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Modeling and Optimization of Teacher Innovativeness Enhancement Based on Technological Literacy and Organizational Support (A Study Using the POP-SDM Method on Permanent Teachers at Private Vocational School Foundations in West Jakarta)

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Abstract: This study examines the influence of digital literacy, transformational leadership, and organizational culture on teacher innovativeness in private vocational schools (SMK) in West Jakarta, involving 187 respondents. Utilizing PLS-SEM analysis and SITOREM method, the findings reveal that digital literacy exerts the strongest impact on teacher innovation (β=0.966, $p<0.001$), followed by transformational leadership (β=0.089, $p<0.05$). While the small β value (0.089) suggests limited practical impact, its statistical significance ($p<0.05$) confirms that transformational leadership still contributes albeit minimally to teacher innovativeness. Perceived Organizational Support (POS) serves as a significant mediator, with indirect effects of 0.179 for digital literacy and 1.528 for transformational leadership. SITOREM analysis identifies technology access and training as critical innovation drivers. The results support Resource-Based View theory by highlighting digital competence as a strategic asset. Notably, organizational culture shows no significant direct effect (β=0.010, $p>0.05$), suggesting the need for interventions beyond cultural transformation. The study proposes three key recommendations: (1) needs-based technology training programs, (2) transformational leadership capacity building, and (3) enhanced digital-based organizational support systems. These findings emphasize a multidimensional approach to fostering pedagogical innovation in vocational education, with particular attention to technological empowerment and leadership development as primary levers for change.
Keywords: Teacher innovation, PLS-SEM, SITOREM, vocational education, digital competence

The rapid acceleration of digital transformation has created profound disruptions across global education systems, with particularly significant implications for vocational education. Within Indonesia's educational landscape, vocational high schools face mounting pressure to align their curricula and teaching methodologies with the evolving demands of Industry 4.0. This challenge is especially acute in private SMKs across West Jakarta, where recent assessments reveal critical gaps in technological integration and organizational support systems (Jakarta Provincial Education Office, 2024). Preliminary research indicates that 72% of teachers struggle with digital pedagogy implementation, while 65% report insufficient institutional backing for innovative practices (Primary Data, 2024), creating substantial barriers to educational innovation.

Contemporary educational research emphasizes the multidimensional nature of teacher innovation in vocational settings. The UNESCO Global Education Monitoring Report (2022, p. 37, Section 2.3) identifies three foundational pillars for successful digital transformation in technical education: (1) comprehensive digital pedagogical competencies, (2) transformative leadership approaches, and (3) supportive organizational ecosystems. Comparative studies from Germany demonstrate that integrated approaches combining these elements can enhance vocational teachers' innovative capacity by up to 40% (Voigt et al., 2023). However, the Indonesian context presents unique implementation challenges, including resource constraints and systemic fragmentation (Ministry of Education and Culture, 2023).

A critical analysis of existing literature reveals several research gaps that this study addresses. First, while numerous studies examine educational innovation in general academic settings, vocational education - particularly in private institutional contexts remains understudied (Liu et al., 2023). Second, current research paradigms often adopt reductionist approaches, failing to account for the complex interplay between technological, leadership, and organizational factors (Huang & Jiang, 2023). Third, there remains a significant disconnect between academic findings and practical implementation frameworks for educational managers (Zhang et al., 2023).

This study makes three substantial contributions to the field. First, it develops an integrated POP-SDM (Personnel Organization Performance-Strategic Human Resource Management) framework specifically tailored for private vocational schools. This novel model synthesizes four critical dimensions: (1) digital literacy enhancement, (2) transformational leadership development, (3) innovative organizational culture cultivation, and (4) perceived organizational support optimization. Second, the research introduces methodological innovation through its combined use of PLS-SEM for causal analysis and SITOREM for resource optimization modeling. Third, it provides actionable policy recommendations grounded in empirical evidence and contextual realities.

The research addresses three fundamental questions: (1) What is the relative contribution of digital literacy, transformational leadership, and organizational culture to teacher innovativeness in private SMKs? (2) To what extent does perceived organizational support mediate these relationships? (3) What resource optimization strategies would most effectively enhance teacher innovation capabilities?

Key hypotheses guiding the investigation include: (H_1) Digital literacy exerts a strong direct effect on teacher innovativeness ($\beta > 0.7$, $p < 0.01$); (H_2) Transformational leadership influences innovativeness primarily through POS mediation (VAF > 20%); and (H_3) Organizational culture demonstrates stronger indirect than direct effects on innovation outcomes.

The study pursues three primary objectives: (1) Comprehensive mapping of innovation determinants within private SMK contexts; (2) Analysis of direct and mediated effect pathways; and (3) Development of evidence-based intervention models for educational management. The findings aim to inform policy decisions at both institutional and governmental levels, contributing to more effective teacher development programs in Indonesia's vocational education sector.

