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IMPROVING INNOVATIVE BEHAVIOR THROUGH STRENGTHENING TRANSFORMATIONAL LEADERSHIP, SELF-EFFICACY, KNOWLEDGE SHARING, AND CREATIVITY (EMPIRICAL STUDY USING SEM PLS AND SITOREM ANALYSIS ON PRIVATE VOCATIONAL SCHOOL TEACHERS IN SOUTH JAKARTA)

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ABSTRACT
This research investigates strategies to enhance innovative behavior among private vocational school teachers in South Jakarta by examining the roles of transformational leadership, self-efficacy, knowledge sharing, and creativity. Amid the challenges posed by the industrial revolution era and educational disruptions such as the COVID-19 pandemic, the study aims to develop effective interventions to boost teacher innovation. Using a quantitative approach, data were collected from 179 permanent teachers through validated questionnaires and analyzed using Structural Equation Modeling (SEM-PLS) and SITOREM methods. Findings reveal that while transformational leadership and self-efficacy significantly influence knowledge sharing and creativity, their direct and indirect impacts on innovative behavior are statistically insignificant. The highest direct influence on innovative behavior was exerted by knowledge sharing (β = 0.189), followed by transformational leadership, creativity, and self-efficacy. However, all effects remain weak. These findings contrast with prior studies asserting stronger direct correlations, highlighting the need for contextual sensitivity in applying leadership and motivational constructs. The research contributes a novel strategy model that prioritizes strengthening key indicators within each variable and proposes a more integrative pathway for developing teacher innovation. It offers practical implications for policymakers, school leaders, and educators to refine leadership approaches and build supportive organizational cultures. Future research is encouraged to explore additional mediators and moderators, such as psychological safety and organizational support, to uncover more robust mechanisms for fostering innovative behavior in educational settings.

Keywords: Transformational Leadership; Self-Efficacy; Knowledge Sharing; Creativity; Innovative Behavior.

INTRODUCTION

Education is a cornerstone of human civilization and plays a crucial role in the life of a nation. In Indonesia, the importance of education is affirmed in the fourth paragraph of the Constitution of the Republic of Indonesia, which aims to "educate the life of the nation." To realize this idealism, qualified teachers are essential. According to Law Number 14 of 2005 concerning Teachers and Lecturers Article 10 paragraph 1, teachers must possess four basic competencies: pedagogical, professional, personality, and social (Foltin, 2023; Fouze & Amit, 2023; Purwanti, 2022; Zimmer, 2016; Zuhdi et al., 2021). These competencies form a holistic unit that defines professional educators, with innovative behavior being one of the key indicators of professionalism.

The current global shift toward the Industrial Revolution 4.0 and Society 5.0—characterized by artificial intelligence, biotechnology, machine learning, and the Internet of Things—requires educators to integrate digital technologies into their teaching methods. This presents significant challenges, especially for older teachers labeled as digital

immigrants, who often struggle to adapt (Ellitan, 2020; Gandasari et al., 2020; Kurniawan, 2022; Nurfitria et al., 2021; Shaddiq et al., 2021). The educational environment is increasingly influenced by VUCA conditions—volatility, uncertainty, complexity, and ambiguity—requiring teachers not only to be competent but also to innovate and remain adaptable in the face of constant change.

The emergence of the COVID-19 pandemic further disrupted education systems worldwide. In Indonesia, the government's response through the implementation of PSBB (Large-Scale Social Restrictions) shifted education to a distance learning model. However, many teachers were unprepared and lacked the technological tools to adapt, thereby highlighting deficiencies in readiness and innovation. Teachers were compelled to adopt new learning media and methods rapidly, underscoring the importance of creativity and flexibility in ensuring continued educational quality during crisis conditions.

Global benchmarks also reflect the need for innovation in Indonesia's education system (Coleman, 2011; Faisal & Martin, 2019; Ngo & Meek, 2019). The Global Innovation Index 2022 revealed that Indonesia fell in rank from 85 in 2019 and 2020 to 87 in 2021, before slightly improving to 75 in 2022. Meanwhile, PISA scores continue to show that Indonesian students underperform in literacy and numeracy, ranking 68th out of 81 countries. Teachers' inability to innovate is a contributing factor to this stagnation. Innovation is essential for developing and implementing new teaching methods and overcoming challenges (Arifin et al., 2021; Mulyati et al., 2023; Sukinem et al., 2022). Without it, the quality of graduates may decline, and national educational goals may remain unmet.

In an effort to strengthen vocational education, the Ministry of Education and Culture launched the SMK Center of Excellence program in 2021. However, a preliminary study in South Jakarta revealed barriers to teacher innovation, such as low self-efficacy, limited creativity, and inadequate leadership support. Many teachers had not participated in training or seminars, which limited idea development and knowledge exchange. This research therefore aims to identify optimal strategies for enhancing innovative behavior through the reinforcement of transformational leadership, self-efficacy, knowledge sharing, and creativity. The study's novelty lies in the development of a constellation model that integrates these variables and provides actionable insights for improving education quality in private vocational schools.

The novelty of this study lies in its simultaneous examination and integration of four interrelated constructs—transformational leadership, self-efficacy, knowledge sharing, and creativity—as a pathway to enhancing innovative behavior among vocational school teachers in South Jakarta. Unlike previous studies that tended to focus on isolated influences of either leadership, self-efficacy, or knowledge sharing on innovation, this study presents a comprehensive model using SEM-PLS and SITOREM analysis. The research also explores the indirect effects through creativity and knowledge sharing, revealing that while individual variables may significantly influence intermediary constructs, their effect on innovative behavior remains weak and mostly insignificant. This nuanced insight uncovers the limitations of existing strategies and proposes a novel strategy constellation model prioritizing critical indicator improvements—thus providing a more strategic framework for educational stakeholders.

METHOD

This research was conducted at Private Vocational High Schools (SMK) in South Jakarta, covering five sub-districts and involving 46 A-accredited schools with a total population of 1,098 teachers. The method used was quantitative with a survey approach, and the path analysis was conducted to test the influence of variables, including transformational leadership, self-efficacy, knowledge sharing, and creativity on innovative behaviors. Data was collected through observation, questionnaires, and documentation, with instruments that have been tested for validity and reliability. The research process includes drafting, proposal testing, questionnaire distribution, and data analysis using SEM PLS and SITOREM to gain deeper insights. The results of the analysis show a significant relationship between exogenous variables and innovative behaviors, with the hypotheses tested covering the direct and indirect influence of transformational leadership and self-efficacy on innovative behavior through knowledge sharing and creativity. Thus, this study aims to provide recommendations for improving the quality of education through strengthening innovative behaviors among vocational school teachers.

