

THE MEDIATING ROLE OF COMPETITIVE ADVANTAGE IN THE RELATIONSHIP BETWEEN DIGITAL COMPETENCE, DIGITAL LEADERSHIP AND VOCATIONAL TRAINING INSTITUTION PERFORMANCE

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Received : 20 June 2026
Revised : 29 June 2026

Accepted : 11 July 2026
Published : 28 July 2026

Abstract

This study examines the effects of digital competence and digital leadership on the performance of vocational training institutions and evaluates the mediating role of competitive advantage. Drawing on the Resource-Based View and Dynamic Capabilities perspectives, the study employed a quantitative survey design involving 180 associate trainers and managerial personnel affiliated with vocational training institutions in East Java, Indonesia. Respondents were selected through purposive sampling, and the data were analyzed using Partial Least Squares Structural Equation Modeling with SmartPLS 4. The results show that digital competence and digital leadership positively and significantly influence competitive advantage and institutional performance. Competitive advantage also has a strong positive effect on institutional performance and significantly mediates the effects of both digital competence and digital leadership. These findings indicate that digital resources generate superior institutional outcomes when they are strategically converted into differentiated services, efficient operational processes, and innovative business models. The study extends capability-based explanations of digital transformation in vocational education and suggests that institutional leaders should simultaneously strengthen staff digital competence, digital leadership, and the strategic use of technology to build sustainable competitive advantage and improve performance.

Keywords: Competitive Advantage; Digital Competence; Digital Leadership; Institutional Performance; Vocational Training Institutions.

INTRODUCTION

The rapid advancement of digital technologies has fundamentally transformed the landscape of education and training institutions, particularly vocational training institutions (VTIs). Digitalization has reshaped not only instructional delivery but also organizational processes, service models, and strategic management within training providers. Vocational education and training systems face particularly intense pressure to adapt to digital transformation due to their close alignment with labor market demands, technological change, and industry standards, which evolve more rapidly than in general education contexts (Yang et al., 2023; Heuling et al., 2021). As a consequence, the performance of vocational training institutions increasingly depends on their ability to integrate digital capabilities into both instructional practices and managerial decision-making processes (Teece et al., 2016).

Within this context, digital competence has emerged as a critical organizational resource for vocational training institutions. Digital competence is widely conceptualized as a multidimensional construct encompassing the knowledge, skills, and attitudes required for the effective, critical, and safe use of digital technologies (Fernández-Sánchez et al., 2022; Zhao et al., 2021). In vocational training institutions, digital competence is particularly salient for trainers and staff who are responsible for designing, delivering, and evaluating digitally supported training programs that align with industry needs. Empirical studies grounded in the European Digital Competence Framework (DigComp) demonstrate that digital competence can be systematically developed, measured, and managed at the institutional level, rather than being treated solely as an individual attribute (Barboutidis & Stiakakis, 2023; Heuling et al., 2021). This institutional perspective suggests that digital competence constitutes a strategic capability that can influence how effectively vocational training institutions implement digital transformation initiatives. In addition to individual and organizational competencies, the success

of digital transformation in vocational training institutions is strongly shaped by digital leadership. Digital leadership refers to a leader's capacity to leverage digital technologies to drive organizational change, foster innovation, and enhance institutional performance (Karaköse et al., 2021). Prior research emphasizes that digital leadership extends beyond technical expertise and involves the articulation of a strategic vision, managerial capability, and the development of human resources capable of operating in digital environments (Trenerry et al., 2021). In educational and training contexts, leaders with strong digital leadership capabilities are better positioned to align digital competence development with institutional goals, allocate resources strategically, and cultivate a supportive digital culture that encourages innovation and continuous improvement (Xin et al., 2024).

Although digital competence and digital leadership are widely recognized as essential enablers of digital transformation, their relationship with institutional performance remains theoretically underexplored, particularly in vocational training institutions. Strategic management literature suggests that organizational performance is rarely influenced directly by capabilities alone; instead, performance outcomes are typically realized through the creation of competitive advantage (Teece et al., 2016). From the perspective of the Resource-Based View (RBV) and Dynamic Capabilities theory, competitive advantage functions as a mechanism through which organizational resources and capabilities are transformed into superior performance outcomes that are difficult for competitors to replicate (Teece et al., 2016; Camilleri, 2021). In vocational and training contexts, competitive advantage may manifest in distinctive service quality, innovation capacity, stakeholder satisfaction, and institutional differentiation in increasingly competitive training markets (Yang et al., 2023); (Muinda et al., 2025).

From an institutional standpoint, vocational training institutions operate in environments characterized by intense competition, where performance is assessed not only by training outputs but also by responsiveness to technological change and labor market expectations. As digital technologies redefine training delivery modes and service models, institutions are required to continuously reconfigure their internal capabilities to remain relevant and competitive (Teece et al., 2016; (Yang et al., 2023)). In this setting, digital competence among trainers and staff provides the foundational capability for implementing digitally supported training, while digital leadership shapes the strategic direction and organizational readiness necessary for sustainable transformation (Karaköse et al., 2021; Xin et al., 2024)). However, without a clear strategic mechanism, investments in digital competence and leadership risk remaining operational improvements rather than drivers of superior institutional performance.

