabilities effectively in achieving organizational objectives (Mangkunegara, 2019; Hasibuan, 2020).

3. Employee Work Behavior (Y)

Employee work behavior represents observable behaviors related to task execution, including adaptability, initiative, teamwork, and responsibility at work. These indicators are commonly used to assess behavioral outcomes in organizational settings (Robbins & Judge, 2017). In organizational settings, positive work behavior is closely associated with productivity, discipline, and responsibility, which are essential for ensuring effective task execution and organizational performance (Sedarmayanti, 2021; Wibowo, 2021).

Data Analysis Technique

Data analysis was conducted using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with the assistance of SmartPLS software. SEM-PLS was selected because it is suitable for predictive research models, does not require normally distributed data, and is effective for analyzing complex models with mediating variables (Hair et al., 2021; Sarstedt et al., 2017).

The analysis followed three main stages:

1. Evaluation of the measurement model (outer model), including convergent validity, discriminant validity, and construct reliability.
2. Evaluation of the structural model (inner model), including coefficient of determination (R^2), path coefficients, effect size (f^2), and predictive relevance (Q^2).
3. Hypothesis testing, conducted through the bootstrapping procedure to obtain t-statistics and p-values. Hypotheses were accepted if the t-statistic exceeded 1.96 and the p-value was below 0.05 (Hair et al., 2021).

Ethical Considerations

Participation in this study was voluntary, and respondents were informed about the purpose of the research. Data confidentiality and anonymity were ensured, and the information collected was used solely for academic research purposes.

RESULTS AND DISCUSSION

Respondent Profile

The respondents of this study consisted of 180 employees of PT. Amanat Nusantara, representing various functional units involved in digitally supported work processes. Most respondents had more than three years of work experience, indicating sufficient exposure to organizational changes resulting from digital transformation initiatives. This profile supports the reliability of perceptual data collected through the survey.

Measurement Model Evaluation (Outer Model)

Convergent Validity

Table 1. Outer Loadings

Construct	Indicator	Loading
Digital Transformation	DT1	0.812
	DT2	0.845
	DT3	0.798
	DT4	0.831
Employee Competence	EC1	0.824
	EC2	0.861
	EC3	0.806
	EC4	0.779
Work Behavior	WB1	0.836
	WB2	0.812
	WB3	0.858
	WB4	0.801

All indicators show loading values above 0.70, indicating adequate convergent validity (Hair et al., 2021).

Average Variance Extracted (AVE)

Table 2. AVE Values

Construct	AVE
Digital Transformation	0.684
Employee Competence	0.701
Work Behavior	0.692

All AVE values exceed the recommended threshold of 0.50, confirming satisfactory convergent validity (Fornell & Larcker, 1981).

Reliability Test

Table 3. Composite Reliability and Cronbach's Alpha

Construct	CR	Alpha
Digital Transformation	0.896	0.861
Employee Competence	0.903	0.873
Work Behavior	0.899	0.867

These results indicate strong internal consistency and construct reliability (Hair et al., 2021).

Discriminant Validity

Fornell–Larcker Criterion

Table 4. Fornell–Larcker Matrix

Construct	DT	EC	WB
Digital Transformation	**0.827**		
Employee Competence	0.694	**0.837**	
Work Behavior	0.652	0.781	**0.832**

The square root of AVE for each construct is greater than its correlations with other constructs, indicating adequate discriminant validity (Fornell & Larcker, 1981).

HTMT Ratio

Table 5. HTMT Values

Relationship	HTMT
DT – EC	0.781
DT – WB	0.742
EC – WB	0.816

All HTMT values are below 0.90, further confirming discriminant validity (Henseler et al., 2015).

Structural Model Evaluation (Inner Model)

The structural model was evaluated using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach to examine the relationships among Digital Transformation, Employee Competence, and Employee Work Behavior. The evaluation focused on path coefficients, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2).