RESULTS AND DISCUSSION

1. Model Analysis

The model analysis method used to prove the research hypothesis and test the model built is by using the non-parametric Partial Least Square-Structural Equation Model (PLS-SEM) method. Data collection was carried out through the distribution of research instruments to 179 teacher respondents. Previously, validity and reliability tests had been carried out by distributing questionnaires to 30 teachers.

The assessment of the measurement model is carried out through the evaluation of the outer model. External model analysis can be carried out using the Embedded Two Stage technique which is a Hierarchical Component Model (HCM) approach. This technique divides the measurement model into levels of indicators that measure their latent variables. The lowest level (low order component = LOC) as level 1 (first order) is a measurement between the manifest indicator and the indicator factor of the latent variable. Furthermore, the high order component = HOC) as level 2 (second order) is a measurement between indicators and dimensions with their latent variables. In this study, the model constellation consists of five (5) variables, each of which has an indicator and a manifest indicator to measure these variables. The following is the LOC assessment of each of the exogenous variables and the innovative behavioral endogenous variables.

a. Model Pengukuran Low Order Component Outer Model

1) Uji Convergent Validity

The convergent validity test is carried out by examining the value of the loading factor on each manifest indicator which measures the indicators of each exogenous and endogenous variable, so that the correlation between the two can be known. This measure provides information on how much the manisfest indicator is capable of measuring its indicators. This test is a measurement of the validity of the instrument as a measurement tool used. The loading factor value of > 0.7 is said to be ideal, meaning that the indicator is said to be valid in measuring the construct. In empirical data research or exploration research, the loading factor value of > 0.5 is still acceptable to be used as a measuring tool for indicators/dimensions of latent variables to be built. The following is a measurement of the convergent validity of each exogenous and endogenous variable in an innovative behavioral model.

The transformational leadership variable (X1) consists of five indicators that are tested for validity using the SmartPLS application, and the results of the analysis show that most of the loading factors meet the validity criteria with values above 0.5, so that the sub-indicators can be maintained, although some are reduced. The self-efficacy variable (X2) was also examined in the same way, resulting in a loading factor that was mostly valid and viable to maintain, while some other indicators were also reduced. Furthermore, the knowledge sharing variable (X3) was examined and showed similar results, with the majority of indicators meeting the required validity criteria, while some other items were also reduced. The creativity variable (X4) shows consistent results with good validity for most indicators, although there are some items that need to be reduced. Finally, the innovative behavior variable (Y) was also analyzed, where most of the indicators met the validity criteria, but there were two indicators that had a loading factor below 0.5 and were reduced. Overall, the analysis showed that the variables had an acceptable convergent validity, and reduction measures were taken to ensure the accuracy and relevance of the research instruments.

2) Uji Composite Reliability

Composite Reliability or Internal Consistency Reliability analysis is to measure the consistency of the reliability of indicators in measuring latent variables that are built. The assessment criteria used in PLS-SEM were a Composite Reliability (CR) score of > 0.7 and an Average Variance Extracted (AVE) score of > 0.5. If the CR value is greater than or equal to 0.7, it means that the indicators used can be relied upon to measure the latent variables that are constructed. If the AVE value is greater than or equal to 0.5, it means that the latent variable constructed can explain the average of more than half of the variants of the indicators.

3) Uji Discriminant Validity

Discriminant validity is useful to prove that each variable or indicator is different from other variables or indicators. The assessment of discriminatory validity uses the Fornell-Lacker criteria. The following is a recapitulation table of the discriminant validity values of endogenous and exogenous variables in innovative behavioral measurement models.

b. Model Pengukuran High Order Component Outer Model

The following is a chart of the results of the measurement model evaluation algorithm at the high order component (HOC) level for each exogenous and endogenous variable.

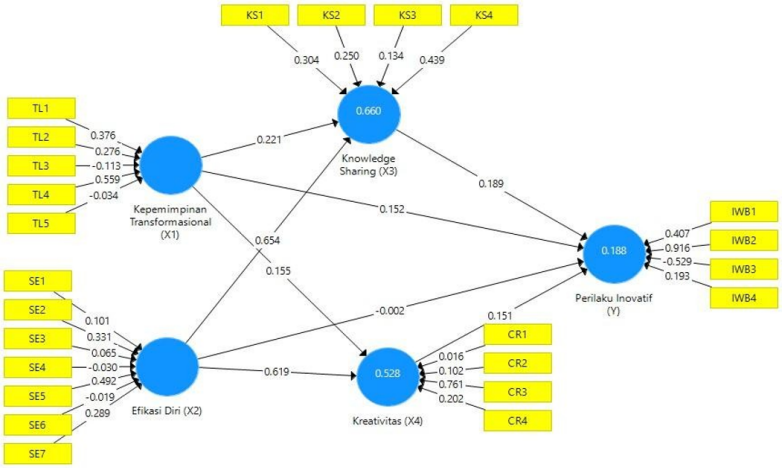

Figure 1. T-Statistic Output Chart of HOC Measurement Model

Based on the T-Statistic value in figure 1, the T-Statistic has a value above 1.96 which means significant. To analyze the level of validity of the convergence, an examination was carried out on the value of the loading factor, whether it was worth above 0.5 so that it could be maintained. The following is a recapitulation table of the results of the multicollaterality test, the value of the weight factor and loading factor and their significance.

Transformational leadership variables (X1) with indicators TL1: Committed to realizing the vision, TL2: Motivating and inspiring, TL3: influencing for the better, TL4: Encouraging subordinates to think openly, TL5: Building attention to subordinates.

Self-efficacy variable (X2) with indicators SE1: Have high motivation, SE2: Happy to carry out challenging tasks, SE3: Confidence to complete tasks on time, SE4: Perseverance in completing tasks, SE5: Ability to develop themselves, SE6: Have an optimistic spirit, SE7: Have optimal work performance.

Knowledge sharing variable (X3) with indicator KS1: Gaining knowledge, KS2: Sharing knowledge KS3: Receiving knowledge, KS3: Receiving knowledge, KS4: Applying knowledge voluntarily.

Creativity variable (X4) with indicator CR1 : Having high curiosity, CR2 : Learning and trying new things, CR3 ; Foresight sees opportunities, CR4: Openness in accepting better ideas.

Innovative behavior variable (Y) with indicators IWB1 : Discovery of new ideas, IWB2 : Creation of new ideas, IWB3 : Exchange of new ideas, IWB4 : Implementation of new ideas.

