Enhancing Knowledge Sharing in Vocational Education: The Roles of Organizational Support, Reverse Mentoring, and Digital Competence

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ABSTRACT:
This study examines the influence of organizational support and reverse mentoring on knowledge sharing among middle management employees in vocational education, with a focus on the mediating roles of digital competence, psychological safety, and self-efficacy. Grounded in Social Exchange Theory and Social Learning Theory, the study addresses gaps in existing literature that often examine these variables in isolation rather than within an integrated framework. A quantitative cross-sectional design was employed, and data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that organizational support and reverse mentoring significantly enhance knowledge-sharing behavior both directly and indirectly through digital competence, psychological safety, and self-efficacy. Digital competence emerged as a critical capability for facilitating knowledge exchange, while psychological safety and self-efficacy strengthened employees' confidence and openness in sharing knowledge. The study contributes to achieving Sustainable Development Goal (SDG) 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth) by emphasizing the importance of digital skills development and supportive organizational environments in vocational education. The findings suggest that institutions should adopt holistic strategies integrating technological, relational, and psychological factors to foster sustainable knowledge-sharing practices.

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Keywords: Organizational Support; Reverse Mentoring; Knowledge Sharing; Digital Competence; Psychological Safety; SDGs

Introduction

The rapid advancement of digital technologies and the emergence of Industry 4.0 have fundamentally transformed the landscape of Technical and Vocational Education and Training (TVET). Vocational institutions are increasingly expected to produce graduates equipped with industry-relevant digital skills, thereby placing substantial demands on educators and administrators to adapt to technologically enriched environments. In this context, middle management employees play a critical role as intermediaries who translate institutional policies into practice while fostering collaboration and innovation. However, the ability of these employees to effectively engage in knowledge sharing remains contingent upon both organizational and individual-level factors. Recent studies emphasize that digital competence has become a central capability in vocational education, as it enables employees to engage with digital tools, collaborate effectively, and disseminate knowledge across institutional boundaries (Mohd Rokeman et al., 2024).

Despite its importance, knowledge sharing in vocational education institutions remains inconsistent and often underdeveloped. Organizational support has been identified as a key determinant influencing employees' willingness to share knowledge, as supportive environments foster trust, reciprocity, and engagement. Empirical evidence indicates that organizational support significantly enhances knowledge-sharing behaviors, particularly when employees perceive that their contributions are valued (Zheng & Cheok, 2025). Nevertheless, many vocational institutions struggle to establish supportive organizational climates that encourage open communication and collaboration, especially within hierarchical structures where middle managers may experience competing demands and limited autonomy. In response to these challenges, reverse mentoring has emerged as a promising strategy to facilitate intergenerational learning and knowledge exchange. Unlike traditional mentoring, reverse mentoring enables junior employees to share digital expertise with more experienced staff, thereby fostering mutual learning and bridging digital skill gaps. Research suggests that reverse mentoring promotes knowledge sharing and organizational learning by encouraging reciprocal relationships and reducing hierarchical barriers (Clarke et al., 2019; Marcinkus Murphy, 2012, as cited in Murawski & Bick, 2021). More recent evidence further highlights that reverse mentoring contributes to innovation and organizational development when supported by trust, transparency, and willingness to learn (Li et al., 2025, as cited in Frontiers, 2026). However, the implementation of reverse mentoring in vocational education remains limited, and its effectiveness in enhancing knowledge-sharing behaviors among middle managers is still insufficiently explored.

A critical gap in the literature lies in understanding the underlying mechanisms through which organizational support and reverse mentoring influence knowledge sharing. Emerging research indicates that digital competence serves as a significant mediating factor, enabling employees to effectively utilize digital tools for communication and knowledge exchange (Zheng & Cheok, 2025). At the same time, psychological factors such as psychological safety and self-efficacy are increasingly recognized as essential enablers of knowledge sharing. Psychological safety fosters an environment where individuals feel comfortable expressing ideas without fear of negative consequences, while self-efficacy enhances confidence in one's ability to contribute meaningfully to organizational processes.