Despite the growing body of literature on digital competence, digital leadership, and organizational performance across educational and service sectors, empirical research explicitly positioning competitive advantage as a mediating mechanism between digital competence, digital leadership, and vocational training institution performance remains limited. Existing studies tend to focus either on individual-level outcomes, such as teachers' digital skills or technology use, or on direct effects of leadership and digital capabilities on performance indicators, thereby overlooking the strategic processes through which digital capabilities are converted into organizational value (Barboutidis & Stiakakis, 2023; Zhao et al., 2021; Mehmood & Hanaysha, 2022). This limitation constrains theoretical understanding of digital transformation in vocational training institutions and leaves practitioners without clear guidance on how to strategically deploy digital resources to achieve sustained performance improvement.

This research gap is particularly salient in vocational training institutions, where competition among providers and the need for differentiation have become increasingly pronounced. As the number of training providers grows and digital delivery becomes more accessible, vocational training institutions must distinguish themselves through strategic capabilities rather than technological adoption alone (Muinda et al., 2025). Understanding whether and how digital competence and digital leadership contribute to institutional performance through competitive advantage is therefore critical for both theory development and managerial practice.

Accordingly, this study aims to examine the mediating role of competitive advantage in the relationship between digital competence, digital leadership, and vocational training institution performance. By integrating perspectives from digital competence research, digital leadership literature, and strategic management theory, this study seeks to advance understanding of the mechanisms through which digital capabilities are translated into superior institutional outcomes. The findings are expected to contribute theoretically by extending RBV and Dynamic Capabilities perspectives to the vocational training context, and practically by providing evidence-based insights for leaders and managers seeking to enhance institutional performance through digital transformation initiatives.

LITERATURE REVIEW

Resource-Based View Theory

The Resource-Based View (RBV) explains organizational performance by emphasizing the strategic role of internal resources and capabilities that are valuable, rare, inimitable, and non-substitutable. RBV argues that sustainable competitive advantage arises when organizations effectively deploy intangible resources rather than relying solely on external market positioning (Teece et al., 2016; Bobe & Kober, 2015). This perspective is further strengthened by Dynamic Capabilities theory, which highlights the ability of organizations to reconfigure internal competencies in response to technological and environmental change (Teece et al., 2016). In education and training institutions, intangible assets such as human capital, leadership capability, and digital competence are increasingly recognized as strategic resources (Camilleri, 2021; Izzo et al., 2022). Empirical studies in education and vocational sectors show that these intangible capabilities support differentiation through service quality, innovation, and stakeholder value creation (Haan, 2015; Vrana et al., 2015). Research also confirms that RBV is highly applicable to service-based organizations operating in competitive environments, including vocational training institutions (Yang et al., 2023; Muinda et al., 2025). These findings suggest that RBV provides a robust theoretical foundation for examining how digital-related capabilities generate competitive advantage and institutional performance in vocational training institutions.

Digital Competence, Institutional Performance, and Competitive Advantage

Digital competence refers to an organization's collective capability to utilize digital technologies through appropriate mindset, knowledge, skills, and collaborative practices. Recent empirical research conceptualizes digital competence as a multidimensional construct encompassing digital mindset and attitudes, digital knowledge and skills, and digital collaboration and development (Xin et al., 2024). This conceptualization emphasizes that digital competence is not limited to technical proficiency but also includes behavioral readiness and continuous improvement in digital environments. In service-oriented organizations, digital competence enables effective management of digital resources and coordination of digitally mediated activities (Yu & Moon, 2021). Empirical evidence suggests that organizational digital competence supports adaptability, service innovation, and institutional responsiveness to market change (Xin et al., 2024). From a Resource-Based View perspective, digital competence represents an intangible organizational resource that can be strategically leveraged. This positioning highlights digital competence as a foundational capability for institutional competitiveness and performance in vocational training institutions.

Empirical studies indicate that digital competence contributes to competitive advantage by enabling organizations to enhance customer experience, optimize operational processes, and support digital business model development (Shehadeh et al., 2023). Research in service organizations demonstrates that institutions with stronger digital competence are better positioned to deliver superior digital interactions and service quality (Yu & Moon, 2021). Evidence from education and training contexts shows that digital competence facilitates institutional differentiation through technology-enabled services and process efficiency (Xin et al., 2024). Studies further suggest that digital competence strengthens value creation mechanisms that underpin competitive advantage in digitally transforming organizations (Shehadeh et al., 2023). From an RBV perspective, these outcomes arise when digital competence is embedded as an organizational capability rather than an isolated individual skill. Considering several of these findings, digital competence is expected to positively influence competitive advantage in vocational training institutions.

