Digital Competence as a Mediating Mechanism Between Organizational Support, Reverse Mentoring, and Knowledge Sharing in Vocational Education

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ABSTRACT

This study examines the mediating role of digital competence in the relationship between organizational support, reverse mentoring participation, and knowledge sharing behavior among middle managers in vocational colleges. Drawing upon organizational support theory and social learning theory, digital competence is conceptualized as a capability-based mechanism that enables effective knowledge exchange in digitally transforming educational institutions. A cross-sectional survey was conducted with 408 middle managers from vocational colleges in China. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that organizational support ($\beta = 0.425$, $p < 0.001$) and reverse mentoring participation ($\beta = 0.411$, $p < 0.001$) significantly enhance digital competence. Digital competence positively influences knowledge sharing behavior ($\beta = 0.215$, $p < 0.001$) and significantly mediates both relationships. The structural model explains 45.1% of the variance in digital competence and 55.0% of the variance in knowledge sharing behavior. The findings highlight the strategic importance of capability development in supporting knowledge exchange within vocational education institutions undergoing digital transformation.

Keywords: digital competence, knowledge sharing, organizational support, reverse mentoring, vocational education

1. INTRODUCTION

Digital transformation has become a defining feature of contemporary educational reform. Across educational sectors, institutions are increasingly integrating digital technologies into governance systems, curriculum design, performance management, and interdepartmental communication. Vocational colleges, in particular, are under strong policy pressure to align with industrial upgrading and digital economy development. As digitally mediated administrative systems, learning management platforms, and collaborative tools become institutionalized, managerial effectiveness increasingly depends on digital capability.

Middle managers occupy a critical position within vocational colleges. They function as intermediaries between senior leadership and operational units, coordinating resources, interpreting policy directives, and facilitating knowledge flow across departments. In digitally transforming institutions, their role extends beyond traditional coordination to include digital system adoption, data-driven decision-making, and online collaborative management. Consequently, effective knowledge sharing among middle managers becomes essential for institutional adaptability and innovation.

Although substantial investments have been made in digital infrastructure, knowledge sharing outcomes remain uneven across vocational colleges. Existing research suggests that organizational support and mentoring mechanisms promote collaborative behavior. However, the mechanism through which such institutional practices translate into actual knowledge sharing behavior in digitally mediated contexts remains insufficiently examined.

Knowledge exchange in contemporary educational institutions is no longer purely interpersonal; it is increasingly technology–enabled. Thus, individual digital competence may represent a crucial enabling capability that determines whether organizational initiatives effectively translate into collaborative behavior. While digital competence has been widely discussed in educational technology research, it has rarely been positioned as a mediating mechanism within organizational behavior frameworks in educational management studies.

This study addresses this gap by examining whether digital competence mediates the relationships between organizational support, reverse mentoring participation, and knowledge sharing behavior among middle managers in vocational colleges.

To address these research gaps, the following section reviews the theoretical foundations underlying organizational support, reverse mentoring, digital competence, and knowledge sharing behavior. By synthesizing prior literature, this study develops a conceptual framework explaining how organizational and

relational factors shape managerial digital competence and, subsequently, knowledge exchange within vocational colleges.

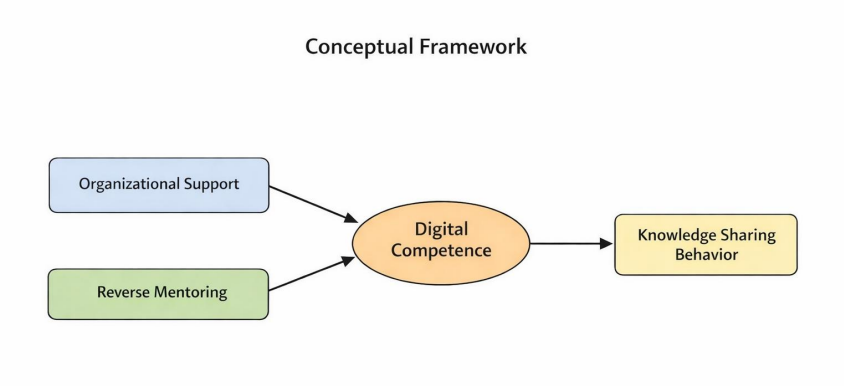

Figure 1. Conceptual Framework

2. LITERATURE REVIEW

2.1 Organizational Support and Digital Competence

Organizational support theory, developed by Robert Eisenberger and colleagues, posits that employees develop global beliefs concerning the extent to which their organization values their contributions and cares about their well–being. When employees perceive strong support, they are more likely to reciprocate through positive attitudes and constructive behaviors.