If the Weight Factor T Statistics value > 1.96, then all indicators can be stated. Based on Table 4.20 of 24 indicators, there are 15 indicators that are insignificant, namely indicators TL2 (Motivate and inspire), TL3 (Influence for the better), TL5 (Build attention to subordinates), SE1 (Have high motivation), SE3 (Confidence in completing tasks on time), SE4 (Perseverance in completing tasks), SE6 (Have an optimistic soul), KS2 (Sharing knowledge), KS3 (Receiving knowledge), CR1 (Have a high curiosity), CR2 (Learning and trying new things), CR4 (Openness in accepting better ideas), IWB1 (Discovery of new ideas), IWB3 (Exchange of new ideas), IWB4 (Implementation of new ideas). Of the 24 indicators, there is 1 indicator that does not have a loading factor value above 0.5, namely the TL5 indicator (Building attention to subordinates), meaning that the 23 indicators can be maintained if they have an outer VIF value of less than 5. Furthermore, the multicollinearity examination based on the outer value of VIF is entirely below the number 5, so that it can be concluded that the measurement model at the HOC level does not have a multicollinear problem.

c. Structural Model Assessment

1) Inner Model Evaluation

Evaluation of structural or inner model is carried out to measure the magnitude of the relationship between exogenous variables and endogenous variables constructed. The following are the results of the iteration of the PLS algorithm of the structural model of innovative behavior.

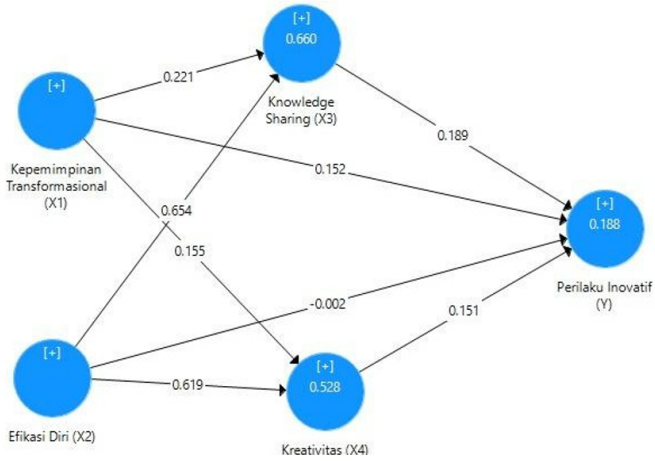

Figure 2. Test Results Chart of Innovative Behavioral Structural Models

The initial stage of structural model testing is to conduct a multicolinierity check through the internal assessment of VIF on the inner model as follows:

Table 1. Output of Inner VIF Values in Innovative Behavioral Structural Models

Variabel Endogen *Inner* Model	Innovative Behavior (Y)	Creativity (X4)	*Knowledge Sharing* (X3)
Transformational Leadership (X1)	**1,820**	**1,675**	**1,675**
Diril Efficacy (X2)	**3,078**	**1,675**	**1,675**
Knowledge Sharing (X3)	**3,973**		
Creativity (X4)	**2,865**		

Based on table 1, all the inner values of VIF are below 5, so it can be concluded that the innovative behavior model does not have a multicollinearity problem. Furthermore, the analysis of the determination coefficient or R-Square based on Figure 4.17, the R-Suare value on the innovative behavioral endogenous variable is 0.188. According to the criteria of the Rules of Thumbs for Structural Model Evaluation, the classification of R2 includes 0.25 < 0.50 < 0.75 are weak, moderate, and strong. So the R-Square value above is 0.188, which is below 0.25, which is included in the weak category, meaning that this model is less able to analyze and explain changes in innovative behavior variables influenced by exogenous variables of transformational leadership, self-efficacy, knowledge sharing, and creativity simultaneously by 18.8% and the rest are influenced by other variables outside this model. The magnitude of the other variable is calculated by the formula 1 - R2 = 1 - 0.188 = 0.812 or 81.2% with an error coefficient of e = √(1 - R2) = √(1 - 0.188) = √0.812 = 0.901. The following is a recapitulation of the path coefficient values.

Table 2. Output of Direct and Indirect Path Coefficient Values

Correlation Pathway	Influence			Category
	Straight	***Indirect***	**Total**	
X1 → Y	0,152	0,065	0,217	Weak
X2 → Y	-0,002	0,217	0,215	Weak
X3 → Y	0,189	0,000	0,189	Very weak
X4 → Y	0,151	0,000	0,151	Very weak

Classification path coefficient: 0.2<0.4<0.6<0.7<0.8 : very weak; weak; moderate/moderate; strong; very strong

Based on the direct effect score value, the largest influence contribution to innovative behavior change was the knowledge sharing variable (0.189), followed by the transformational leadership variable (0.152), followed by the creativity variable (0.151), and the self-efficacy variable (-0.002). Based on the magnitude of the indirect effect, the self-efficacy variable (0.217) has a greater influence on innovative behavior compared to transformational leadership (0.065). Therefore, the largest total effect on innovative behavior was the transformational leadership variable (0.217), followed by self-efficacy (0.215), knowledge sharing (0.189), and creativity (0.151).

2) Evaluasi Goodness of Fit

The evaluation of Goodness of Fit or Model Fit shows the suitability or suitability of the built model with the construct variables that support it. This stage is carried out by evaluating the Normed Fit Index (NFI) and Standardized Root Mean Square Residual (SRMR) values as follows:

Table 3. SRMR and NFI Values of Innovative Behavior

Innovative Behavior	Fit Model Criteria	
	SRMR	**NFI**
Saturated	0,047	0,884
Estimated	0,060	0,868

The SRMR value is used to predict the difference between the observed correlation and the correlation matrix displayed by the model, while the NFI represents an additional match measure for the model being tested. Thus it is possible to assess the average magnitude of the difference between the observed correlation and the expected correlation as an absolute measure of the fit criteria (model). The SRMR and NFI values meet the fit of model criteria. Where the SRMR value is below 0.08 and NFI is below 1.0. Thus, innovative behavior models are considered fit. This means that in general the parameters indicated by the Smart PLS fit model information are sufficient and acceptable as a model prerequisite.

3) Model Strength Evaluation

The evaluation of the power model was carried out by checking the redictive relevance (Q2), size effect (F2), and PLS-predict. The following is a recapitulation of the assessment of the strength of the Innovative Behavior model.