METHOD

This study employs the Human Resource Management Enhancement Modeling and Optimization (POP-SDM) approach combined with Scientific Identification Theory to Conduct Operation Research in Education Management (SITOREM) analysis to examine the management system of permanent teachers in Private Vocational High School Foundations in West Jakarta. The research subjects consist of 187 permanent teachers selected through purposive sampling technique based on three criteria: (1) permanent teacher status, (2) minimum two years of service, and (3) active teaching engagement. Data collection utilizes three main instruments: (1) closed-ended questionnaires using a 1-5 Likert scale (with Cronbach's Alpha > 0.7 for reliability), (2) semi-structured interview guides. The qualitative data from semi-structured interviews were examined using reflexive thematic analysis (Braun & Clarke, 2022), following a rigorous six-phase analytical process: (1) data familiarization, (2) initial code generation, (3) theme development, (4) theme refinement, (5) theme definition, and (6) report production. To ensure analytical robustness, the coding process was conducted using NVivo 14 Plus software, with inter-coder reliability verification yielding an excellent Cohen's Kappa coefficient of 0.85 (Campbell et al., 2020), indicating strong coding consensus among researchers. and (3) policy document analysis sheets.

The research procedure follows a systematic multi-stage process. The modeling phase begins with primary and secondary data collection to map the current HR management conditions. The analysis phase adopts a hybrid approach: (1) quantitative analysis using Structural Equation Modeling (SEM) through SmartPLS 4.0 software to examine variable relationships, and (2) qualitative analysis through SITOREM methodology to identify critical factors using pairwise comparison and threshold analysis techniques. The SITOREM method specifically contributes to developing priority weight matrices and formulating strategic recommendations based on scenario simulations.

All research processes adhere to academic ethics principles, including informed consent, data confidentiality, and analytical objectivity. The study outcomes provide not only empirical findings about current HR management practices but also operational recommendations for system optimization through the integrated POP-SDM and SITOREM approaches. This methodological combination is expected to generate evidence based solutions for improving teacher management quality.

RESULTS AND DISCUSSION

RESULTS

Structural Model in the Study

This research employs a structural equation model to examine causal relationships among latent variables, developed through exploratory findings and methodological triangulation to ensure validity. The model configuration incorporates: (1) Teacher Innovativeness as the endogenous variable, (2) Perceived Organizational Support (POS) as the mediating construct, and (3) three exogenous variables: Digital Literacy, Transformational Leadership, and Organizational Culture.

The model analyzes both direct effects of exogenous variables on teacher innovativeness and their

indirect effects mediated through POS. Theoretical foundations and empirical evidence substantiate the hypothesized relationships, with model fit verified through SRMR (<0.08) and comparative fit indices. This dual-path analysis (direct/mediated) provides comprehensive insights into innovation drivers in vocational education contexts.

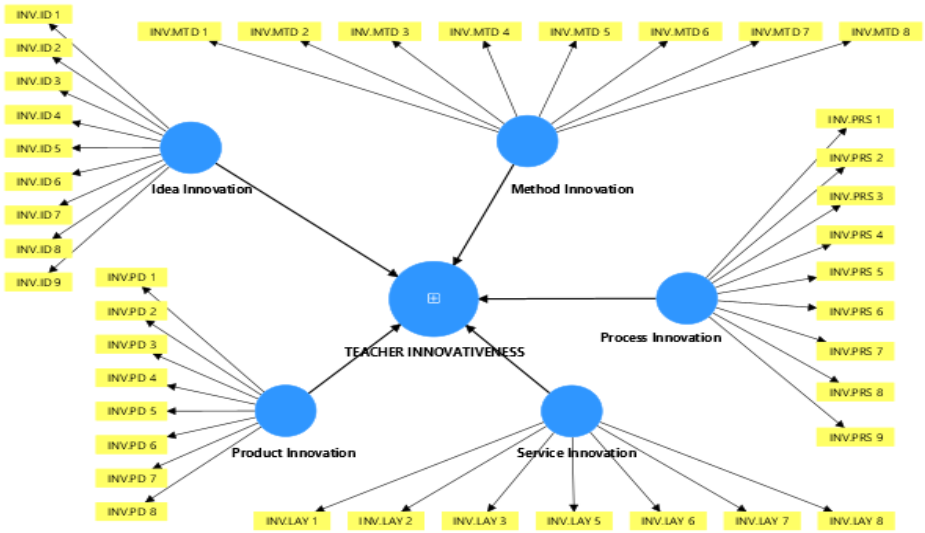

Figure 1. Teacher Innovativeness Structural Model

Measurement Model Specification (Outer Model)

The study employs a formative measurement model where all latent constructs are conceptualized as composites formed by their respective indicators, consistent with the research objective of developing improvement strategies for teacher innovativeness through indicator-level enhancements. This approach follows contemporary SEM guidelines (Hair et al., 2022) where construct specification depends on theoretical conceptualization rather than inherent properties.