In digital transformation contexts, organizational support may manifest in several ways: provision of digital infrastructure, access to technical training, managerial encouragement, and institutional recognition of digital innovation. Such support reduces uncertainty associated with technological adoption and enhances confidence in using digital systems.

Digital competence development requires sustained learning and practice. When institutions provide structured training programs and create psychologically

safe environments for experimentation, employees are more likely to invest effort in improving digital skills. Therefore:

H1: Organizational support positively influences digital competence.

While organizational support provides structural resources, relational learning mechanisms such as reverse mentoring may further strengthen digital capability development.

2.2 Reverse Mentoring and Digital Competence

Reverse mentoring involves developmental interactions in which younger or technologically proficient employees mentor senior staff. Grounded in social learning theory proposed by Albert Bandura, reverse mentoring facilitates observational learning, modeling, and self–efficacy enhancement.

In vocational colleges, generational differences often result in younger employees possessing stronger digital literacy. Through structured interaction, middle managers may acquire updated technological knowledge, learn practical digital applications, and enhance confidence in digital tool utilization.

Unlike traditional top–down training, reverse mentoring provides personalized, context–specific learning opportunities. This relational learning mechanism is particularly relevant in digitally transforming educational environments.

H2: Reverse mentoring participation positively influences digital competence.

Beyond competence acquisition, an important question remains: how does digital competence translate into observable organizational behaviors?

2.3 Digital Competence and Knowledge Sharing

Digital competence refers to the ability to effectively use digital technologies for communication, collaboration, information management, and problem-solving. In digitally mediated organizational environments, knowledge sharing increasingly relies on digital platforms, online repositories, and collaborative software.

From a knowledge-based perspective of organizations, effective knowledge integration depends on both motivation and capability. Even when individuals are willing to share knowledge, insufficient digital competence may constrain their ability to articulate, codify, and disseminate knowledge effectively.

Individuals with higher digital competence are better equipped to utilize collaborative tools, manage digital documentation, and engage in online professional communities. Thus:

H3: Digital competence positively influences knowledge sharing behavior.

2.4 Mediating Role of Digital Competence

Organizational support and reverse mentoring provide structural and relational inputs. However, without sufficient digital capability, such inputs may not translate into active knowledge sharing behavior. Digital competence may function as a capability-based mechanism that converts institutional support into actionable collaborative behavior.

H4: Digital competence mediates the relationship between organizational support and knowledge sharing behavior.

H5: Digital competence mediates the relationship between reverse mentoring

participation and knowledge sharing behavior.

To empirically test the proposed hypotheses and examine the mediating role of digital competence, a quantitative research design was employed. The methodological procedures are described in the following section.

3. MATERIAL AND METHODS

3.1 Research Design

This study adopted a quantitative, cross-sectional survey design to examine the mediating role of digital competence in the relationships between organizational support, reverse mentoring participation, and knowledge sharing behavior among middle managers in vocational colleges.

A cross-sectional design was considered appropriate because the study aims to test theoretically grounded relationships among latent constructs rather than examine longitudinal change. The research model involves multiple latent variables and mediation effects, making structural equation modeling suitable for empirical testing.

Given the study's predictive orientation and the presence of mediation effects, Partial Least Squares Structural Equation Modeling was deemed appropriate. The following subsections detail the sampling procedures, measurement instruments, and analytical strategy.

3.2 Sample and Data Collection

The target population consisted of middle managers employed in vocational colleges in China. Middle managers were selected because they occupy a

strategic position in institutional coordination, digital implementation, and cross-departmental knowledge exchange.

A stratified convenience sampling approach was adopted. Electronic questionnaires were distributed via institutional communication networks and professional administrative groups. Participation was voluntary and anonymous.