Table 4. Values of F Squre and Q Square Innovative Behavior Models

Variabel	f-*Square*	Category *1)	Q-*Square*	Category *2)
Y			0,081	Weak
X1	0,016	Small		
X2	0,000	Small		
X3	0,011	Small	0,611	Strong
X4	0,010	Small	0,459	Moderate

*1)Classification categoryF2: 0.02<0.15<0.35 (small, intermediate large)
*2) Q2 category classification: 0<0.25<0.50 (weak, moderate, strong)

Based on Table 4.24, the value of f2 or size effect on the innovative behavior variable provided by the exogenous variable falls into a small category. Meanwhile, the Q2 value is all greater than 0, this shows that the model built has a predictive relevance ability of 0.081 for the innovative behavior variable, 0.611 for the knowledge sharing variable, and 0.459 for the creativity variable. In other words, the value of Q2 > 0 indicates that the model has predictive relevance for endogenous constructs of innovative behavior, knowledge sharing, and creativity. These results show that innovative behavior models, knowledge sharing, and

creativity have good observation values generated by the model and also the estimation of its parameters.

d. Substructural Model 1 : Innovative Behavior Pathway Relationships

The influence model between variables in substructural 1 consists of one endogenous variable of innovative behavior (Y) and four exogenous variables, namely transformational leadership (X1), self-efficacy (X2), knowledge sharing (X3), and creativity (X4), plus one residual variable, namely εy, so that the path model in substructural 1 is obtained as follows: $\hat{Y} = \beta y1X1 + \beta y2X2 + \beta y3X3 + \beta y4X4 + \varepsilon y$

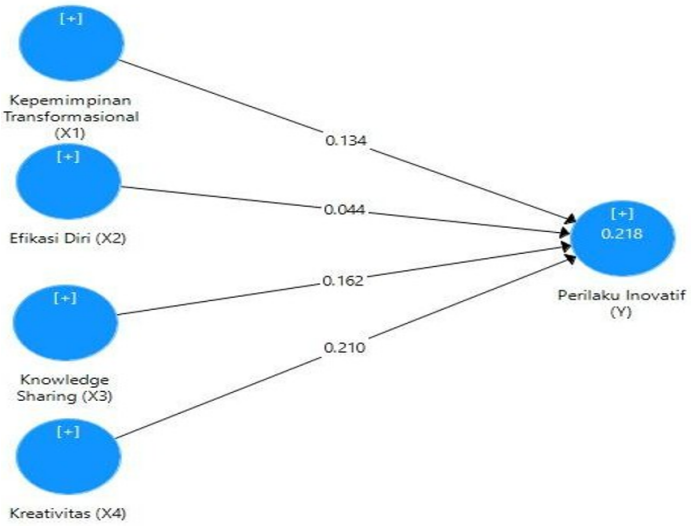

Figure 3. Innovative Behavior Substructural Model Chart-1

Based on Figure 3, a determinant coefficient value or R-Square of 0.218 was obtained, meaning that the four independent variable constructs can explain 21.8% of the changes or variances of the innovative behavioral variable construct. Based on the magnitude of the R2 value, it shows the influence of four independent variables on weak innovative behavior Thus, it can be concluded that there is a weak direct influence of the independent variables of transformational leadership, self-efficacy, knowledge sharing, and creativity simultaneously on innovative behavior of 21.8% and the rest is influenced by other variables outside this model. The magnitude of the other variable is 100 - R2 = 78.2% with an error coefficient of e = √(1-R2) =√(0.782) = 0.884. Then the mathematical equation of the substructural model-1 is $\hat{Y} = 0.134X1 + 0.044X2 + 0.162X3 + 0.210X4 + \varepsilon 0.884$.

Based on the magnitude of the path coefficient value of each independent variable on the innovative behavior variable, it shows that the influence of the creativity variable has the strongest effect of 0.210 on innovative behavior compared to other variables. Furthermore, the largest effect was followed by the knowledge sharing variable of 0.162, the transformational leadership variable of 0.134, and the self-efficacy variable of 0.044.

e. Structural Model-2 : Knowledge Sharing Path Relationships

The influence model between variables on substructural-2 consists of one endogenous variable knowledge sharing (X3) and two exogenous variables, namely transformational leadership (X1), self-efficacy (X2), plus one residual variable, namely εy, so that the path model in substructural-2 is obtained as follows: $X3 = \beta 31X1 + \beta 32X2 + \varepsilon 2$

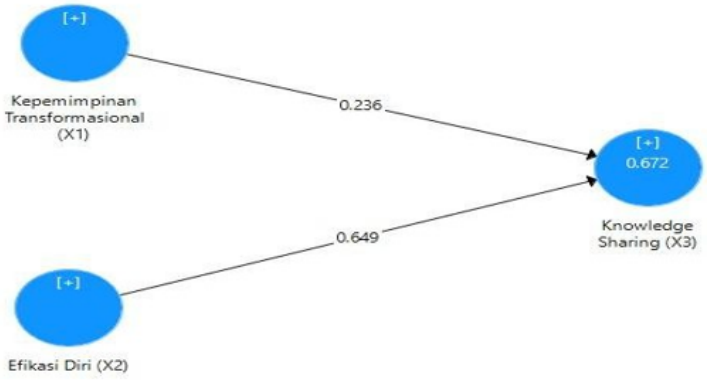

Figure 4. Substructural Model Chart-2 Knowledge Sharing

Based on Figure 4, the value of the determinant coefficient or R-Square is obtained of 0.672, meaning that the two independent variable constructs can explain 67.2% of the changes or variances of the knowledge sharing variable construct. Based on the magnitude of the R2 value, it shows that the influence of the two independent variables on knowledge sharing is quite strong. Thus, it can be concluded that there is a strong direct influence of the independent variables of transformational leadership and simultaneous self-efficacy on knowledge sharing of 67.2% and the rest is influenced by other variables outside this model. The magnitude of the other variable is 1 - R2 = 0.328 or 32.8% with an error coefficient of e = √(1-R2) = √0.328 = 0.572 So the mathematical equation of the substructural-2 model is X3 = 0.236X1 + 0.649X2 + ε0.572

Based on the magnitude of the path coefficient value of each independent variable on the knowledge sharing variable, it shows that the influence of the self-efficacy variable has the strongest effect of 0.649 on knowledge sharing. This was followed by the transformational leadership variable of 0.236.

f. Structural Model-3 : Creativity Path Relationship

The influence model between variables on substructural-3 consists of one endogenous variable of creativity (X4) and two exogenous variables, namely transformational leadership (X1), self-efficacy (X2), plus one residual variable, namely ε2, so that a path model in substructural-3 is obtained as follows: X4 = β41X1 + β42X2 + ε2