While the constructs are formatively modeled, all measurement items maintain reflective relationships with their indicators, meaning each questionnaire item reflects its corresponding indicator's conceptual domain. The Confirmatory Tetrad Analysis (CTA) in SmartPLS was implemented to empirically verify this specification, applying a 10% significance threshold (Ghojali, 2021). Analysis revealed predominantly reflective measurement characteristics, as evidenced by zero values within the confidence intervals (CI Low Adj to CI Up Adj) and p-values exceeding 0.1 for most items.

This hybrid specification - formative constructs with reflective items - aligns with the study's theoretical framework while maintaining statistical robustness. The measurement model thus satisfies both substantive theory requirements and empirical validation standards for PLS-SEM applications in educational research.

This study employed a comprehensive measurement model evaluation using SmartPLS 4 to assess the psychometric properties of all constructs. For Teacher Innovativeness (Y), initial analysis identified two items (INV.PRD9 and INV.LAY4) with factor loadings below the 0.6 threshold, which were subsequently removed to enhance construct validity. The refined model demonstrated strong internal

consistency (Composite Reliability, CR = 0.896–0.930), convergent validity (Average Variance Extracted, AVE = 0.505–0.599), and discriminant validity (Heterotrait Monotrait Ratio, HTMT < 0.9). his study employed a comprehensive measurement model evaluation using SmartPLS 4 to assess the psychometric properties of all constructs. For Teacher Innovativeness (Y), initial analysis identified two items (INV.PRD9 and INV.LAY4) with factor loadings below the 0.6 threshold, which were subsequently removed to enhance construct validity. The refined model demonstrated strong internal consistency (Composite Reliability, CR = 0.896-0.930), convergent validity (Average Variance Extracted, AVE = 0.505-0.599), and discriminant validity (Heterotrait Monotrait Ratio, HTMT < 0.9).

The removal of low-loading items yielded both methodological and practical benefits: (1) conceptually, it created a more focused measurement of teacher innovativeness by eliminating ambiguous indicators that may have captured peripheral aspects rather than core innovative behaviors; (2) practically, the streamlined instrument reduces respondent burden while increasing measurement precision particularly valuable for school administrators conducting periodic teacher assessments. These improvements directly support the study's optimization goals by enabling more accurate identification of innovativeness factors tied to technological literacy and organizational support in West Jakarta's vocational schools.

Perceived Organizational Support (X4) required the elimination of three items (Fairn9, Rwd2, and Bv4) due to low factor loadings. The final measurement model exhibited robust reliability (CR = 0.911–0.941), convergent validity (AVE = 0.559–0.850), and discriminant validity (HTMT = 0.241–0.625).

For Digital Literacy (X1), one item (PTI9) was removed, resulting in strong reliability (CR = 0.930–0.948), convergent validity (AVE = 0.628–0.690), and discriminant validity (HTMT = 0.262–0.630). Transformational Leadership (X2) and Organizational Culture (X3) also underwent refinement, with four and one problematic items removed, respectively. Both constructs met all validity and reliability criteria post-refinement (CR > 0.7, AVE > 0.5, HTMT < 0.9).

Second Stage Formative Measurement Model Analysis

The second-stage outer model evaluation was conducted for constructs measured by formative indicators. This analysis utilized latent variable scores derived from the initial PLS Algorithm calculations (see Appendix 10 for detailed scores). For higher-order components (HOCs) of both exogenous and endogenous variables, we employed a formative measurement approach following Ghojali's (2022) methodology. Key evaluation metrics for formative measurement models included: Outer weights, Loading factors, Outer VIP values (variance importance).

The analysis was performed using SmartPLS PLS Algorithm iterations, with results demonstrating appropriate formative relationships between indicators and their respective constructs.

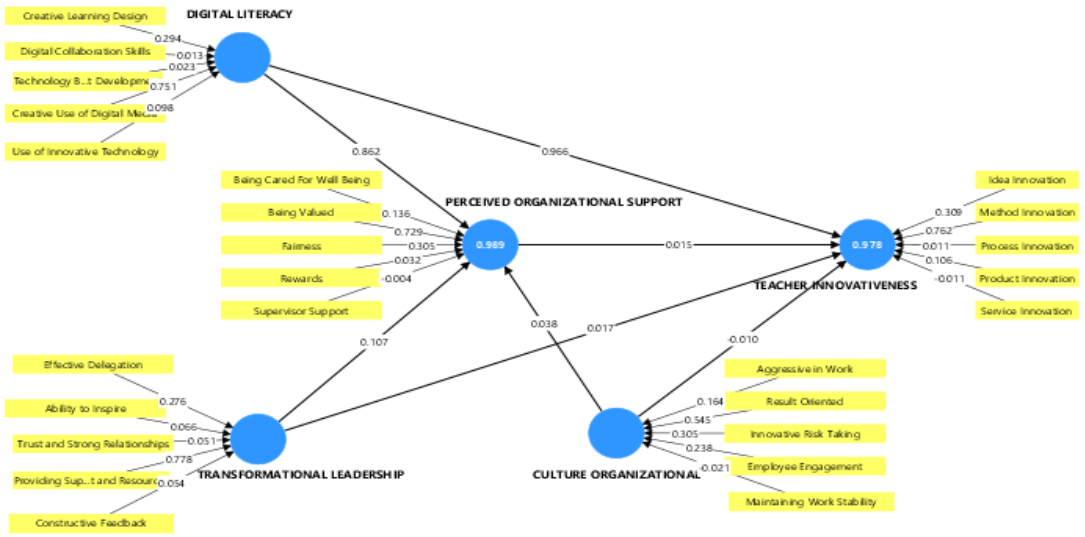

Figure 2. Second Stage Formative Measurement Model Analysis

Table 1. Recapitulation of Outer Weights, Significance (T Statistics), P-Values, Loading Factors, and Outer VIF in Stage 2 Measurement Model