A total of 435 questionnaires were returned. After removing incomplete responses, 408 valid questionnaires were retained, yielding an effective response rate of 93.8%.

Sample Characteristics

· Gender: 54% female, 46% male

· Age distribution:

· 30–39 years (32%)

· 40–49 years (41%)

· 50 years and above (27%)

· Average managerial tenure: 8.7 years

Sample Size Justification

According to Hair et al. (2021), the minimum sample size in PLS-SEM should be ten times the maximum number of structural paths pointing at any construct. In this model, digital competence has two predictors; thus, the minimum required sample is 20. The obtained sample (N = 408) substantially exceeds this threshold, ensuring adequate statistical power.

3.3 Measurement Instruments

All constructs were measured using previously validated scales.

Organizational Support

Measured using the 16-item scale developed by Eisenberger et al. (1986). The scale captures employees' perceptions of institutional recognition, care, and developmental support.

Reverse Mentoring Participation

Measured using the 11-item scale developed by Garg et al. (2021), assessing structured engagement in intergenerational digital mentoring relationships.

Digital Competence

Measured using the 12-item professional digital competence scale developed by Schwarz et al. (2024). The scale captures digital communication, collaboration, information management, and problem-solving capabilities.

Knowledge Sharing Behavior

Measured using the 5-item scale developed by Bock et al. (2005), assessing willingness and actual behavior of sharing knowledge within organizations.

All items were measured using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

3.4 Data Analysis Strategy

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software.

PLS-SEM was selected for three reasons:

· The study involves mediation analysis.

· The model focuses on prediction and variance explanation.

· The data distribution does not require multivariate normality.

Following the two-step approach recommended by Hair et al. (2021):

· Assessment of the measurement model

· Assessment of the structural model

Bootstrapping with 5,000 resamples was conducted to test the significance of path coefficients.

3.5 Assessment of Measurement Model

Reliability was assessed using Cronbach's alpha and Composite Reliability (CR). All constructs exceeded the threshold of 0.70.

Convergent validity was evaluated using Average Variance Extracted (AVE). All AVE values exceeded 0.50.

Discriminant validity was assessed using:

· Fornell–Larcker criterion

· Heterotrait–Monotrait ratio (HTMT)

All HTMT values were below 0.85, indicating satisfactory discriminant validity.

3.6 Assessment of Structural Model

Collinearity diagnostics indicated that all VIF values were below 3.3, suggesting no multicollinearity issues.

The structural model results indicated:

· Organizational support → Digital competence ($\beta = 0.425$, $p < 0.001$)

· Reverse mentoring → Digital competence ($\beta = 0.411$, $p < 0.001$)

· Digital competence → Knowledge sharing ($\beta = 0.215$, $p < 0.001$)

Coefficient of Determination (R^2)

· Digital competence: $R^2 = 0.451$

· Knowledge sharing: $R^2 = 0.550$

These values indicate moderate to substantial explanatory power.

Effect Size (f^2)

· OS → DC: $f^2 = 0.27$ (medium effect)

· RMP → DC: $f^2 = 0.25$ (medium effect)

· DC → KSB: $f^2 = 0.08$ (small to medium effect)

Predictive Relevance (Q^2)

Blindfolding procedures indicated Q^2 values greater than zero, confirming predictive relevance.

3.7 Common Method Bias

To minimize common method bias:

· Procedural remedies were applied (anonymity assurance, scale randomization).

· Harman's single-factor test showed that the first factor accounted for less than 40% of total variance.

· Full collinearity VIF values were below 3.3 (Kock, 2015).

These results suggest that common method bias is unlikely to threaten the validity of findings.

After establishing the research design and analytical procedures, the next section presents the empirical findings, beginning with the evaluation of the measurement model and followed by structural model assessment.

4. RESULTS AND DISCUSSION

4.1 Overview of Data Analysis

This chapter presents the empirical findings of the study. Following the two-step approach recommended by Hair et al. (2021), the measurement model was first evaluated to assess reliability and validity, followed by an assessment of the structural model to test the hypothesized relationships. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed using SmartPLS 4.0.

Bootstrapping with 5,000 resamples was conducted to determine the significance of path coefficients.

4.2 Assessment of the Measurement Model

The measurement model was evaluated in terms of internal consistency reliability, convergent validity, and discriminant validity.