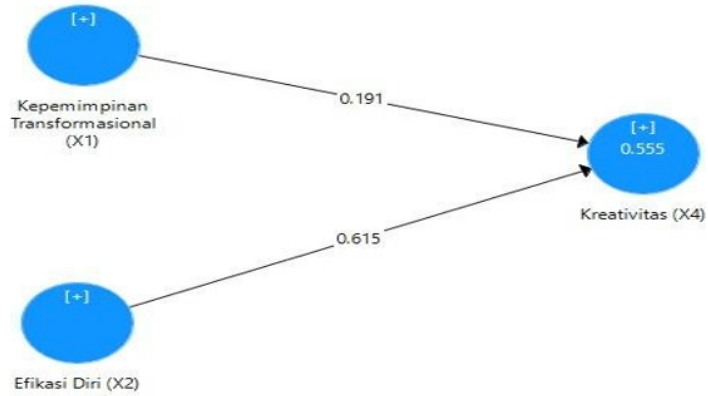

Figure 5. Creativity Substructural Model Chart-3

Based on Figure 5, the value of the determinant coefficient or R-Square is obtained of 0.555, meaning that the two independent variable constructs can explain 55.5% of the change or variance of the creativity variable construct. Based on the magnitude of the R2

value, the influence of the two independent variables on creativity is quite strong. Thus, it can be concluded that there is a fairly strong direct influence of the independent variables of transformational leadership and simultaneous self-efficacy on creativity by 55.5% and the rest is influenced by other variables outside this model. The magnitude of the other variable is 1 - R2 = 0.445 or 44.5% with an error coefficient of e = √(1-R2) = √0.445 = 0.667 Then the mathematical equation of the substructural-3 model is X4 = 0.191X1 + 0.615X2 + ε0.667

Based on the magnitude of the path coefficient value of each independent variable on the creativity variable, it shows that the influence of the self-efficacy variable has the strongest effect of 0.615 on creativity. Furthermore, it was followed by the transformational leadership variable of 0.191.

2. Research Hypothesis Test

Hypothesis testing is the final stage of testing a constellation of models that are built. Test the research hypothesis using the bootstrapping method. A t-statistic test of significance test of an innovative behavioral model is presented in Figure 6, Figure 7, Table 5.

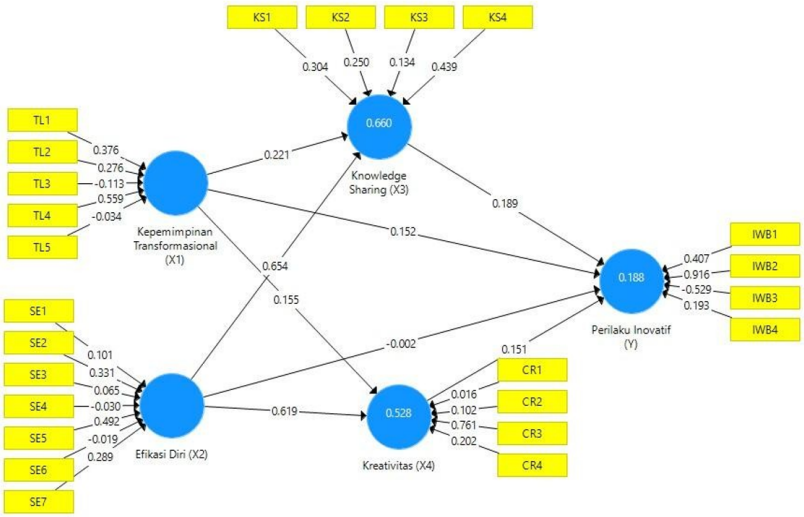

Figure 6. Path Analysis of Innovative Behavior Models

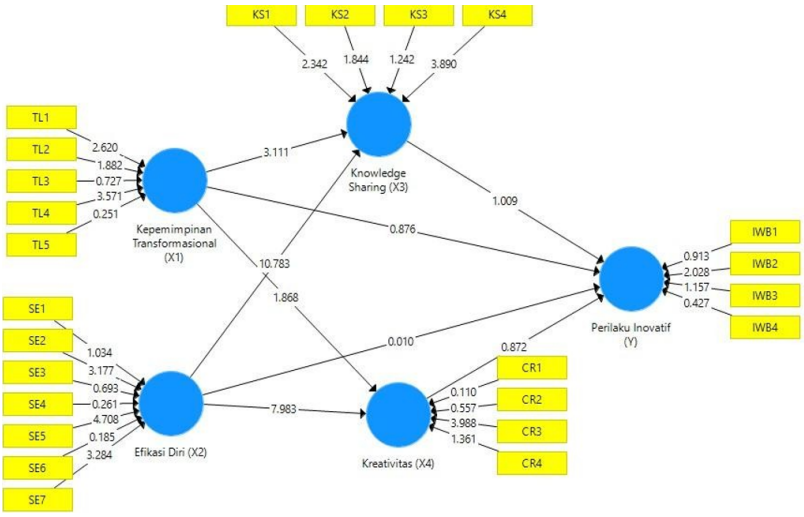

Figure 7. Results of T-Statistics Significance Test of Innovative Behavioral Models

Table 5. Recapitulation of T-Statistics and P-Value of Innovative Behavior

Yes	Correlation Pathway	*Path Coefficient*	T-*Statistics*	P-Value	Conclusion
	Direct Influence				
1.	Leadership Transformational (X1) → Innovative Behavior (Y)	0,152	0,876	**0,381**	There are influence immediately positive and insignificant
2.	Efficacy Self (X2) → Innovative Behavior (Y)	-0,002	0,010	**0,992**	There are Direct Influence negative and insignificant
3.	*Knowledge Sharing* (X3) → Innovative Behavior (Y)	0,189	1,009	**0,313**	There are Direct Influence positive and insignificant
4.	Creativeness (X4) → Innovative Behavior (Y)	0,151	0,872	**0,384**	There are influence immediately positive and insignificant
5.	Transformational Leadership (X1) → *Knowledge Sharing* (X3)	0,221	3,111	**0,002**	Available live signifikan Positive Influenceand
6.	Efficacy Self (X2) → *Knowledge Sharing* (X3)	0,654	10,783	**0,000**	Available live signifikan Positive Influenceand
7.	Transformational Leadership (X1) → Creativity (X4)	0,155	1,868	**0,062**	There are Direct Influence positive and insignificant
8.	Efficacy Self (X2) → Creativity (X4)	0,619	7,983	**0,000**	Available live Positive Influenceand signifikan
	Indirect Influence				
9.	Transformational Leadership (X1) → *Knowledge Sharing* (X3) → Innovative Behavior (Y)	0,042	0,877	**0,381**	There are positive and insignificant indirect influences
10.	Efficacy Self (X2) → *Knowledge Sharing* (X3) → Innovative Behavior (Y)	0,124	1,007	**0,315**	There are positive and insignificant indirect influences
11.	Leadership Transformational (X1) → Creativity (X4) → Innovative Behavior (Y)	0,023	0,636	**0,525**	There are positive and insignificant indirect influences
12.	Efficacy Self (X2) → Creativeness (X4) → Innovative Behavior (Y)	0,093	0,866	**0,387**	There are positive and insignificant indirect influences

Based on the direct effect significance test in Table 5, it is shown that seven pathways have a direct positive influence on the performance of innovative behavior variables, while the rest have one pathway that has a negative direct effect, namely self-efficacy (X2) on innovative behavior (Y). Furthermore, in the specific indirect effect test, all pathways were able to provide a real and positive role as mediators of transformational leadership variables and self-efficacy because they could change the significance value of transformational leadership pathways and self-efficacy to innovative behaviors.