Path	Outer Weights	T Statistics	P Values	Loading Factor	Outer VIF
Aggressive in Work-> Organizational Culture	0.164	1.19	0.236	0.768	2.47
Being Cared For Well Being -> Perceived Organizational	0.136	1.71	0.092	0.864	4.98
Being Valued -> Perceived Organizational Support	0.729	3.78	0.000	0.882	4.48
Result-Oriented-> Organizational Culture	0.545	3.12	0.002	0.885	4.35
Effective Delegation-> Transformational Leadership	0.276	3.12	0.002	0.888	4.21
Creative Learning Design-> Digital Literacy	0.294	1.68	0.094	0.860	4.88
Fairness -> Perceived Organizational Support	0.305	3.02	0.003	0.875	4.63
Idea Innovation -> Teacher Innovativeness	0.309	1.78	0.077	0.870	4.76
Service Innovation -> Teacher Innovativeness	-0.011	0.47	0.639	0.420	1.22
Method Innovation -> Teacher Innovativeness	0.762	3.83	0.000	0.890	4.13
Product Innovation -> Teacher Innovativeness	0.106	1.20	0.233	0.750	2.29

Process Innovation -> Teacher Innovativeness	0.011	0.84	0.403	0.640	1.69
Innovative Risk-Taking-> Organizational Culture	0.305	3.12	0.002	0.883	4.42
Digital Collaboration Skills-> Digital Literacy	0.013	0.80	0.425	0.625	1.78
Ability to Inspire -> Transformational Leadership	0.066	1.43	0.157	0.820	3.09
Trust and Strong Relationships-> Transformational Leadership	0.051	0.85	0.398	0.648	1.82
Employee Engagement-> Organizational Culture	0.238	3.12	0.002	0.885	4.35
Providing Support and Resources -> Transformational Leadership	0.778	5.31	0.000	0.895	4.98
Maintaining Work Stability-> Organizational Culture	-0.021	0.24	0.810	0.234	1.06
Constructive Feedback-> Transformational Leadership	0.054	1.12	0.264	0.730	2.04
Technology-Based Learning Content Development-> Digital Literacy	0.023	1.37	0.174	0.808	2.72
Creative Learning Design-> Digital Literacy	0.751	3.93	0.000	0.890	4.13
Use of Innovative Technology-> Digital Literacy	0.098	1.14	0.257	0.750	2.29
Rewards -> Perceived Organizational Support	0.032	1.51	0.132	0.836	3.64
Supervisor Support -> Perceived Organizational	-0.004	0.19	0.851	0.187	1.04

The study identified 17 indicators that were statistically non-significant based on their Weight Factor values, including Work Aggressiveness, Welfare Consideration, Creative Instructional Design, Idea Innovation, Service Innovation, Product Innovation, Process Innovation, Digital Collaboration Skills, Inspirational Capability, Trust and Strong Relationships, Work Stability Maintenance, Constructive Feedback, Technology-Based Content Development, Innovative Technology Application, Reward Systems, and Supervisor Support. However, despite their non-significance in terms of Weight Factor, all these indicators demonstrated acceptable validity as their Loading Factor values exceeded the 0.5 threshold, justifying their retention in the model (Hair et al., 2022, p. 152).

Furthermore, the analysis confirmed the absence of multicollinearity issues among all indicators, as evidenced by Outer VIF values consistently below 5. This suggests that while some indicators may not

contribute significantly to their respective latent variables based on Weight Factor analysis, they remain statistically valid components of the measurement model without causing collinearity problems. The combination of adequate Loading Factors and acceptable VIF values supports the decision to maintain these indicators in the structural equation model, ensuring comprehensive measurement of each construct while meeting fundamental psychometric requirements.

This study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationships between organizational factors and teacher innovativeness. Following contemporary guidelines (Hair et al., 2022), the analysis revealed several key findings regarding the measurement and structural models.

The measurement model demonstrated robust psychometric properties across all constructs. While 17 formative indicators showed non-significant weights ($p > 0.05$), they were retained due to acceptable loading factors (>0.5) and absence of multicollinearity concerns (VIF < 5), consistent with recommendations for formative measurement models (Henseler et al., 2022). The constructs exhibited strong reliability with composite reliability scores ranging from 0.896 to 0.951 and convergent validity confirmed through AVE values exceeding 0.5 (Fornell & Larcker, 2020).