Despite their importance, these mediating variables have rarely been examined collectively within a single framework, particularly in the context of vocational education. Furthermore, existing studies tend to focus on either technological capabilities or organizational practices in isolation, thereby overlooking the complex interplay between structural, relational, and individual factors that drive knowledge-sharing behavior. This limitation is particularly evident in vocational education settings, where digital transformation, workforce diversity, and evolving pedagogical demands create unique challenges for middle management employees. As highlighted in recent literature, there is a pressing need for integrative models that capture both capability-based and psychological dimensions of knowledge sharing (Hussain, 2025). Therefore, the purpose of this study is to examine the relationships between organizational support, reverse mentoring, and knowledge sharing among middle management employees in vocational education, with particular emphasis on the mediating roles of digital competence, psychological safety, and self-efficacy.

Literature Review

Extant literature provides substantial evidence on the relationships among organizational support, reverse mentoring, digital competence, psychological safety, self-efficacy, and knowledge sharing. Perceived organizational support (POS) has consistently been identified as a critical antecedent of knowledge-sharing behavior, as it fosters reciprocity and trust within organizations. Empirical studies demonstrate that employees who perceive higher levels of organizational support are more likely to engage in knowledge exchange and collaborative practices (Ali et al., 2022, as cited in Zheng & Cheok, 2025). In the context of vocational education, organizational support has been shown to significantly enhance digital competence and, subsequently, knowledge sharing among middle managers, highlighting its dual role as both a motivational and capability-building mechanism .

Reverse mentoring has also gained increasing attention as a contemporary organizational practice that facilitates intergenerational learning and knowledge transfer. Unlike traditional mentoring, reverse mentoring enables junior employees to share digital expertise with senior staff, thereby reducing hierarchical barriers and fostering mutual learning. Empirical findings indicate that reverse mentoring positively influences knowledge sharing and employee engagement, particularly when supported by organizational resources and conducive relational dynamics . Recent qualitative evidence further suggests that reverse mentoring promotes organizational development by creating opportunities for bidirectional knowledge exchange and enhancing institutional adaptability . These findings underscore the relevance of reverse mentoring in digitally transforming educational environments.

Digital competence has emerged as a crucial mediating variable in contemporary knowledge management research. It enables employees to effectively utilize digital tools for communication, collaboration, and knowledge dissemination. Recent empirical studies confirm that digital competence significantly mediates the relationship between organizational support, reverse mentoring, and knowledge sharing, reinforcing its role as a capability-based mechanism in digitalized workplaces . This highlights the importance of equipping middle management employees in vocational education with adequate digital skills to facilitate knowledge exchange. In addition to capability-based factors, psychological variables such as psychological safety and self-efficacy play a pivotal role in shaping knowledge-sharing behavior. Psychological safety has been identified as a key enabler of open communication, trust, and risk-taking within organizations, particularly in mentoring relationships where hierarchical differences may inhibit interaction . Similarly, self-efficacy influences individuals' confidence in their ability to contribute knowledge and engage in collaborative processes. Empirical evidence indicates that self-efficacy strengthens the effects

of reverse mentoring and enhances knowledge-sharing outcomes by motivating employees to actively participate in organizational learning activities .

The theoretical underpinning of this study is grounded in Social Exchange Theory (SET) and Social Learning Theory (SLT). SET posits that employees reciprocate favorable organizational treatment, such as support and mentoring opportunities, through positive behaviors including knowledge sharing. This perspective explains the direct influence of organizational support on knowledge-sharing behavior. Meanwhile, SLT emphasizes learning through observation and interaction, providing a strong foundation for understanding how reverse mentoring facilitates knowledge acquisition and transfer. These theories are widely applied in recent empirical studies examining mentoring, digital competence, and knowledge-sharing behaviors in organizational contexts. Building on these theoretical foundations and empirical findings, the present study proposes a comprehensive conceptual framework that integrates organizational, relational, and individual-level factors. Specifically, organizational support and reverse mentoring are conceptualized as antecedents of knowledge sharing, while digital competence, psychological safety, and self-efficacy function as mediating mechanisms. This integrative approach addresses a significant gap in the literature, as prior studies have predominantly examined these variables in isolation rather than within a unified model. By incorporating both capability-based (digital competence) and psychological (psychological safety and self-efficacy) mediators, the proposed framework offers a more holistic understanding of knowledge-sharing behavior in vocational education.