Hypothesis testing criteria, if the T-Statistics value > 1.96 or the P value

The value < 0.05 is declared significant. On the other hand, if the T-Statistics value is < 1.96 or the P-Value is > 0.05, then it is declared insignificant. The following are the results of the all-pathway hypothesis test on innovative behavior models: There is a direct positive

and insignificant effect of transformational leadership (X1) on innovative behavior (Y), which shows that strengthening transformational leadership is not able to increase innovative behavior, while self-efficacy (X2) shows a direct negative and insignificant influence on innovative behavior, so strengthening self-efficacy is also not able to improve behavior Innovative. On the other hand, knowledge sharing (X3) has a direct positive and insignificant effect on innovative behavior, which means that strengthening knowledge sharing is not effective in increasing innovative behavior, and creativity (X4) also shows a direct positive and insignificant influence on innovative behavior, so strengthening creativity also has no effect. However, transformational leadership (X1) has a positive and significant effect on knowledge sharing (X3), which means that strengthening transformational leadership can increase knowledge sharing, while self-efficacy (X2) also has a positive and significant effect on knowledge sharing, showing that strengthening self-efficacy can increase knowledge sharing. For the influence of transformational leadership (X1) on creativity (X4), the results showed positive and insignificant influences, so that strengthening transformational leadership was not able to increase creativity, while self-efficacy (X2) had a positive and significant effect on creativity (X4), which showed that strengthening self-efficacy was able to increase creativity. Finally, both transformational leadership (X1) and self-efficacy (X2) showed positive and insignificant influences on innovative behavior (Y) through knowledge sharing (X3) and creativity (X4), so that the reinforcement of these two variables was not able to increase innovative behavior through the two mediators.

Based on the results of the research hypothesis test, there are three hypothesis paths H0 rejected and there are nine hypothesis paths H0 accepted.

1. **Direct Influence of Transformational Leadership (X1) on Innovative Behavior (Y)**

The results showed a path coefficient value of 0.152, T-statistics 0.876, and P-value 0.381, which showed that there was a direct positive and insignificant influence of transformational leadership (X1) on innovative behavior (Y), so that transformational leadership was unable to increase innovative behavior, with a total influence of 0.217 which was relatively weak. This research reveals that the low level of innovative behavior among teachers can be caused by an unsupportive organizational culture, conservative attitudes, and resistance to change. In addition, the lack of clear vision communication from leaders, as well as limited resources such as training and infrastructure, are also obstacles. Teachers are also often not ready to innovate due to low competence, high workload, and inability to take risks. These findings are in line with other research that shows that factors such as organizational culture and resource support strongly influence the effectiveness of transformational leadership in encouraging innovative behaviors.

2. **Direct Influence of Self-Efficacy (X2) on Innovative Behavior (Y)**

The results of the calculation showed a path coefficient value of -0.002, T-statistics 0.010, and a P-value of 0.992, which showed that there was a direct negative and insignificant influence of self-efficacy (X2) on innovative behavior (Y), so that self-efficacy was not able to increase innovative behavior, with a total influence that was relatively weak. Confirmation from interviews with some teachers revealed that although they felt confident in their abilities, limited time and facilities, and rigid school policies and cultures often hindered the implementation of innovation. Many teachers feel pressured to follow existing methods and are afraid to try new things, resulting in their creative ideas not being able to be realized. In addition, the lack of support from leaders and peers as well as appreciation for innovation

makes teachers reluctant to take the initiative. The study also showed that demographic factors such as gender and age affect self-efficacy, where men tend to have higher self-efficacy than women, and older age is usually associated with more experience, increasing self-efficacy. Although self-efficacy should be a trigger for achieving goals, this study shows that an unsupportive environment and high administrative burden discourage teachers from behaving innovatively, which is in line with the findings of Widyani et al. (2017) and Mustika et al. (2020), which show that self-efficacy does not have a significant influence on innovative behaviour.

3. Direct Influence of Knowledge Sharing (X3) on Innovative Behavior (Y)

The calculation results showed a path coefficient value of 0.189, T-statistics of 1.009, and a P-value of 0.313, which indicates a direct positive and insignificant influence of knowledge sharing (X3) on innovative behavior (Y), so that knowledge sharing is not able to increase innovative behavior, with a total influence that is classified as very weak. To confirm these findings, researchers conducted interviews with several teachers, who revealed that although they often do knowledge sharing, their implementation has not been significant in improving innovative behaviors. Some of the factors that affect this include the lack of relevance of the knowledge shared to the needs of the teacher, the lack of in-depth knowledge, and the lack of skills in integrating knowledge to support the work. An unsupportive environment, lack of appreciation for innovative teachers, and limited time due to teaching and administrative tasks are also obstacles. In order for knowledge sharing to be effective in promoting innovative behavior, a supportive organizational culture, incentives, training to improve knowledge application capabilities, and support from leaders and peers for collaboration without fear of failure. This research is in line with the findings of Sulistiowati (2018), which shows an insignificant influence between knowledge sharing and innovative behavior, and states that knowledge sharing should create excellence in organizations through cooperation that gives and receives knowledge. Tonnessen et al. (2021) also noted that age affects knowledge sharing, with older employees having a wider social network, while demographic data shows that the majority of teachers are in the younger age range, so their knowledge sharing activities tend to be less optimal. The results of this study are not in line with various previous studies by Hariyanti and Izzati (2024).