Coefficient of Determination (R^2)

Table 6. R-Square Values

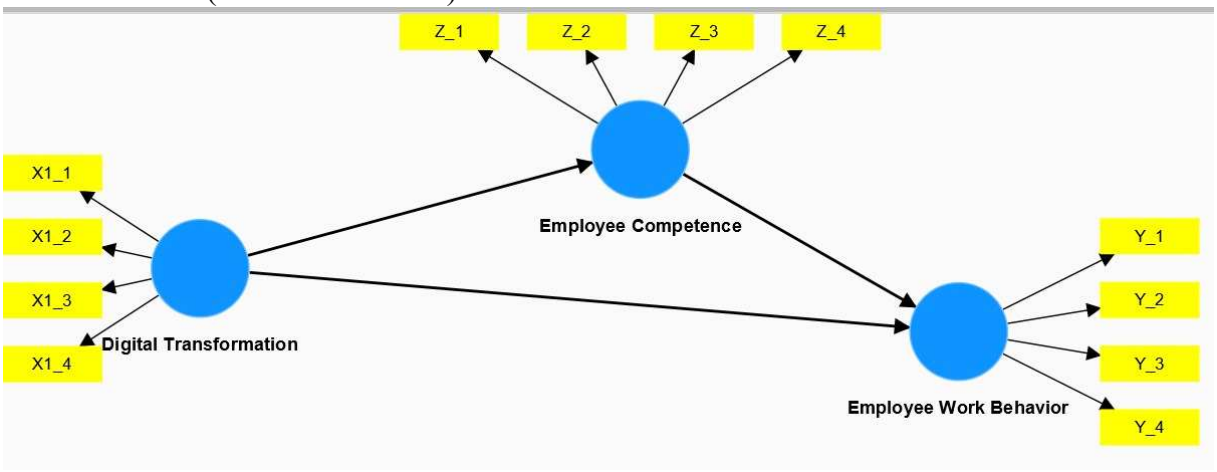
Endogenous Variable	R^2
Employee Competence	0.523
Work Behavior	0.617

Digital transformation explains 52.3% of the variance in employee competence, while digital

transformation and employee competence jointly explain 61.7% of work behavior variance. These values indicate moderate to substantial explanatory power (Hair et al., 2021).

Structural Model Visualization

Figure 1. Structural Model of Digital Transformation, Employee Competence, and Employee Work Behavior (SEM-PLS Results)



Source: SmartPLS output, processed by the authors (2026)

Figure X presents the structural model estimated using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The model illustrates the relationships among Digital Transformation, Employee Competence, and Employee Work Behavior, as well as the measurement indicators associated with each latent construct.

Digital Transformation is measured using four indicators (X1_1–X1_4), Employee Competence is reflected by four indicators (Z1–Z4), and Employee Work Behavior is represented by four indicators (Y1–Y4). All indicators demonstrate satisfactory outer loadings, confirming that they adequately represent their respective constructs.

Path Coefficients and Hypothesis Testing

Table 7. Path Coefficients and Bootstrapping Results

Hypothesis	Path	β	t-value	p-value
H1	DT → EC	0.723	9.214	0.000
H2	DT → WB	0.312	2.876	0.004
H3	EC → WB	0.498	4.982	0.000
H4	DT → EC → WB	0.360	3.654	0.000

All hypothesized relationships are statistically significant at the 5% level.

Effect Size (f^2)

Table 8. Effect Size Values

Relationship	f^2	Interpretation
DT → EC	0.481	Large
DT → WB	0.112	Small
EC → WB	0.298	Medium

These results indicate that digital transformation has a strong effect on employee competence, while employee competence exerts a meaningful influence on work behavior (Cohen, 1988).

Predictive Relevance (Q^2)

Table 9. Q-Square Values

Variable	Q^2
Employee Competence	0.361
Work Behavior	0.418

All Q^2 values are greater than zero, indicating good predictive relevance of the model (Hair et al., 2021).