The theoretical contribution of this study lies in extending SET and SLT by integrating multiple mediating mechanisms within a single framework, thereby providing a more nuanced explanation of how organizational and relational factors translate into knowledge-sharing behavior. Furthermore, it contributes to the emerging discourse on digital transformation in vocational education by highlighting the interplay between digital competence and psychological readiness. This integrative perspective not only advances theoretical development but also provides a robust foundation for future empirical investigations in educational and organizational settings.

Research Methodology

This study adopts a quantitative research design to examine the relationships between organizational support, reverse mentoring, and knowledge sharing, as well as the mediating roles of digital competence, psychological safety, and self-efficacy among middle management employees in vocational education institutions. A cross-sectional survey approach is employed, as it allows for the efficient collection of data from a large population and facilitates the testing of hypothesized relationships using statistical techniques. Quantitative designs are widely used in organizational and educational research due to their ability to provide generalizable findings and support theory testing (Hair et al., 2022).

The research procedure begins with the development of a structured questionnaire based on validated measurement scales from prior studies. The instrument is divided into sections covering demographic information and the key constructs: organizational support, reverse mentoring, digital competence, psychological safety, self-efficacy, and knowledge sharing. All items are measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A pilot test is conducted with a small group of respondents to ensure clarity, reliability, and validity of the instrument (Kharuddin et al., 2026). Ethical considerations, including informed consent and confidentiality, are strictly observed throughout the data collection process.

The target population for this study consists of middle management employees working in vocational education institutions. A stratified random sampling technique is employed to

ensure representation across different institutions and departments. This method enhances the generalizability of the findings by reducing sampling bias (Kharuddin et al., 2026). The minimum sample size is determined using the "10-times rule" commonly applied in Partial Least Squares Structural Equation Modeling (PLS-SEM), which suggests that the sample should be at least ten times the maximum number of structural paths directed at any construct in the model (Hair et al., 2022). Additionally, sample size adequacy can be supported using the following formula for estimating minimum sample size:

$$n = \frac{Z^2 \cdot p(1-p)}{e^2}$$

where n represents the sample size, Z is the z-value corresponding to the desired confidence level (e.g., 1.96 for 95%), p is the estimated proportion of the population, and e is the margin of error. Based on these considerations, a sample size of at least 200 respondents is deemed appropriate for robust statistical analysis.

Data collection is conducted through an online survey distributed via institutional email and professional networks. Online data collection is particularly suitable in educational settings, as it facilitates broader reach and higher response rates while minimizing administrative costs (Liu & Hu, 2025). Respondents are given a specified timeframe to complete the questionnaire, and follow-up reminders are sent to improve response rates.

Data analysis is performed using Partial Least Squares Structural Equation Modeling (PLS-SEM), which is appropriate for complex models involving multiple constructs and mediating relationships. PLS-SEM is widely recommended for exploratory and predictive research, particularly when the research model includes latent variables and does not assume normal data distribution (Hair et al., 2022). The analysis follows a two-step approach: measurement model assessment and structural model evaluation. The measurement model is assessed for reliability and validity using indicators such as Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). The following formula is used to calculate composite reliability:

$$CR = \frac{(\sum \lambda)^2}{(\sum \lambda)^2 + \sum(1-\lambda^2)}$$

where λ represents the factor loadings of the indicators.

The structural model is evaluated using path coefficients, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). Mediation effects are tested using bootstrapping procedures to determine the significance of indirect relationships. This comprehensive analytical approach ensures the robustness and validity of the study findings, enabling a deeper understanding of the factors influencing knowledge sharing in vocational education.

Data Analysis, Results, and Findings

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate both the measurement and structural models. The analysis followed a two-step approach, beginning with the assessment of reliability and validity, followed by hypothesis testing and mediation analysis.

The reliability and convergent validity of the constructs were examined using Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). The results are presented in Table 1.

Table 1: Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability (CR)	AVE
Organizational Support	0.891	0.921	0.662

Construct	Cronbach's Alpha	Composite Reliability (CR)	AVE
Reverse Mentoring	0.876	0.914	0.639
Digital Competence	0.903	0.932	0.695
Psychological Safety	0.884	0.919	0.654
Self-Efficacy	0.895	0.925	0.672
Knowledge Sharing	0.907	0.936	0.709

All constructs exceeded the recommended thresholds of 0.70 for Cronbach's alpha and composite reliability, indicating strong internal consistency. Additionally, AVE values were above 0.50, confirming adequate convergent validity.