4. Direct Influence of Creativity (X4) on Innovative Behavior (Y)

The results showed a path coefficient value of 0.151, T-statistics 0.872, and P-value 0.384, which indicated that there was a direct positive and insignificant influence of creativity (X4) on innovative behavior (Y), so creativity was not able to increase innovative behavior, with the total influence categorized as very weak. To confirm the results of the study, interviews with several teachers revealed that although teachers have a high level of creativity, this does not always lead to innovative behavior. Lack of support from schools, limited access to resources, time, and managerial support often prevent teachers from realizing their ideas. In addition, the fear of trying and failing due to an environment that is intolerant of mistakes makes teachers hesitant to implement the creative ideas they have, which are often irrelevant to the needs of the school. Innovative behavior requires managerial skills, technical skills, and a willingness to collaborate, so that new ideas can be implemented more easily. Support from leaders is also very important in overcoming bureaucracy and policies that can facilitate the implementation of creativity. Research by Tanga et al. (2024) showed a T-value of 0.964 and a P-value of 0.335, indicating that creativity does not have

enough impact on the improvement of innovative behaviors, as innovation often requires practical skills that do not always coincide with creativity. Wahyuni (2022) also found a P-value of 0.724, indicating that creativity has no effect on innovative behavior, because employees are not yet able to explore new ideas. Sinaga et al. (2024) state that although the theory associates creativity with innovative behavior, not all creative individuals are able to realize innovative behaviors, which indicates challenges in implementation. These findings are not in line with the research of Umalihayati et al. (2022).

5. The Direct Influence of Transformational Leadership (X1) on Knowledge Sharing (X3).

The results showed a path coefficient value of 0.221, T-statistics of 3.111, and P-value of 0.002, which indicates that there is a direct positive and significant influence of transformational leadership (X1) on knowledge sharing (X3), so that transformational leadership is able to increase knowledge sharing. This is due to the presence of leaders who have a clear and inspiring vision, which encourages teachers to share knowledge to achieve common goals. Leaders who are creative, think critically, and are able to discuss effectively create a comfortable atmosphere for teachers to share knowledge. In addition, leaders who understand the needs of teachers and provide a safe environment make teachers feel free to convey their ideas without fear of criticism. Research by Sarmento et al. (2024) supports this finding with a path coefficient value of 0.386, T-statistics of 3.476, and a P-value of 0.000, showing that transformational leadership has a significant effect on knowledge sharing. Good leadership in the context of higher education is essential to drive individual performance, and factors such as trust and optimism fostered by leaders can improve performance through knowledge sharing. Khorsandi et al.'s (2024) research also shows the significant influence of transformational leadership on knowledge sharing, emphasizing the important role of leaders in creating visionary and inspiring visions. Similar results were found by Rafique et al. (2022) with a T-value of 5,541 and a P-value of 0,000, which shows that transformational leadership is able to build trusting relationships and develop knowledge. The research of Prasetyaningtyas et al. (2020) also confirmed the positive and significant influence of transformational leadership on knowledge sharing, with a path coefficient of 0.430. Suhana et al. (2019) emphasized the importance of the role of leaders in facilitating knowledge sharing activities, creating a warm atmosphere that motivates employees to share experiences. Finally, Widodo et al.'s (2020) research shows that a good leadership style can create an environment that supports knowledge sharing, although the results of this study are not in line with the findings of Kese et al. (2021).

6. Direct Effect of Self-Efficacy (X2) on Knowledge Sharing (X3).

The calculation results showed a path coefficient value of 0.654, T-statistics 10.783, and P-value 0.000, which indicates a direct positive and significant influence of self-efficacy (X2) on knowledge sharing (X3), so that self-efficacy can increase knowledge sharing. Self-efficacy reflects teachers' confidence in their ability to complete tasks and achieve goals, where teachers with high self-efficacy are more confident in sharing knowledge, ideas, experiences, and insights with peers. When teachers are confident in their abilities, they are more courageous to provide information without fear of criticism, are more actively involved in discussion, mentoring, and collaboration, and are less easily intimidated, which contributes to strengthening a positive organizational culture and increasing innovation. This study is in line with the findings of Clara et al. (2024), which show a significant effect of self-efficacy on knowledge sharing with a probability value of 0.000. Teachers who are

confident that they are able to overcome complex problems tend to be more active in accessing new knowledge, supported by persistence in achieving goals. Rombina (2024) also found a T-statistic value of 3.065, emphasizing that self-efficacy has a significant effect on knowledge sharing, where the higher the self-efficacy, the greater the teacher's encouragement to share knowledge. In addition, Faozun's research (2023) shows that self-efficacy has a positive and significant effect on knowledge sharing, with individuals who have high self-efficacy being more motivated to share information, allowing for more effective information delivery. Mustika et al. (2020) also support this with a direct influence coefficient value of 0.351, showing that individuals with high self-efficacy are able to provide their knowledge and answer questions well.

7. The Direct Influence of Transformational Leadership (X1) on Creativity (X4).

The results showed a path coefficient value of 0.155, T-statistics 1.868, and P-value of 0.062, which indicated a direct positive and insignificant influence of transformational leadership (X1) on creativity (X4), so that transformational leadership was unable to increase creativity. In confirming the results of the research, interviews with several teachers revealed that while transformational leadership is supposed to be able to inspire and motivate teachers by providing a clear vision and creating a supportive environment, practice in the field shows that overly restrictive visions can limit teachers' scope to explore ideas. Many teachers depend on the principal's direction, which can hinder their initiative and creative thinking. Principals tend to emphasize the success of the team, so teachers' ideas are often overlooked, and the lack of support for idea creation discourages teachers from innovating. Although principals are emotionally motivated, they lack the technical training necessary to boost creativity. To overcome these limitations, principals need to adopt a more flexible approach, provide individual freedom, and support teachers to take risks without fear of failure. These findings are supported by research by Tanga et al. (2024), who show that transformational leadership is insignificant to creativity, as well as by Nafal et al. (2024), who highlight challenges in implementing transformational leadership related to interpersonal skills and organizational culture. However, the results of this study are not in line with the findings of Pakaya et al. (2024), Jaboob et al. (2023), and Wijayanti & Supartha (2019).