H1: *Digital competence has a positive effect on competitive advantage.*

Prior research shows that digital competence is directly associated with institutional performance through enhanced service delivery, responsiveness, and customer satisfaction (Yu & Moon, 2021). Empirical evidence indicates that organizations with digitally competent staff demonstrate higher non-financial performance outcomes, including service effectiveness and market engagement (Xin et al., 2024). Studies in digitally intensive service sectors suggest that digital competence improves organizational adaptability and performance sustainability (Shehadeh et al., 2023). From an RBV perspective, performance improvements occur when digital competence is systematically integrated into institutional routines and processes. Evidence further suggests that digital competence enhances institutional outcomes related to service quality and customer experience in education-related services (Yu & Moon, 2021). Referring to the findings of prior studies, digital competence is therefore expected to positively affect institutional performance.

H3: *Digital competence has a positive effect on institutional performance*

Digital Transformation and Digital Leadership

Digital leadership refers to leadership capabilities that enable organizations to navigate digital transformation through innovation orientation, adaptability, uncertainty absorption, and visionary direction. Empirical research conceptualizes digital leadership as a multidimensional construct comprising innovation, adaptability, absorbing uncertainty, and visionary leadership characteristics (Magesa & Jonathan, 2022). This perspective emphasizes leaders' anticipatory behavior, digital savviness, risk-taking orientation, and ability to provide strategic direction in uncertain environments. In digitally transforming organizations, digital leadership plays a critical role in aligning digital initiatives with organizational goals (Yu & Moon, 2021). Empirical studies suggest that digital leadership enhances institutional readiness for digital change and strategic renewal (Magesa & Jonathan, 2022). This framing positions digital leadership as a higher-order capability within the Resource-Based View.

Empirical research shows that digital leadership contributes to competitive advantage by fostering digital innovation and enabling effective transformation of customer experience and operational processes (Shehadeh et al., 2023). Studies indicate that leaders who demonstrate innovation and adaptability are better able to orchestrate organizational resources in digital environments (Magesa & Jonathan, 2022). Evidence from service organizations highlights that digital leadership strengthens strategic positioning through enhanced digital service delivery (Yu & Moon, 2021). Research further suggests that leadership-driven digital initiatives enable institutions to leverage digital competence into differentiated value propositions. From an RBV perspective, digital leadership functions as a strategic capability that supports competitive advantage creation. Considering several of these findings, digital leadership is expected to positively influence competitive advantage.

H2: *Digital leadership has a positive effect on competitive advantage.*

Previous studies indicate that digital leadership directly contributes to institutional performance by improving organizational coordination, service effectiveness, and strategic execution (Yu & Moon, 2021). Empirical evidence suggests that leaders with strong digital leadership characteristics enhance institutional performance by guiding innovation and managing uncertainty (Magesa & Jonathan, 2022). Research shows that digital leadership supports performance outcomes by ensuring effective implementation of digital transformation initiatives (Shehadeh et al., 2023). From an RBV perspective, leadership capabilities enhance performance when they enable effective utilization of organizational resources. These findings highlight the direct role of digital leadership in shaping institutional performance in digitally intensive environments. Referring to the findings of prior studies, digital leadership is expected to positively affect institutional performance.

H4: *Digital leadership has a positive effect on institutional performance.*

Competitive Advantage and Institutional Performance

Competitive advantage refers to an organization's ability to create superior value through digital transformation of customer experience, operational processes, and business models. Recent empirical studies conceptualize competitive advantage in digital contexts through customer experience digital transformation, operational process transformation, and business model innovation (Shehadeh et al., 2023). In service-oriented organizations, these dimensions enable differentiation beyond traditional financial performance metrics. Research suggests that competitive advantage in digital environments is closely linked to service quality and customer experience outcomes (Yu & Moon, 2021). From an RBV perspective, competitive advantage represents the mechanism through which organizational capabilities generate performance outcomes.

Empirical evidence shows that organizations with stronger digital transformation-based competitive advantage demonstrate higher institutional performance (Shehadeh et al., 2023). Research in service sectors indicates that superior customer experience and process efficiency contribute significantly to performance outcomes (Yu & Moon, 2021). Studies further suggest that business model transformation enhances organizational performance by supporting service innovation and market responsiveness. From an RBV perspective, competitive advantage strengthens performance by translating capabilities into value creation. These findings consistently support the positive role of competitive advantage in shaping institutional performance. Referring to the findings of prior studies, competitive advantage is therefore expected to positively influence institutional performance.

H5: *Competitive advantage has a positive effect on institutional performance.*

The Mediating Role of Competitive Advantage

Competitive advantage is widely recognized as a strategic mechanism that connects organizational capabilities with performance outcomes in digital environments. RBV emphasizes that capabilities must be converted into differentiated value through strategic deployment to generate performance benefits. In digital transformation contexts, competitive advantage functions as the link between digital capabilities and institutional outcomes (Shehadeh et al., 2023; Yu & Moon, 2021).

Empirical studies indicate that digital competence influences institutional performance primarily through its contribution to digital transformation-based competitive advantage (Shehadeh et al., 2023). Research suggests that digital competence enhances performance when it improves customer experience and operational efficiency (Xin et al., 2024; Yu & Moon, 2021). Evidence shows that competitive advantage enables organizations to convert digital capabilities into performance outcomes. From an RBV perspective, competitive advantage acts as a mediating mechanism in capability–performance relationships. Referring to the findings of prior studies, competitive advantage is expected to mediate the relationship between digital competence and institutional performance.