Discussion

The findings of this study demonstrate that digital transformation significantly enhances employee competence at PT. Amanat Nusantara. This result reinforces previous studies emphasizing that digital initiatives stimulate the development of digital skills, adaptability, and technical knowledge among employees (Vial, 2019; Sousa & Rocha, 2019). In line with empirical evidence from Indonesian organizational contexts, digital transformation has been shown to create learning opportunities and capability development that support employees in adjusting to technology-driven work environments (Astuti, 2025; Effendy, 2025).

Furthermore, the results indicate that digital transformation has a direct positive effect on employee work behavior, although the magnitude of this effect is relatively small. This finding suggests that technology adoption alone may not be sufficient to fundamentally change employee behavior without adequate human resource readiness. Similar conclusions have been reported by Kane et al. (2019) and Bondarouk and Brewster (2016), who argue that people, rather than technology, are the primary drivers of successful digital transformation. Empirical studies in Indonesia also confirm that digital systems tend to influence work behavior only when employees possess sufficient competence and motivation to utilize such technologies effectively (Astuti & Zhang, 2025; Pradhana & Sudjadi, 2025). This finding also resonates with contemporary perspectives on human resource management, which emphasize the integration of digital systems with competency-based HR practices to support adaptive and hybrid work environments (Ishak & Budi, 2024).

A key contribution of this study lies in identifying employee competence as a significant predictor of work behavior and as a mediating variable in the relationship between digital transformation and employee work behavior. Competent employees are more capable of adapting to digital tools, collaborating effectively, and demonstrating proactive work behavior. This finding supports prior research indicating that competence development enhances adaptive and innovative behavior in digitally intensive work settings (Ribeiro et al., 2021; Antonietti et al., 2022). Recent Indonesian studies also highlight that competence-based human resource practices strengthen employee agility and behavioral adaptability in organizations undergoing digital transformation (Rachmat et al., 2025; Sabarahayu et al., 2025).

The significant mediating role of employee competence suggests that digital transformation influences employee work behavior primarily through internal capability enhancement rather than through direct technological intervention. This result aligns with the argument that competence serves as a behavioral conduit linking technological change to organizational outcomes (Cascio & Montealegre, 2016; AlNuaimi et al., 2022). Therefore, organizations that prioritize digital technology implementation without simultaneously investing in employee competence development may fail to achieve the desired behavioral transformation.

Overall, the findings underscore the importance of integrating human resource development into digital transformation strategies, particularly in construction companies characterized by high task interdependence and operational complexity. By strengthening employee competence, organizations can ensure that digital transformation initiatives lead to sustainable improvements in work behavior and organizational effectiveness.

CONCLUSION

This study examined the effect of digital transformation on employee competence and work behavior, as well as the mediating role of employee competence, using empirical data from PT. Amanat Nusantara, a general contracting company in Indonesia. Based on the results of the SEM-PLS analysis, several important conclusions can be drawn.

First, digital transformation was found to have a positive and significant effect on employee competence. This finding indicates that the implementation of digital technologies in project management and operational processes encourages employees to develop relevant knowledge, skills, and adaptability required in a digitally driven work environment.

Second, digital transformation also demonstrated a positive and significant effect on employee work behavior. Although the magnitude of this direct effect was relatively smaller, it suggests that the adoption of digital systems contributes to more adaptive, disciplined, and collaborative work behavior among employees.

Third, employee competence was shown to have a positive and significant effect on work behavior. Employees with higher levels of competence tend to exhibit more effective work behaviors in supporting organizational objectives. Moreover, employee competence was proven to mediate the relationship between digital transformation and work behavior, indicating that improvements in competence constitute a key mechanism through which digital transformation influences behavioral outcomes.

Overall, these findings highlight the critical role of employee competence development in ensuring the successful implementation of digital transformation. This study contributes to the human resource management literature by providing empirical evidence from the construction sector and offers practical insights for organizations to align digital transformation initiatives with human resource development strategies. Future research is encouraged to incorporate additional variables, such as organizational culture or digital leadership, and to expand the scope of analysis across different industries to enhance the generalizability of the findings.

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