4.2.1 Internal Consistency Reliability

Internal consistency was assessed using Cronbach's alpha and Composite Reliability (CR). As shown in Table 1, all constructs exceeded the recommended threshold of 0.70, indicating satisfactory reliability.

Table 1 Reliability and Convergent Validity

Construct	Cronbach's Alpha	CR	AVE
Organizational Support	0.94	0.95	0.57
Reverse Mentoring Participation	0.92	0.93	0.55
Digital Competence	0.93	0.94	0.56
Knowledge Sharing Behavior	0.89	0.92	0.70

All reliability indicators are above the recommended levels (Hair et al., 2021).

4.2.2 Convergent Validity

Convergent validity was evaluated using Average Variance Extracted (AVE). All AVE values exceeded 0.50, confirming that each construct explains more than 50% of the variance of its indicators.

4.2.3 Discriminant Validity

Discriminant validity was assessed using:

· Fornell–Larcker criterion

· Heterotrait–Monotrait ratio (HTMT)

All square roots of AVE were greater than inter–construct correlations. Additionally, HTMT values were below the conservative threshold of 0.85, confirming discriminant validity.

These results indicate that the measurement model demonstrates satisfactory psychometric properties.

Having established the reliability and validity of the measurement model, the structural relationships among constructs were subsequently examined.

4.3 Assessment of the Structural Model

After establishing the adequacy of the measurement model, the structural model was evaluated.

4.3.1 Collinearity Assessment

Variance Inflation Factor (VIF) values ranged between 1.45 and 2.30, which are below the threshold of 3.3, indicating no multicollinearity concerns.

4.3.2 Path Coefficients and Hypothesis Testing

The structural relationships were assessed using bootstrapping (5,000 resamples).

Table 2 Structural Path Results

Hypothesis	Path	β	t-value	p-value	Result
H1	OS → DC	0.425	9.87	< .001	Supported
H2	RMP → DC	0.411	8.94	< .001	Supported
H3	DC → KSB	0.215	4.32	< .001	Supported

Organizational support significantly predicted digital competence (β = 0.425, $p < .001$), supporting H1. Similarly, reverse mentoring participation exerted a significant positive effect on digital competence (β = 0.411, $p < .001$), supporting H2. Digital competence significantly influenced knowledge sharing behavior (β = 0.215, $p < .001$), thus supporting H3.

4.3.3 Coefficient of Determination (R^2)

The R^2 value for digital competence was 0.451, indicating that organizational support and reverse mentoring participation jointly explain 45.1% of its variance.

The R^2 value for knowledge sharing behavior was 0.550, suggesting substantial explanatory power.

According to Cohen (1988), these values indicate moderate to substantial explanatory capacity.

4.3.4 Effect Size (f^2)

Effect sizes were examined to determine the relative contribution of each predictor.

Path	f^2	Effect Size
OS → DC	0.27	Medium
RMP → DC	0.25	Medium
DC → KSB	0.08	Small–Medium

The findings indicate that organizational support and reverse mentoring exert meaningful effects on digital competence, whereas digital competence has a modest but significant effect on knowledge sharing behavior.

4.3.5 Predictive Relevance (Q^2)

Blindfolding procedures revealed Q^2 values greater than zero for endogenous constructs, indicating that the model has predictive relevance.

Beyond examining direct relationships, the mediating role of digital competence was further assessed to clarify the underlying mechanism.

4.4 Mediation Analysis

To examine the mediating role of digital competence, indirect effects were tested using bootstrapping.

Both indirect paths:

- OS → DC → KSB
- RMP → DC → KSB

were statistically significant ($p < .001$), indicating partial mediation.

These findings suggest that digital competence serves as an important explanatory mechanism linking organizational and relational factors to knowledge sharing behavior.