H6: *Competitive advantage mediates the relationship between digital competence and institutional performance.*

Previous studies suggest that digital leadership affects institutional performance through its role in enabling competitive advantage in digital transformation (Shehadeh et al., 2023). Empirical evidence shows that leadership characteristics such as innovation, adaptability, and visionary direction enhance organizational performance by supporting digital differentiation (Magesa & Jonathan, 2022). Research further indicates that competitive advantage serves as the mechanism through which leadership-driven digital initiatives generate performance outcomes (Yu & Moon, 2021). From an RBV perspective, leadership capabilities contribute to performance when strategically leveraged through competitive advantage. Referring to the findings of prior studies, competitive advantage is therefore expected to mediate the relationship between digital leadership and institutional performance.

H7: *Competitive advantage mediates the relationship between digital leadership and institutional performance.*

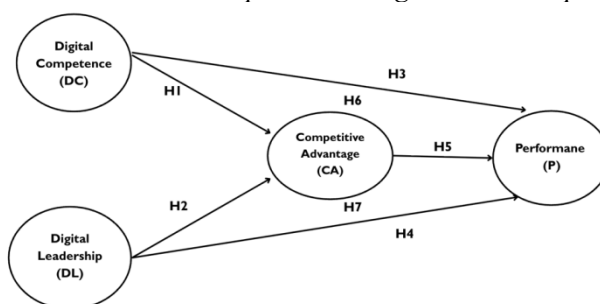


Figure 1. Conceptual Model

METHOD

Research Context

The rapid pace of digital transformation has increasingly positioned vocational training institutions (VTIs) as key actors in workforce development and employability systems. In Indonesia, this is reflected in the large number of VTI, which reached 7,213 institutions nationwide in Semester I of 2025 (Kementerian Ketenagakerjaan RI, 2025). Within this national context, East Java holds a strategic position by accounting for approximately 18.7–18.8 percent of all LPKs, or around 1,352 institutions, representing nearly one-fifth of the national total. This relatively high proportion indicates a dense and competitive training environment compared to other provinces. Such conditions intensify external pressures on LPKs, particularly related to digitalization of training delivery, competition among providers, and increasing industry demand for digital skills aligned with Industry 4.0. As a result, vocational training institutions are required to continuously adapt their strategies to maintain relevance, service quality, and institutional performance.

Beyond external pressures, the high concentration of LPKs in East Java also highlights internal challenges related to organizational capability and performance differentiation. Variations in trainers' digital competence and leadership readiness for digital transformation can lead to unequal training quality across institutions. In a region contributing almost 19 percent of Indonesia's LPKs, institutional performance can no longer be assessed solely through financial indicators, but must also reflect service quality, training effectiveness, and graduate outcomes.

These conditions create observable performance variation among institutions operating within a similar regulatory and market environment. Such variation provides a relevant empirical setting to examine how internal capabilities contribute to competitive advantage and institutional performance. Referring to this context, East Java was selected as the unit of analysis in this study, as it allows a focused investigation of vocational training institutions under high competitive density and digital transformation pressures.

Research Method and Sample

This study employed a quantitative research approach by collecting primary data through an online questionnaire distributed to associate trainers collaborating with vocational training institutions (LPKs) in East Java, Indonesia. A purposive sampling technique was applied, with the criteria that respondents must be active associate trainers who have experience working with one or more vocational training institutions. This criterion was used to ensure that respondents possessed adequate exposure to institutional practices, digital training implementation, and leadership dynamics within vocational training organizations. Data collection was conducted online using several digital communication channels, including messaging applications, email, and social media platforms. The questionnaire was distributed online from August 22, 2025, to November 5, 2025, using several media such as WhatsApp, official email, and other social media applications. A total of 180 valid responses were collected during this period, and all responses met the predefined criteria and were retained for further analysis. Accordingly, the final dataset consisted of 180 respondents and was used in the main analysis.

To describe the characteristics of the research sample, a descriptive analysis was conducted based on respondents' demographic profiles, including gender, age, educational background, work experience, and job position. The results indicate that the respondents were predominantly female 62%, while male respondents accounted for 38% of the sample. In terms of age, most respondents were within the 31–50 years range, comprising 65% of the total sample, indicating a relatively mature and experienced workforce. Regarding educational background, the majority of respondents held higher education degrees, with 58% holding a bachelor's degree and 36% holding a master's degree. Based on work experience, respondents with 5–10 years of experience dominated the sample 54%, reflecting substantial professional involvement in vocational training activities. In terms of job position, most respondents served as trainers 79%, while 21% occupied managerial roles, providing both operational and managerial perspectives. A detailed summary of respondent characteristics is presented in Table 1.