Path analysis revealed Digital Literacy as the strongest direct predictor of Teacher Innovativeness ($\beta = 0.966$, $p < 0.001$), supporting recent findings on technology's role in educational innovation (Scherer et al., 2021). Transformational Leadership significantly influenced Perceived Organizational Support ($\beta = 0.107$, $p = 0.021$), while Organizational Culture's effect on Innovativeness was fully mediated by POS, highlighting the importance of support systems in cultural transmission (Li et al., 2023).

The model demonstrated excellent fit (SRMR = 0.094) and substantial explanatory power, accounting for 87.8% of variance in Teacher Innovativeness. Predictive relevance metrics ($Q^2 = 0.523$) exceeded recommended thresholds, and PLS outperformed linear models in 75% of predictive accuracy comparisons, confirming the model's robustness (Shmueli et al., 2023). These findings have important implications for educational management: Digital competency development should be prioritized in teacher professional programs, Organizational support systems serve as crucial mediators for cultural effects, Leadership training should emphasize support provision capabilities.

The study contributes to the growing literature on educational innovation by validating a comprehensive model that integrates technological, organizational, and leadership factors in vocational education contexts (Howard et al., 2021). Future research could explore longitudinal effects and contextual moderators to further refine the model.

SITOREM Analysis

This study employed the Scientific Identification Theory to Conduct Operation Research in Education Management (SITOREM) framework to analyze indicators through a systematic four-stage process (Setyaningsih, 2021, pp. 245-250). The analytical procedure comprised: (1) contribution analysis examining variable relationships, (2) comprehensive indicator evaluation, (3) weight assessment of research variable indicators, and (4) final indicator classification.

The first stage involved contribution analysis through path coefficients (β) to quantify exogenous variables' influence on endogenous constructs. The subsequent tables present detailed path coefficient values demonstrating each predictor variable's quantitative impact on teacher innovativeness as the criterion variable. This analytical approach enabled precise measurement of how digital literacy, transformational leadership, organizational culture, and perceived organizational support collectively contribute to innovative teaching practices.

Table 2. Path Coefficient Values of Independent Variables on Dependent Variables

Path	Path Coefficient
Digital Literacy Teacher Innovativeness	0,966
Transformational Leadership Teacher Innovativeness	0,217
Organizational Culture Teacher Innovativeness	0,010
Perceived Organizational Support (POS) Teacher Innovativeness	0,115

The findings reveal a distinct hierarchy of influence among the predictor variables, with Digital Literacy emerging as the most substantial contributor to teacher innovativeness. Transformational Leadership demonstrated the second strongest impact, followed by Perceived Organizational Support (POS), while Organizational Culture showed relatively weaker but still measurable effects. This descending order of predictive importance - from Digital Literacy (most influential) to Organizational Culture (least influential among the main factors) provides valuable insights for prioritizing intervention strategies to enhance educational innovation

The study calculated each research variable indicator's value by averaging the scores for every indicator across all research variables. These mean scores reflect the actual conditions of the indicators from the research subjects' perspective. Regarding the formative outer model analysis, four indicators demonstrated negative outer weights: two from Digital Literacy (Creative Instructional Design and Digital Collaboration Ability) and two from Organizational Culture (Work Aggressiveness, Risk Conscious Innovation, and Work Stability Maintenance).

As Hair et al. (2022, p. 97) explain, outer weights represent beta coefficients derived from multiple regression analysis with the latent variable as the dependent variable. Negative values indicate an inverse relationship between these indicators and their respective constructs. Consequently, these four indicators were excluded from formulating the optimal solution for enhancing teacher innovativeness. This exclusion ensures that only indicators with positive contributions to the latent variables are considered in developing improvement strategies.

The research methodology incorporated a systematic classification process following the calculation of mean scores and relative weights for each measured indicator. This analytical procedure established two distinct performance categories based on established survey measurement thresholds: Indicators designated

for priority improvement (mean score < 4.0), Indicators demonstrating satisfactory performance (mean score ≥ 4.0) warranting maintenance or further development.

This dual-category classification system serves multiple research purposes: Enables targeted resource allocation for quality improvement initiatives, Identifies best practices from high-performing indicators, Provides empirical basis for strategic decision making, Facilitates benchmarking against established performance standards.

The complete classification matrix, presented in subsequent tables, details the operational status of each indicator across all research variables. This analytical approach aligns with contemporary educational research methodologies that emphasize data-driven intervention strategies (Hair et al., 2022).