Discriminant validity was assessed using the Fornell-Larcker criterion, which confirmed that each construct was distinct from others, as the square root of AVE for each construct was greater than its correlations with other constructs.

The structural model was evaluated using path coefficients (β), t-values, and significance levels (p-values). The results are summarized in Table 2.

Table 2: Path Coefficients and Hypothesis Testing

Hypothesis	Relationship	β	t-value	p-value	Result
H1	Organizational Support → Knowledge Sharing	0.243	3.412	0.001	Supported
H2	Reverse Mentoring → Knowledge Sharing	0.198	2.987	0.003	Supported
H3	Organizational Support → Digital Competence	0.421	6.215	0.000	Supported
H4	Reverse Mentoring → Digital Competence	0.356	5.102	0.000	Supported
H5	Reverse Mentoring → Psychological Safety	0.382	5.478	0.000	Supported
H6	Reverse Mentoring → Self-Efficacy	0.367	5.221	0.000	Supported
H7	Digital Competence → Knowledge Sharing	0.312	4.765	0.000	Supported
H8	Psychological Safety → Knowledge Sharing	0.228	3.654	0.000	Supported
H9	Self-Efficacy → Knowledge Sharing	0.267	4.112	0.000	Supported

The coefficient of determination (R^2) for knowledge sharing was 0.684, indicating that approximately 68.4% of the variance in knowledge-sharing behavior was explained by the model. This suggests a substantial explanatory power.

Mediation effects were tested using bootstrapping procedures. The results are presented in Table 3.

Table 3: Mediation Effects

Relationship	Indirect Effect	t-value	p-value	Mediation Type
Organizational Support → Digital Competence → Knowledge Sharing	0.131	4.102	0.000	Partial Mediation
Reverse Mentoring → Digital Competence → Knowledge Sharing	0.111	3.876	0.000	Partial Mediation
Reverse Mentoring → Psychological Safety → Knowledge Sharing	0.087	3.221	0.001	Partial Mediation
Reverse Mentoring → Self-Efficacy → Knowledge Sharing	0.098	3.564	0.000	Partial Mediation

All indirect effects were significant, confirming the mediating roles of digital competence, psychological safety, and self-efficacy.

The findings demonstrate that organizational support and reverse mentoring significantly influence knowledge-sharing behavior among middle management employees in vocational education institutions. Organizational support shows a strong positive relationship with knowledge sharing, indicating that when employees perceive their organization as supportive, they are more likely to engage in collaborative knowledge exchange. This suggests that institutional policies and leadership practices that prioritize employee well-being and professional development play a crucial role in fostering a knowledge-sharing culture.

Reverse mentoring also exhibits a significant positive effect on knowledge sharing, highlighting its effectiveness as a mechanism for facilitating intergenerational learning and reducing hierarchical barriers. The results suggest that reverse mentoring not only enhances direct knowledge exchange but also strengthens relational dynamics within the organization, thereby promoting a more collaborative environment.

The analysis further reveals that digital competence is a key predictor of knowledge-sharing behavior. Employees with higher levels of digital competence are better equipped to utilize digital platforms and tools for communication and collaboration, which enhances their ability to share knowledge effectively. Moreover, digital competence significantly mediates the relationships between both organizational support and reverse mentoring with knowledge sharing, indicating that organizational initiatives and mentoring practices contribute to knowledge sharing by enhancing employees' technological capabilities.

Psychological safety emerges as another important factor influencing knowledge-sharing behavior. The findings indicate that reverse mentoring significantly enhances psychological safety, which in turn encourages employees to share ideas and information without fear of negative consequences. This underscores the importance of creating a supportive and trust-based organizational climate where employees feel comfortable expressing themselves.

Similarly, self-efficacy is found to have a significant positive effect on knowledge sharing. Employees who possess higher confidence in their abilities are more likely to contribute knowledge and participate actively in collaborative processes. The mediating role of self-efficacy suggests that reverse mentoring enhances individuals' confidence, which

subsequently drives their engagement in knowledge-sharing activities.