Table 1. Respondent Demographics

Profile	Classification	Number	Percentage
Gender	Male	68	38%
	Female	112	62%
Age	20 - 30	9	5%
	31 - 40	54	30%
	41 - 50	63	35%
	51 - 60	27	15%
	> 60	27	15%
Latest Education	High School	6	3%
	Bachelor	104	58%
	Master	64	36%
	Doctoral	6	3%
Work Experience	Less than 5 years	43	24%
	5 - < 10 years	97	54%
	10 - < 15 years	27	15%
	>15 years	13	7%
Job Position	Managerial	38	21%
	Trainer	142	79%

Measurements

Institutional performance was measured using five indicators adapted from Yu & Moon (2021) encompassing two dimensions, namely market performance and customer satisfaction. Competitive advantage was operationalized using six indicators developed by Shehadeh et al. (2023) structured into three dimensions: customer experience digital transformation, operational process transformation, and business model transformation. Digital competence was measured using six indicators adopted from Xin et al. (2024) covering digital mindset and attitude, digital knowledge and skills, and digital collaboration and development. Furthermore, digital leadership was measured using twelve indicators derived from Magesa & Jonathan (2022), comprising four dimensions: innovation, adaptability, absorbing uncertainty, and visionary leadership. All constructs were specified as reflective latent variables and measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), resulting in a total of 29 questionnaire items, the details of which are provided in the appendix.

RESULTS AND DISCUSSION

As described previously, data analysis in this study was conducted using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with the assistance of SmartPLS 4 software. The analysis was carried out in sequential stages. The first stage involved the measurement model assessment, which aimed to evaluate the validity and reliability of the latent constructs. Convergent validity was assessed by examining the outer loading values of each indicator, with values of ≥ 0.70 indicating acceptable indicator reliability. Construct reliability was further evaluated using composite reliability (CR) and average variance extracted (AVE), where CR values of ≥ 0.70 and AVE values of ≥ 0.50 indicate adequate reliability and convergent validity (Hair et al., 2019). The second stage involved the structural model assessment, which aimed to examine the explanatory capability of the proposed research model and test the hypothesized relationships. Structural model evaluation was conducted by analyzing path coefficients, coefficients of determination (R^2), and hypothesis testing. Hypothesis testing was performed using the bootstrapping procedure to obtain t-values and p-values for each structural relationship. Following the recommendations of Hair et al. (2019) a relationship is considered statistically significant when the t-value is ≥ 1.96 , corresponding to a 95% confidence level (two-tailed test). The results of the measurement and structural model assessments are presented and discussed in the following sections

Measurement Model Assessment

The results of the measurement model assessment for all constructs are presented in Table 2. The findings indicate that all measurement indicators exhibit satisfactory outer loading values (≥ 0.70), demonstrating adequate indicator reliability. In addition, the results show that Cronbach's alpha and composite reliability (CR) values for all constructs meet the recommended threshold (≥ 0.70), confirming strong internal consistency reliability. The average variance extracted (AVE) values for all constructs also exceed the minimum criterion (≥ 0.50), indicating that each construct explains more than half of the variance of its indicators and thus satisfies the requirement for convergent validity. Overall, the assessment of indicator reliability, internal consistency reliability, and convergent validity confirms that all constructs in this study meet the recommended criteria for validity and reliability. Therefore, the reflective measurement model is considered adequate and suitable for subsequent structural model assessment.

Table 2. Validity and Reliability Test Results

Variable	Dimension	Item	Outer Loading	Cronbach Alpha	CR	AVE	Conclusion
Institutional Performance	Market Performance	IP1	0,748	0,857	0,862	0,636	Valid and Reliable
		IP2	0,780				
	Customer Satisfaction	IP3	0,846				
		IP4	0,804				
		IP5	0,808				
Competitive Advantage	Customer Experience Digital Transformation	CA1	0,776	0,892	0,875	0,608	Valid and Reliable
		CA2	0,798				
	Operational	CA3	0,752				

Variable	Dimension	Item	Outer Loading	Cronbach Alpha	CR	AVE	Conclusion
	Process Transformation	CA4	0,849				
	Business Model Transformation	CA5	0,740				
		CA6	0,759				
Digital Competence	Digital Mindset & Attitude	DC1	0,715	0,892	0,895	0,651	Valid and Reliable
		DC2	0,832				
	Digital Knowledge & Skills	DC3	0,821				
		DC4	0,824				
	Digital Collaboration & Development	DC5	0,847				
		DC6	0,796				
Digital Leadership	Innovation	DL1	0,710	0,929	0,93	0.563	Valid and Reliable
		DL2	0,707				
		DL3	0,754				
	Adaptability	DL4	0,732				
		DL5	0,787				
		DL6	0,830				
	Absorbing Uncertainty	DL7	0,754				
		DL8	0,726				
		DL9	0,809				
	Visionary Leadership	DL10	0,710				
		DL11	0,748				
		DL12	0,724				

Discriminant Validity (HTMT)

Discriminant validity was evaluated using the Heterotrait–Monotrait ratio (HTMT), which is widely recommended for assessing discriminant validity in Partial Least Squares Structural Equation Modeling (SEM-PLS). The HTMT results are reported in Table 3. The findings indicate that all HTMT values between the constructs are below the recommended threshold ($HTMT < 0.90$), thereby demonstrating adequate discriminant validity among the latent variables. Specifically, the HTMT values between competitive advantage and digital competence (0.741), competitive advantage and digital leadership (0.624), and digital competence and digital leadership (0.674) are well within acceptable limits. Moreover, the HTMT values involving institutional performance, including its relationships with competitive advantage (0.837), digital competence (0.775), and digital leadership (0.677), also satisfy the recommended criterion. These results indicate that each construct is empirically distinct and captures a unique conceptual domain within the research model. Therefore, the assessment confirms that discriminant validity is satisfactorily established, and the measurement model is suitable for further structural model evaluation.