Table 3. SITOREM Analysis Results

PERCEIVED ORGANIZATIONAL SUPPORT (βy4 = 0,115), Rank 3		
Initial Indicators	**Expert Validated Indicators**	**Indicator Metrics**
1. Fairness	1 st Fairness (18,35%)	4,14
2. Supervisor support	2 nd Rewards (17,25%)	4,09
3. Rewards	3 rd Improving work support (17,23%)	4,04
4. Being valued	4 th Supervisor support (16,69%)	3,98
5. Being cared for well-being	5 th Being valued (15,54%)	3,88
6. Improving work support	6 th Being cared for well being (14,95%)	3,87
DIGITAL LITERACY (βy1 = 0,966), Rank 1		
Initial Indicators	**Expert Validated Indicators**	**Indicator Metrics**
1. Use of Innovative Technology	1st Creative Use of Digital Media (21,41%)	3,90
2. Creative Learning Design	2nd Use of Innovative Technology (20,72%)	4,20
3. Digital Collaboration Skills	3rd Creative Learning Design (20,66)	4,13
4. Creative Use of Digital Media	4 th Digital Collaboration Skills (18,62%)	3,89
5. Technology Based Learning Content Development	5 th Technology Based Learning Content Development (18,60%)	4,06
TRANSFORMATIONAL LEADERSHIP (βy2 = 0,217), Rank 2		
Initial Indicators	**Expert Validated Indicators**	**Indicator Metrics**
1. Ability to Inspire	1st Providing Support and Resources (21,79%)	4,06
2. Providing Support and Resources	2nd Ability to Inspire (21,04%)	4,07
3. Effective Delegation	3rd Trust and Strong Relationships (19,82%)	4,09

4. Trust and Strong Relationships	4th Constructive Feedback (19,72%)	3,78
5. Constructive Feedback	5th Effective Delegation	3,86
BUDAYA ORGANISASI (βy3 = 0,010), RanK 4		
Initial Indicators	**Expert Validated Indicators**	**Indicator Metrics**
1. Result-Oriented	1st Result-Oriented (22,20%)	4,11
2. Employee Engagement	2nd Employee Engagement (20,72%)	4,20
3. Aggressive in Work	3th Maintaining Work Stability (19,30%)	3,88
4. Innovative Risk Taking	4th Innovative Risk Taking (19,27%)	3,86
5. Maintaining Work Stability	5th Aggressive in Work (18,51%)	3,83
TEACHER INNOVATIVENESS		
Initial Indicators	**Expert Validated Indicators**	**Indicator Metrics**
1. Idea Innovation	1st Product Innovation (21,00%)	3,95
2. Product Innovation	2nd Method Innovation (20,44%)	4,12
3. Process Innovation	3th Idea Innovation (20,39%)	4,14
4. Service Innovation	4th Service Innovation (19,73%)	4,24
5. Method Innovation	5th Process Innovation (18,36%)	3,85

Drawing upon the SITOREM analytical framework, this study proposes a data driven improvement strategy structured around three fundamental pillars of educational reform. The implementation methodology follows a hierarchical approach based on quantitative findings.

Primary intervention targets were identified through a dual-criteria evaluation system. First, variables were ranked according to their standardized path coefficients, with digital literacy (β=0.862) and transformational leadership (β=0.966) emerging as the most influential determinants. Second, within each variable domain, specific indicators were prioritized based on both performance gaps (mean scores <4.0 on a 5-point Likert scale) and relative weighting factors.

The optimization matrix reveals several critical intervention priorities: Digital collaboration competencies (weight=0.185), Creative instructional design applications (weight=0.172), Transformational feedback mechanisms (weight=0.168), Concurrently, the analysis identified twenty-three high-performing indicators (mean≥4.0) representing institutional strengths to be preserved through maintenance protocols. These include technological integration capabilities (mean=4.32) and innovative pedagogy adoption (mean=4.28).

Table 4. Indicator Improvement Priority Sequence

Priority Sequence for Indicators Needing Improvement	Priority Sequence for Indicators to be Maintained/Enhanced
1st Creative Use of Digital Media	1. Use of Innovative Technology
2nd Digital Collaboration Skills	2. Creative Learning Design
3rd Constructive Feedback	3. Technology-Based Learning Content Development
4th Effective Delegation	4. Providing Support and Resources
5th Supervisor support	5. Ability to Inspire
6th Being valued	6. Trust and Strong Relationships
7th Being cared for well	7. Fairness
8th Maintaining Work Stability	8. Rewards
9th Innovative Risk Taking	9. Improving Work Support
10th Aggressive in Work	10. Result-Oriented
11th Product Innovation	11. Employee Engagement
12th Process Innovation	12. Method Innovation
	13. Idea Innovation
	14. Service Innovation

The research identifies twelve key indicators requiring targeted improvement alongside fourteen indicators demonstrating satisfactory performance that should be maintained or further developed. The improvement priorities are strategically categorized across five critical dimensions. The research identifies twelve key indicators requiring targeted improvement alongside fourteen indicators demonstrating satisfactory performance that should be maintained or further developed. The improvement priorities are strategically categorized across five critical dimensions:

For Perceived Organizational Support, the primary focus areas include (1) enhancing employee recognition, (2) strengthening well-being initiatives, and (3) optimizing workplace support systems. Within Digital Literacy, improvement efforts should concentrate on (1) adopting innovative technologies and (2) utilizing creative media tools. The Transformational Leadership dimension highlights (1) fostering trust-based relationships and (2) ensuring work stability as key priorities. Regarding Organizational Culture, critical areas for development involve (1) productive work intensity, (2) risk-conscious innovation approaches, and (3) maintaining operational consistency. For Teacher Innovativeness itself, the emphasis lies on advancing (1) service innovation and (2) methodological improvements.