8. Direct Influence of Self-Efficacy (X2) on Creativity (X4)

The calculation results showed a path coefficient value of 0.619, T-statistics 7.983, and a P-value of 0.000, which indicates that there is a direct positive and significant influence of self-efficacy (X3) on creativity (X4), so that self-efficacy is able to increase creativity. This research proves that teachers with high self-efficacy can influence their creativity, as they are more confident in trying new ideas and facing challenges. In addition, teachers who have high intrinsic motivation are more motivated to explore ideas without fear of failure, persistent in facing obstacles in the creative process, and able to think outside the box to generate creative ideas. Research by Sofiatun and Mansyur (2021) explains that self-efficacy reflects an individual's ability to manage self-potential in certain situations, where individuals with high self-efficacy are more motivated to engage in creative activities and are confident in taking risks. Research by Ripki et al. (2023) also shows that self-efficacy has a direct and significant influence on creativity, with teachers who have high self-efficacy likely to be able to increase their creativity, which is reflected in their efforts to make breakthroughs in learning. In addition, research by Kusyanti et al. (2024) confirms that self-

efficacy has a positive and significant effect on creativity, which is in line with social cognitive theories that emphasize an individual's belief in his or her abilities. In difficult situations, individuals with low self-efficacy tend to reduce effort, while those with high self-efficacy are more persistent in facing challenges, so teachers with high self-confidence will increase creativity and competitiveness. Research by Nurhikmah et al. (2022) also shows that self-efficacy has a significant effect on teachers' work creativity, which suggests that creativity can be increased through self-efficacy, by designing attractive learning models and developing creative ideas in teaching and learning activities. However, the results of this study are not in line with the findings of Rianasta and Yuniawan (2023).

9. Influence Not Direct Leadership Transformational (X1) Towards innovative behavior (y) through knowledge sharing (x3).

The results showed a path coefficient value of 0.042, T-statistics 0.877, and P-value 0.381, which indicates that there is a positive and insignificant indirect influence of transformational leadership (X1) on innovative behavior (Y) through knowledge sharing. To confirm these findings, researchers conducted interviews with principals and teachers, who revealed that knowledge sharing does not function as a mediator due to the lack of support from the organizational culture, so teachers feel uncomfortable in sharing knowledge. Although there are some teachers who try to share, it is not enough to encourage their innovative behaviors, influenced by factors such as a lack of intrinsic motivation, organizational support, and limited innovation resources. In bureaucratic organizations, knowledge sharing is often not enough to drive innovation due to the absence of freedom of expression, lack of appreciation from leaders, and minimal support. These findings are in line with the research of Praditya (2023), which shows that knowledge sharing is not able to improve transformational leadership in encouraging innovative behavior, and the research of Saif et al. (2024), which states that knowledge sharing does not significantly mediate these relationships, considering that many educational institutions in developing countries influence teachers' careers through good relationships with leaders, thus shifting teachers' focus from creating innovation to establish good relationships. The results of this study contradict the findings of Khorsandi et al. (2024) and Rafique (2022).

10. Indirect Influence of Self-Efficacy (X2) on Innovative Behavior (Y) through Knowledge Sharing (X3).

The results showed a path coefficient value of 0.124, T-statistics 1.007, and P-value 0.315, which indicated that there was a positive and insignificant indirect influence of self-efficacy (X2) on innovative behavior (Y) through knowledge sharing. To confirm these findings, researchers conducted interviews with teachers, who revealed that while self-efficacy is important, it does not necessarily encourage teachers to share knowledge or innovate if the surrounding environment is not supportive. Social and cultural factors of the school play a bigger role, because in a competitive and less collaborative work environment, teachers feel hesitant to share their ideas, worried that they will not be appreciated or even criticized. Practical experience shows that innovation is more prevalent in environments that build mutual trust and value individual contributions, with regular knowledge sharing activities and appreciation for new ideas. While self-efficacy remains important, the creation of a collaborative and supportive climate in the work environment is a crucial factor that allows knowledge sharing to evolve into innovative behaviors. The meaning of the results of this study shows that teachers with high self-efficacy have motivation to complete tasks and

optimism, but in practice, knowledge sharing activities are only limited to discussions and participation in seminars without real application in the classroom. The provision of access to information through the learning teacher community is expected to encourage innovation, but school principals need to evaluate the knowledge sharing activities that take place, because optimal environmental support is very important to bring out innovative behavior of teachers, and the results of this study are not in line with the findings of Widyani et al. (2017).

11. Influence Not Direct Leadership Transformational (X1) Towards innovative behavior (y) through creativity (x4).

The results showed a path coefficient value of 0.023, T-statistics 0.636, and P-value 0.525, which indicates that there is a positive and insignificant indirect influence of transformational leadership (X1) on innovative behavior (Y) through creativity (X4), because the T-statistics are less than 1.96 and the P-value is more than 0.05. To confirm these findings, researchers conducted interviews with principals and teachers, who revealed that while transformational leadership seeks to drive a vision of change and provide room for innovation, various barriers such as limited facilities, administrative burden, curriculum demands, and school culture that emphasize compliance rather than the exploration of ideas prevent creativity from evolving into tangible action. In addition, the fear of failure and the negative consequences of unsuccessful innovations makes teachers more cautious in their actions. Despite encouragement from leadership, teacher creativity does not automatically lead to innovative behavior without the support of a safe environment, adequate resources, and a culture that values experimentation and learning from failure. In this context, transformational leadership requires stronger systemic support for its impact on innovation to be significant. These findings are in line with research by Tanga et al. (2024) who stated that creativity is unable to mediate the relationship between transformational leadership and innovative behavior, suggesting that despite a supportive organizational culture, creativity alone is not enough to create more innovative organizations.

12. The indirect influence of self-efficacy (x2) on innovative behavior (y) through creativity (x4).

The results showed a path coefficient value of 0.093, with a T-value of 0.866 and a P-value of 0.387, indicating a positive and insignificant indirect influence of self-efficacy (X2) on innovative behavior (Y) through creativity (X4), because the T-statistic was less than 1.96 and the P-value was more than 0.05. Interviews with teachers reveal that individuals with high self-efficacy do not always exhibit innovative behaviors, and creativity as a mediator is not enough to drive innovation. Some of the influencing factors include the need for a supportive organizational culture, a conducive school environment, teachers' courage to take risks, and high intrinsic motivation. Also important is a teacher development program that focuses on improving innovation skills, critical thinking, and problem solving. In conclusion, all exogenous variables, both direct and indirect, have not been able to optimally improve teachers' innovative behavior, which can be seen from the lack of teacher achievement or appreciation at various levels and the absence of schools with the status of SMK Center of Excellence.

CONCLUSION

Given that this study found knowledge sharing and creativity do not mediate the relationship between transformational leadership, self-efficacy, and innovative behavior—while also revealing that transformational leadership and self-efficacy significantly influence knowledge sharing but not directly innovative behavior—future research should explore alternative mediators (e.g., psychological safety, intrinsic motivation, or team dynamics) and moderators (e.g., organizational support, risk-taking propensity, or industry context) to better understand these dynamics. Additionally, refining the measurement of innovative behavior (particularly weak indicators like idea implementation and exchange), adopting longitudinal or experimental designs, and conducting cross-cultural comparisons could provide deeper insights into fostering workplace innovation. This approach would help identify more effective pathways to enhance innovative behaviors beyond the current limitations.

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