Table 3. Discriminant Validity - Heterotrait–Monotrait ratio Matrix

	Competitive Advantage	Digital Competence	Digital Leadership	Institutional Performance
Competitive Advantage				
Digital Competence	0,741			
Digital Leadership	0,624	0,674		

	Competitive Advantage	Digital Competence	Digital Leadership	Institutional Performance
Institutional Performance	0,837	0,775	0,677	

Structural Model Assessment

After confirming that the measurement model meets the criteria for validity and reliability, the next step is to evaluate the structural model. The structural model assessment aims to examine the relationships among latent constructs, evaluate the model's explanatory power, and test the proposed hypotheses. In Partial Least Squares Structural Equation Modeling (SEM-PLS), this evaluation is commonly conducted by examining the coefficient of determination (R^2), path coefficients, and their statistical significance.

The coefficient of determination (R^2) was used to evaluate the explanatory power of the structural model. The results, as presented in Table 4, indicate that competitive advantage has an R^2 value of 0.475 (adjusted $R^2 = 0.469$), suggesting that digital competence and digital leadership jointly explain 47.5% of the variance in competitive advantage. This value reflects a moderate level of explanatory power. Furthermore, institutional performance shows an R^2 value of 0.635 (adjusted $R^2 = 0.629$), indicating that digital competence, digital leadership, and competitive advantage together account for 63.5% of the variance in institutional performance. According to commonly accepted guidelines in PLS-SEM, these findings demonstrate that the proposed structural model possesses moderate to substantial explanatory capability, supporting its adequacy for hypothesis testing.

Table 4. Coefficient of Determination (R^2)

	R-Square	R-Square Adjusted
Competitive Advantage	0,475	0,469
Institutional Performance	0,635	0,629

Figure 2, presents the structural model results obtained from the SEM-PLS analysis, illustrating the causal relationships among digital competence, digital leadership, competitive advantage, and institutional performance. The results show that digital competence and digital leadership have positive and significant effects on competitive advantage and institutional performance, while competitive advantage also exerts a direct effect on institutional performance. The R^2 values of the endogenous constructs indicate that the model explains a substantial proportion of variance, thereby supporting the proposed research framework.

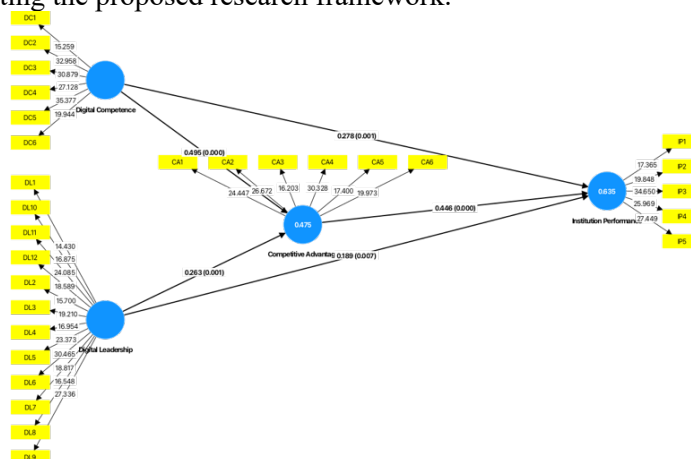


Figure 2. Structural Model Results

The interpretation of the direct relationships among the variables examined in this study is presented in Table 5. The table reports the results of hypothesis testing based on the path coefficients, t-values, and p-values obtained through the bootstrapping procedure. The findings indicate that all proposed direct relationships demonstrate statistically significant results, with t-values exceeding the recommended threshold of 1.96 at the 95% confidence level. Therefore, the empirical evidence supports the significance of the direct effects specified in the research model.