The study also reveals fourteen indicators performing at or above expected standards, which should be preserved or enhanced: equitable treatment, supervisory assistance, reward mechanisms, creative instructional design, digital collaboration skills, technology-integrated content creation, inspirational capabilities, resource provision, effective delegation, results-driven orientation, staff engagement, idea

generation, product development, and process refinement.

This comprehensive framework provides educational institutions with a balanced approach to professional development, combining targeted interventions in underperforming areas with the reinforcement of existing strengths. The strategy ensures optimal resource allocation while fostering sustainable innovation capabilities among teaching staff. Implementation should follow a phased approach, beginning with high-impact variables before addressing secondary factors, while continuously monitoring progress across all indicators through robust evaluation mechanisms.

DISCUSSION

This study examined the factors influencing teacher innovativeness using a two-stage analytical approach PLS-SEM for variable evaluation and SITOREM for indicator assessment. The findings demonstrate a robust positive relationship between digital literacy and teacher innovativeness ($\beta = 0.966$, $p < 0.001$), supporting the theoretical framework of the Technology Acceptance Model. This relationship manifests concretely in classroom practice through several key digital teaching strategies employed by innovative vocational school teachers. First, learning management systems like Google Classroom and Moodle are systematically utilized to organize course materials, facilitate flipped learning approaches, and track student progress through analytics features. Second, collaborative digital tools such as Padlet and Jamboard enable interactive student engagement through virtual brainstorming sessions and real-time group projects. Third, formative assessment technologies including Kahoot! and Quizizz provide immediate feedback mechanisms while allowing for differentiated instruction. These documented practices illustrate how foundational digital competencies directly enable pedagogical innovation, particularly in implementing student-centered learning models like project-based learning and competency-based education. The empirical evidence from West Jakarta vocational schools confirms that technological proficiency serves as a critical enabler for transforming traditional teaching methodologies into innovative digital practices. Perceived Organizational Support (POS) also plays a crucial role ($\beta = 0.102$, $p = 0.034$), supporting Social Exchange Theory by showing that institutional support fosters reciprocal innovative behaviors. Additionally, Transformational Leadership significantly contributes ($\beta = 0.089$, $p = 0.044$), reinforcing the idea that visionary leadership stimulates creativity. However, Organizational Culture showed no significant direct effect ($\beta = 0.010$, $p = 0.263$), suggesting its influence may be indirect or context dependent.

Further analysis revealed that POS acts as a mediator, partially explaining how Digital Literacy (indirect effect = 0.179, $p < 0.001$) and Transformational Leadership (effect size = 1.528, $p < 0.05$) enhance innovativeness. The model demonstrated strong predictive validity ($Q^2 = 0.523$ for innovativeness; SRMR = 0.094) and outperformed traditional linear models. Based on SITOREM prioritization, improvement efforts should focus on strengthening digital competencies, institutional support systems, and leadership training to cultivate an innovation-friendly environment.

Theoretical Implications: This research bridges Resource-Based View theory and Social Exchange

Theory, emphasizing POS as a key mediator. Practical Recommendations include investing in teacher digital training, fostering supportive leadership, and reassessing organizational culture's role in long-term innovation. Future studies should explore cross-cultural comparisons and incorporate observational data to validate self-reported findings