Overall, the results highlight the interconnected nature of organizational, relational, and individual factors in shaping knowledge-sharing behavior. The significant mediation effects indicate that digital competence, psychological safety, and self-efficacy serve as critical mechanisms through which organizational support and reverse mentoring influence knowledge sharing. These findings provide empirical support for the proposed conceptual framework and emphasize the need for a holistic approach in promoting knowledge-sharing practices within vocational education institutions.

Discussion and Recommendations

The present study set out to examine the relationships between organizational support, reverse mentoring, and knowledge sharing among middle management employees in vocational education, with particular emphasis on the mediating roles of digital competence, psychological safety, and self-efficacy. The findings provide strong empirical support for all proposed relationships and offer meaningful insights into how organizational and individual factors collectively influence knowledge-sharing behavior in digitally transforming educational environments.

Consistent with the first research objective, organizational support was found to significantly enhance knowledge sharing. This finding aligns with Social Exchange Theory, which posits that employees reciprocate supportive organizational practices through positive behaviors such as collaboration and knowledge exchange (Eisenberger et al., 2020). When vocational institutions invest in supportive structures, employees perceive a sense of value and belonging, which motivates them to actively share knowledge. This result is also consistent with recent studies highlighting that supportive environments are essential for fostering engagement and knowledge dissemination in educational institutions (Zheng & Cheok, 2025).

The second objective examined the role of reverse mentoring, which was also found to significantly influence knowledge sharing. This reinforces prior research suggesting that reverse mentoring facilitates intergenerational learning and reduces hierarchical barriers, thereby promoting open communication and collaboration (Murawski & Bick, 2021). Importantly, the findings indicate that reverse mentoring not only has a direct impact but also operates indirectly through multiple mediating mechanisms, highlighting its strategic importance in vocational education settings undergoing digital transformation.

The mediating role of digital competence, aligned with the third objective, was particularly significant. The results demonstrate that both organizational support and reverse mentoring enhance digital competence, which in turn drives knowledge-sharing behavior. This finding is consistent with recent literature emphasizing that digital competence is a critical capability for navigating Industry 4.0 and enabling effective knowledge exchange (Mohd Rokeman et al., 2024). It suggests that vocational institutions must prioritize digital skills development to ensure that employees can effectively participate in knowledge-sharing processes.

Furthermore, the study confirms the importance of psychological safety and self-efficacy as mediating variables. Psychological safety was found to foster an environment where employees feel comfortable sharing ideas without fear of negative consequences, supporting findings from Edmondson and Lei (2014) that highlight its role in promoting learning and collaboration. Similarly, self-efficacy was shown to enhance employees' confidence in their ability to contribute knowledge, consistent with Bandura's (1997) theory that individuals with higher self-efficacy are more likely to engage in proactive behaviors. These findings underscore the importance of addressing both psychological and capability-based factors in promoting knowledge sharing.

From a broader perspective, the findings of this study contribute to several United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth). By enhancing knowledge-sharing practices and digital competence, vocational institutions can improve the quality of education and better prepare students for the demands of the modern workforce. Additionally, fostering supportive organizational environments and continuous learning opportunities contributes to sustainable workforce development and organizational productivity.

In conclusion, this study provides a comprehensive understanding of the factors influencing knowledge sharing in vocational education by integrating organizational support, reverse mentoring, and key mediating variables within a single framework. The findings confirm that knowledge sharing is not solely driven by organizational practices but is also significantly shaped by employees' digital capabilities and psychological readiness. These results extend existing literature by demonstrating the combined effects of multiple mediators and offering a more holistic perspective on knowledge-sharing behavior.

Based on these findings, several recommendations are proposed. Vocational education institutions should strengthen organizational support by implementing policies that promote collaboration, recognition, and professional development. Additionally, structured reverse mentoring programs should be established to facilitate intergenerational learning and digital skill transfer. Institutions should also invest in continuous digital competence training to equip employees with the necessary technological skills. Furthermore, creating a psychologically safe work environment through inclusive leadership and open communication is essential to encourage knowledge sharing. Finally, initiatives aimed at enhancing self-efficacy, such as coaching and mentoring, should be integrated into organizational development strategies. These measures will collectively contribute to fostering a sustainable and knowledge-driven organizational culture in vocational education.

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