Table 5. Direct Effect Test Result

Hypothesis	Path	Path Coefficient	t-value	p-value	Conclusion
H1	Digital Competence → Competitive Advantage	0,495	5,836	0,000	Supported
H2	Digital Leadership → Competitive Advantage	0,263	3,182	0,001	Supported
H3	Digital Competence → Institutional Performance	0,278	3,428	0,001	Supported
H4	Digital Leadership → Institutional Performance	0,189	2,694	0,007	Supported
H5	Competitive Advantage → Institutional Performance	0,446	6,766	0,000	Supported

Based on the results presented in Table 5, digital competence has a positive and significant effect on competitive advantage ($\beta = 0.495$; $t = 5.836$; $p < 0.001$), supporting H1. Similarly, digital leadership positively influences competitive advantage ($\beta = 0.263$; $t = 3.182$; $p = 0.001$), thereby supporting H2. Furthermore, the results show that digital competence has a positive and significant effect on institutional performance ($\beta = 0.278$; $t = 3.428$; $p = 0.001$), supporting H3, while digital leadership also exerts a positive and significant effect on institutional performance ($\beta = 0.189$; $t = 2.694$; $p = 0.007$), supporting H4. In addition, competitive advantage demonstrates a strong positive and significant effect on institutional performance ($\beta = 0.446$; $t = 6.766$; $p < 0.001$), thus supporting H5. Overall, the results confirm that all hypothesized direct relationships in the structural model are positive and statistically significant.

Table 6. Mediation Effect Test Results

Hypothesis	Path	Path Coefficient	t-value	p-value	Conclusion
H6	Digital Competence → Competitive Advantage → Institutional Performance	0,221	4,298	0,000	Supported
H7	Digital Leadership → Competitive Advantage → Institutional Performance	0,117	3,094	0,002	Supported

In addition to examining direct effects, this study also evaluated the indirect effects through the mediating variable of competitive advantage using the bootstrapping procedure in SEM-PLS. The mediation test results, as presented in Table 6, indicate that digital competence has a positive and significant indirect effect on institutional performance through competitive advantage ($\beta = 0.221$; $t = 4.298$; $p < 0.001$), thereby supporting H6. This finding suggests that competitive advantage plays an important role in transmitting the effect of digital competence on institutional performance. Furthermore, digital leadership also exhibits a positive and significant indirect effect on institutional performance through competitive advantage ($\beta = 0.117$; $t = 3.094$; $p = 0.002$), which supports H7. These results confirm that competitive advantage functions as a significant mediating variable in the relationships between digital competence and institutional performance as well as between digital leadership and institutional performance.

Discussion

The result of H1 indicates that digital competence has a positive and significant effect on competitive advantage. This finding supports the view that digital competence functions as a strategic intangible resource that enables institutions to differentiate their services in increasingly competitive training markets. In vocational and training contexts, digitally competent trainers and staff are better able to utilize digital tools to enhance service delivery, learning flexibility, and responsiveness to stakeholder needs, which strengthens institutional competitiveness (Shehadeh et al., 2023; Xin et al., 2024). This result is consistent with the resource-based view (RBV), which emphasizes that organizational capabilities grounded in knowledge and skills can be transformed into competitive advantage when effectively deployed. Furthermore, the finding aligns with prior studies

highlighting that digital capabilities contribute to competitive positioning through improved customer experience and digitally enabled business processes (Shehadeh et al., 2023). Thus, digital competence serves as a foundational capability that allows vocational training institutions to build and sustain competitive advantage in a digitalized environment.

The result of H3 shows that digital competence has a positive and significant effect on institutional performance. This finding suggests that higher levels of digital competence among institutional actors enhance performance outcomes related to market reach, customer satisfaction, and overall service effectiveness. Consistent with previous research, digitally competent institutions are more capable of leveraging digital technologies to improve operational efficiency and service quality, which in turn supports institutional performance (Xin et al., 2024; Yu & Moon, 2021). From an RBV perspective, digital competence contributes to performance by strengthening internal capabilities that enable institutions to adapt to environmental changes and meet stakeholder expectations. This result also reinforces the argument that digital competence should not be viewed merely as an individual skill, but as an organizational capability that directly supports performance outcomes. Therefore, the empirical evidence confirms the strategic importance of digital competence in enhancing the performance of vocational training institutions.

The result of H2 indicates that digital leadership has a positive and significant effect on competitive advantage. This finding shows that visionary, adaptive, and innovation-oriented leadership enables vocational training institutions to coordinate digital resources, respond to uncertainty, and develop differentiated digital services. The result is consistent with the Resource-Based View, which positions leadership capability as a strategic intangible resource that supports competitive positioning. It also aligns with prior research showing that digital leadership strengthens organizational innovation and the effective transformation of customer experience and operational processes (Magesa & Jonathan, 2022; Shehadeh et al., 2023). Therefore, digital leadership is an important antecedent of competitive advantage in vocational training institutions.

The finding of H4 demonstrates that digital leadership has a positive and significant effect on institutional performance. This result indicates that leaders who are visionary, adaptive, and capable of managing uncertainty play a crucial role in guiding institutions toward improved performance outcomes. The finding aligns with previous research highlighting that digital leadership supports organizational innovation, enhances decision-making quality, and strengthens institutional responsiveness in digitally driven environments (Magesa & Jonathan, 2022). In the context of vocational training institutions, effective digital leadership facilitates the alignment of digital initiatives with institutional goals, thereby improving service quality and stakeholder satisfaction (Yu & Moon, 2021). Thus, the result confirms that digital leadership is a key driver of institutional performance in the digital era.