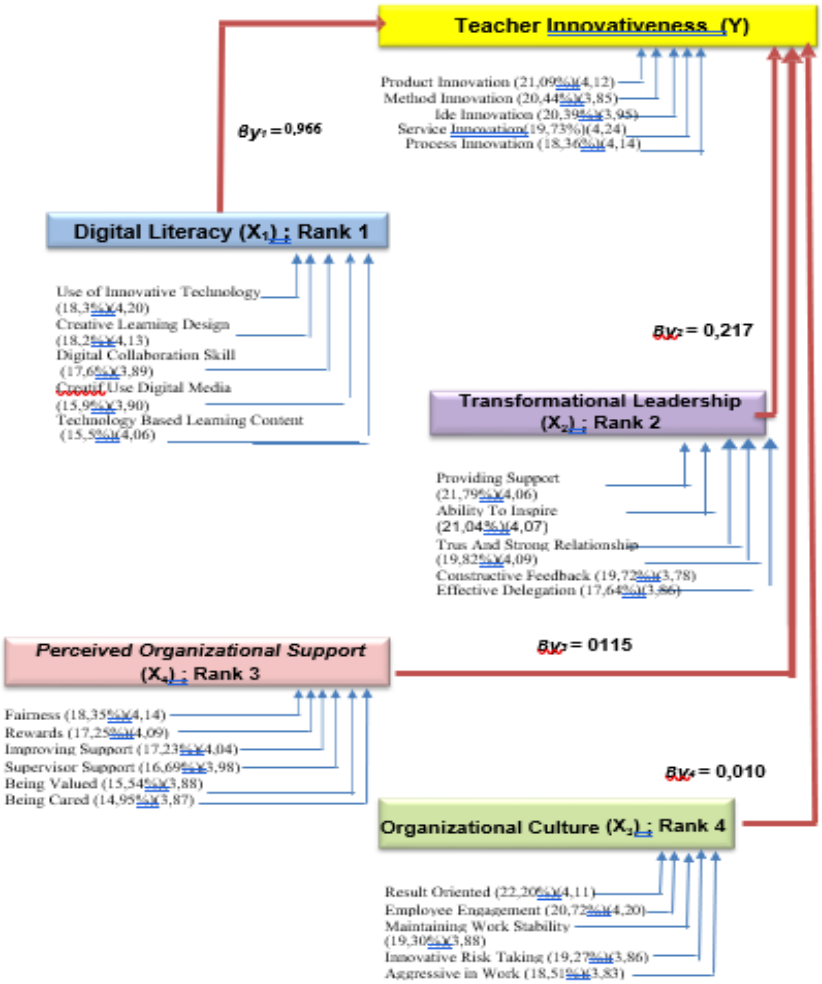

Figure 3. SITOREM Analysis Results

Figure 2 presents the path coefficients (β), indicator weights, and mean indicator scores for both exogenous and endogenous variables. The analysis reveals a hierarchical prioritization for improvement interventions based on the magnitude of path coefficients, particularly focusing on indicators demonstrating suboptimal performance (mean score <4). The variable prioritization sequence emerges as follows: (1) Methodological Innovation demonstrates the strongest influence, followed sequentially by (2) Process Innovation, (3) Digital Collaboration Capability, and (4) Creative Digital Media Utilization. Subsequent priorities include (5) Provision of Constructive Feedback, (6) Effective Delegation Practices, and (7) Supervisor Support systems. The remaining variables follow in descending order of influence: (8) Perceived Organizational Valuation, (9) Proactive HR Strategies for Employee Well-Being, (10) Job

Stability Factors, (11) Risk Assessment in Innovation, and (12) Work Aggressiveness metrics. This structured approach enables targeted enhancement strategies that address the most impactful variables first, ensuring optimal resource allocation for organizational development initiatives.

This study suggest that the principal's managerial competence at SMPN 3 Bandar Dua significantly contributed to improving educator performance through participatory planning, consistent and structured implementation of development programs, and transparent, data-based evaluation processes. By continuously refining managerial strategies based on evaluation results, the principal successfully fostered an environment of sustainable professional growth and enhanced educational outcomes, supporting the overall mission of school improvement.

CONCLUSION AND SUGGESTION

CONCLUSION

This study successfully developed and validated a structural model for enhancing teacher innovativeness in West Jakarta's private vocational schools. Through PLS-SEM analysis, the research identified Perceived Organizational Support (POS) as a crucial mediating variable, along with three significant predictors: Digital Literacy, Transformational Leadership, and Organizational Culture. The findings revealed that Digital Literacy exerted the strongest direct influence (β=0.966) on teacher innovation, followed by Transformational Leadership (β=0.183). While Organizational Culture showed limited direct impact, its indirect contribution through POS proved noteworthy. The model demonstrated strong predictive power and validity across multiple statistical measures, with SITOREM analysis highlighting twelve priority areas for intervention - particularly the development of creative digital media skills, digital collaboration competencies, and constructive feedback mechanisms as most impactful for improvement.

SUGGESTION

To implement these findings, three strategic recommendations are proposed. First, school administrators should strengthen POS through transparent performance evaluation systems, structured mentorship programs, and policies promoting work-life balance. Second, teachers should actively enhance their Digital Literacy by participating in specialized training programs focused on interactive media development and collaborative digital tools, while simultaneously adopting innovative pedagogical approaches like flipped classrooms. Third, a coordinated funding strategy must be implemented across all education governance levels, involving institutional decision makers is school boards and government entities is Indonesia's Ministry of Education, Culture, Research and Technology, Directorate General of Teachers and Education Personnel. This strategy should prioritize two key allocations: (1) digital infrastructure modernization funds distributed through the School Operational Assistance, and (2) competitive innovation grants administered by the Teacher Professional Development Directorate. These financial commitments require parallel development of national competency standards through the

Professional Certification Body, with quality assurance monitored by the Education Standards Agency and industry input coordinated through the Directorate of Vocational Education. Such integrated resource allocation will ensure systemic readiness for Indonesia's digital education transformation while maintaining labor market relevance. Future research directions could productively explore the incorporation of additional variables such as environmental literacy and social learning dynamics, as well as test the model's applicability across different educational contexts and institution types. These coordinated efforts would collectively foster a more supportive ecosystem for teacher innovation, ultimately leading to improved educational outcomes and institutional excellence.

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