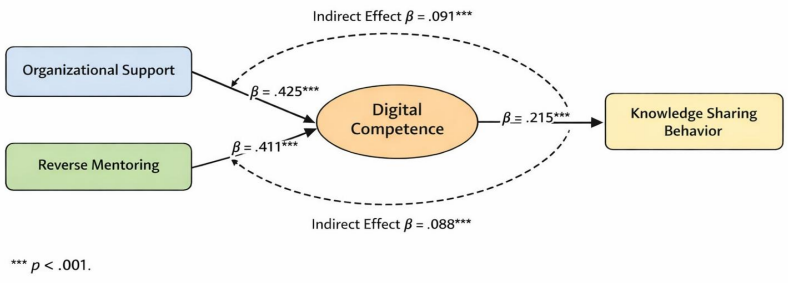

Figure 2. Structural model with standardized path coefficients.

$p < .001$.

4.5 Summary of Findings

The results provide strong empirical support for the proposed model. Organizational support and reverse mentoring participation both significantly enhance digital competence. In turn, digital competence significantly promotes knowledge sharing behavior.

The model demonstrates satisfactory reliability, validity, explanatory power, and predictive relevance, confirming its robustness within the vocational college context.

5. CONCLUSION

This study examined the mechanisms through which organizational support and reverse mentoring participation influence knowledge sharing behavior among middle managers in vocational colleges, with digital competence serving as a mediating construct. Drawing on a sample of 408 middle managers and employing PLS–SEM analysis, the findings provide robust empirical support for the proposed model.

The results indicate that both organizational support and reverse mentoring participation significantly enhance digital competence. In turn, digital competence positively influences knowledge sharing behavior. Furthermore, digital competence partially mediates the relationships between organizational support, reverse mentoring participation, and knowledge sharing behavior. These findings underscore the pivotal role of digital competence as a bridging mechanism linking

institutional support structures and intergenerational learning practices to knowledge exchange outcomes.

6.1 Theoretical Contributions

This study contributes to the literature in several important ways.

First, it advances research on knowledge sharing by identifying digital competence as an explanatory mechanism rather than treating it merely as an individual skill outcome. By positioning digital competence as a mediating construct, this study clarifies how organizational and relational factors are translated into behavioral outcomes in digitalized educational settings.

Second, the study integrates organizational support theory and intergenerational learning perspectives within a unified framework. While previous studies have examined these factors separately, this research demonstrates their joint influence on digital capability development, thereby enriching the theoretical understanding of capability formation in educational organizations.

Third, the study extends knowledge–sharing and digital competence research into the context of vocational colleges, which remain underexplored in international literature. Given the accelerating digital transformation in vocational education, understanding how managerial digital competence facilitates knowledge exchange is particularly significant.

6.2 Practical Implications

The findings offer several managerial implications for vocational colleges undergoing digital transformation.

First, institutional support should move beyond symbolic endorsement and be embedded into systematic resource allocation, professional development programs, and digital infrastructure investment. Organizational policies that recognize and reward digital engagement may strengthen digital competence development.

Second, reverse mentoring programs should be formalized as part of professional development strategies. Structured intergenerational digital learning mechanisms can accelerate the diffusion of digital knowledge across hierarchical levels and foster collaborative culture.

Third, middle managers should be viewed as strategic agents in digital transformation initiatives. Enhancing their digital competence can facilitate more effective coordination, communication, and knowledge sharing across departments.

Collectively, these implications suggest that digital competence development is not solely an individual responsibility but a strategically managed organizational process.

6.3 Limitations and Future Research

Despite its contributions, this study has several limitations.

First, the cross-sectional design restricts causal inference. Future research may adopt longitudinal or experimental designs to examine the dynamic evolution of digital competence and knowledge sharing behavior.

Second, the data were collected from vocational colleges within a single national context. Comparative studies across educational systems or cultural environments could enhance generalizability.

Third, the study relied on self-reported measures. Future research may incorporate multi-source data or objective performance indicators to reduce potential common method bias.

Additionally, future studies may explore potential moderators such as organizational culture, digital leadership, or age diversity to further refine the proposed framework.

6.4 Final Remarks

In an era characterized by rapid digital transformation, vocational colleges face increasing pressure to enhance organizational adaptability and knowledge integration. This study highlights that digital competence serves as a critical mechanism through which institutional support and intergenerational collaboration translate into meaningful knowledge-sharing behavior.

By emphasizing the central role of middle managers in digital capability development, this research provides both theoretical insights and actionable guidance for educational management practice. Strengthening digital competence at the managerial level may represent a foundational strategy for fostering sustainable organizational development in vocational education.

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