The result of H5 shows that competitive advantage has a strong positive and significant effect on institutional performance. This finding implies that institutions that are able to differentiate themselves through superior digital services, efficient processes, and innovative business models tend to achieve higher levels of performance. This result is consistent with studies indicating that competitive advantage derived from digital transformation enhances market performance and customer satisfaction in service-oriented organizations (Shehadeh et al., 2023; Yu & Moon, 2021). From the resource-based view, competitive advantage represents the mechanism through which internal capabilities are translated into observable performance outcomes. Accordingly, the findings confirm that competitive advantage plays a critical role in strengthening institutional performance in vocational training institutions.

Moreover, the mediating effect observed in the results of H6 and H7 demonstrates that competitive advantage plays a significant mediating role in the relationships between digital competence, digital leadership, and institutional performance. The findings indicate that digital competence contributes to institutional performance not only directly, but also indirectly through the enhancement of competitive advantage, suggesting that digitally competent institutions are better able to transform technological capabilities into differentiated value. This result is consistent with prior studies emphasizing that digital competence strengthens service innovation and market positioning, which subsequently improve performance outcomes (Xin et al., 2024; Yu & Moon, 2021). Similarly, the mediation effect of competitive advantage in the relationship between digital leadership and institutional performance indicates that leadership capabilities influence performance primarily by enabling strategic differentiation and effective digital transformation. This finding aligns with research highlighting that digital leadership facilitates innovation, adaptability, and business model transformation, which serve as sources of competitive advantage (Magesa & Jonathan, 2022; Shehadeh et al., 2023). Overall, these results confirm that

competitive advantage functions as a key explanatory mechanism through which digital competence and digital leadership are translated into superior institutional performance.

CONCLUSION

This study was conducted to examine the effects of digital competence and digital leadership on institutional performance, as well as the mediating role of competitive advantage in vocational training institutions (VTIs). Institutional performance has become an increasingly critical concern for vocational training institutions as they operate in a competitive environment shaped by rapid digital transformation. As service-oriented organizations, VTIs are expected to deliver high-quality training outcomes while simultaneously responding to technological change, market competition, and evolving stakeholder expectations. In this context, institutional performance is no longer determined solely by operational efficiency, but by the institution's ability to leverage digital-related capabilities as strategic resources.

This study demonstrates that digital competence represents a fundamental capability that contributes to institutional performance in vocational training institutions. Digitally competent institutions are better equipped to integrate technology into learning delivery, improve service quality, and enhance responsiveness to market and learner needs. These findings reinforce the view that digital competence should be understood not merely as an individual technical skill, but as an institutional-level capability that supports adaptability and continuous improvement. In line with the Resource-Based View, digital competence functions as an intangible resource that strengthens institutional effectiveness and performance.

The results also confirm the important role of digital leadership in shaping institutional performance. Digital leadership enables institutions to navigate uncertainty, foster innovation, and align digital initiatives with strategic objectives. Leaders who are adaptive, visionary, and capable of managing digital change provide direction and coherence to digital transformation efforts. This study highlights that digital leadership is essential not only for adopting digital technologies, but also for ensuring that such technologies contribute meaningfully to institutional outcomes in vocational training contexts.

A key contribution of this research lies in identifying competitive advantage as a central mechanism linking digital capabilities to institutional performance. The findings indicate that digital competence and digital leadership enhance institutional performance primarily by enabling institutions to build competitive advantage through superior digital customer experience, more efficient operational processes, and innovative business models. This result supports capability-based perspectives which emphasize that internal resources must be transformed into differentiated value to generate sustainable performance outcomes.

This study contributes to the literature by extending the application of capability-based theories within the context of vocational training institutions. Specifically, the findings demonstrate that digital competence and digital leadership function as strategic intangible resources whose performance effects are not merely direct, but are largely realized through the creation of competitive advantage. By empirically positioning competitive advantage as a mediating mechanism, this study advances existing research that often treats digital capabilities and institutional performance as directly linked. Furthermore, this research enriches the digital transformation literature in vocational education by integrating capability-based theory with service-oriented performance outcomes, thereby providing a more nuanced explanation of how digital resources are converted into sustainable institutional performance.

From a managerial perspective, the findings offer important implications for vocational training institutions. Institutional leaders should invest in developing digital competence among trainers and staff as a strategic priority rather than a technical necessity alone. At the same time, strengthening digital leadership capabilities is essential to guide digital transformation initiatives and ensure their alignment with institutional goals. Furthermore, VTIs should focus on leveraging digital transformation to create competitive advantage, as this enables digital capabilities to translate into improved institutional performance, market positioning, and stakeholder satisfaction.

Despite its contributions, this study has several limitations. The use of self-reported data may introduce subjective bias, and the cross-sectional design limits the ability to capture changes in digital capabilities and performance over time. In addition, the study focuses on a specific institutional context, which may affect the generalizability of the findings. Future research may adopt longitudinal approaches, incorporate objective performance measures, or explore additional strategic capabilities and contextual factors that influence institutional performance in vocational education and training. This study offers empirical evidence from vocational training institutions by demonstrating how digital competence and digital leadership are transformed into institutional

performance through competitive advantage, thereby extending capability-based perspectives in the context of vocational education and training.

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