

## Modeling and Optimization Teacher Work Innovation: An Empirical Study Using POP-SDM Approach on Vocational Teachers of Private Vocational Schools in Depok

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### ABSTRACT

*The research aims to find ways and strategies to improve teacher work innovation by analyzing the influence of other variables that influence it. Research using the Modeling and Optimization of Resource Management Approach (POP-SDM). At the initial stage Qualitative exploratory research was conducted on 7 principals of SMK to find variables that affect teacher work innovation. Based on the dominant variables found, a constellation model of research was built through theoretical studies and expert judgment. Furthermore, the research constellation model was tested through quantitative research using SEM-PLS on 157 vocational teachers of SMK. The sub structural models tested were: 1) The direct influence of proactive personality, adversity quotient, organizational support, technological pedagogical content knowledge, and work motivation on teacher work innovation; 2) The direct influence of proactive personality and adversity quotient on technological pedagogical content knowledge; 3) The direct influence of organizational support on work motivation. The study found: 1) Teacher work innovation can be explained by the influence of proactive personality, adversity quotient, organizational support, technological pedagogical content knowledge and work motivation,  $R^2 = 0.753$  (75.3%) with the structural equation  $Y = 0.514X_1 + 0.259X_2 + 0.579X_3 + 0.274X_4 + 0.226X_5 + \varepsilon 0.497$ ; 2) technological pedagogical content knowledge can be explained by the influence of proactive personality and adversity quotient,  $R^2 = 0.355$  (35.5%) with structural equation  $X_4 = 0.408X_1 + 0.303X_2 + \varepsilon 0.803$ ; 3) Work motivation can be explained by the influence of organizational support,  $R^2 = 0.417$  (41.7%) with the structural equation  $X_4 = 0.408X_1 + 0.303X_2 + \varepsilon 0.803$ . The value of  $Q^2 = 0.734$  indicates the model has a GoF of 73%. (Good category). The results of hypothesis testing also concluded that the variables of technological pedagogical content knowledge and work motivation were not effective as intervening variables. Thus, the improvement of teacher work innovation is more effectively carried out directly through strengthening proactive personality, adversity quotient, organizational support, technological pedagogical content knowledge and work motivation. Sitorem's analysis concluded that organizational support variables and knowledge of pedagogical content had a major influence on teacher work innovation. As a follow-up to the research results, strengthening the indicators that are still weak in these two variables is a priority to be improved immediately.*

**Keywords:** *Proactive personality, adversity quotient, organizational support, technological pedagogical content knowledge, work motivation, teacher work innovation, Sitorem.*



## INTRODUCTION

Vocational High School (SMK) aims to prepare graduates to be ready to enter the workforce. This is stated in Article 15 of the National Education System Law that the purpose of vocational education is to prepare students to work in certain fields. To achieve this goal, the educational process must equip students with competencies that are in accordance with the needs of graduate users. Based on data from the Central Statistics Agency released in February 2020, SMK graduates are in the highest position at 8.49%. The highest position also occurred in the same month in 2018 at 8.92% and in 2019 at 8.63%. (Source: Official Statistics News: Indonesia's Labor Situation February 2020). This is a challenge for SMK stakeholders to link and match vocational education with the needs of graduate users.

Vocational teachers play an important role in realizing the goals of vocational education. The development of new job competencies requires teachers to be proactive in aligning the national curriculum with actual work needs. The ability of teachers to make breakthroughs and innovations through material development or modification of learning procedures and strategies that reflect the world of work is needed to accommodate the demands of real work competencies. The importance of vocational teacher innovations is increasingly visible from the latest revised curriculum of SMK in 2021. This curriculum that prioritizes an independent educational philosophy gives teachers great autonomy in developing learning outcomes, learning objectives, material scope, learning strategies and assessments taking into account the real world needs. The importance of vocational teacher innovation is stated by Surya Darma et al. (2013: 182) that the development of human resources must be built through vocational teachers who have innovation in implementing learning. Innovative teachers are not only required to develop knowledge and skills, but are also able to give birth to new and different things as a form of creative ideas that are useful for students.

As a learning agent, the work of vocational teachers can be realized at the planning, process, and evaluation stages of learning and other activities in accordance with their main duties as educators. In the product dimension, teacher work innovation can be realized in the results of developing or modifying lesson plans or learning equipment products that are in accordance with work world standards. In the process dimension, teacher work innovation can be realized in the creation, development and modification of learning procedures and strategies that reflect the world of work. While in the service dimension, teacher work innovation can be realized from renewal efforts in interaction with various stakeholders.

The UNESCO report in the 2016 Global Education Monitoring (GEM) Report shows that teacher innovation in Indonesia is still at a low rank. Haris Iskandar as Director at the Directorate General of Secondary Education of the Ministry of Education and Culture stated that of the 5.6 million teachers in Indonesia, only about 2% of teachers are innovative, while 98% are not yet innovative (Source: <https://silabus.org/create-inovasi-and-creativity-teacher/> downloaded on December 12, 2019, at 8.30 WIB). The results of Basar's (2021: 208-218) study on the problems of distance learning during the Covid-19 pandemic concluded that 51% of students were less interested in participating in learning because it was less interesting and less varied. Teacher innovation is highly demanded so that learning is not only focused on delivering material through presentations or giving monotonous tasks that dominate distance learning.

Teachers who have high work innovation are the expectations of all schools, especially for private schools whose existence and organizational sustainability are highly dependent on independent managerial abilities. Private schools that have teachers with high work innovation can be a competitive



advantage so that it becomes a special attraction to attract public interest. Therefore, it is important for all schools to ensure the availability of teachers with high work innovation to realize organizational goals.

The reality on the ground, based on the results of an initial survey of 30 private vocational high school teachers in the Depok City area in January 2019 indicates that teacher work innovation is still problematic.

1. There are still 50% of teachers who have problems in developing or modifying new learning plans.
2. There are still 53% of teachers with problems in developing or modifying new teaching aids and media products.
3. There are still 57% of teachers who have problems in innovating the application of learning models/methods.
4. There are still 50% of teachers who have problems in learning evaluation innovations that refer to competency standards and standards of the world of work.
5. There are still 67% of teachers who have problems with innovation in developing new ways to provide services to students, parents and colleagues.

Based on the results of the initial survey, it is indicated that the work innovation of private vocational high school teachers in Depok City is still problematic. Whereas teacher work innovation has an important role in realizing the goals of vocational education. Vocational teachers with high work innovation can be seen from their continuous efforts to generate added value and novelty in products, processes, and services to produce graduates who are competitive in the world of work. Based on these initial findings, it is necessary to pursue a more in-depth study to uncover and analyze what variables affect teacher work innovation. Improvement and improvement of teacher work innovation is carried out through strengthening the positive and dominant variables that affect teacher work innovation.

The research aims to find ways and strategies to improve teacher work innovation by analyzing the effect of other variables on the teacher's work innovation. Furthermore, the methods and strategies for improving teacher work innovation were found to be used as recommendations to related parties, namely the education office, principals, school supervisors, and vocational teachers in Depok City.

## **METHOD**

The qualitative research was carried out at 7 private vocational schools in the Depok City area from October to December 2019. The research informants were 7 principals from vocational schools. Collecting data using interview techniques. The purpose of the interview is to find data on variables that have a positive and dominant influence on the work innovation of vocational teachers in SMK. Data analysis of the actual condition of vocational teachers' work innovations refers to the Miles and Huberman Model which consists of stages of data reduction, data display, and verification or drawing conclusions. While the data analysis of variables that affect teacher work innovation is carried out by: 1) compiling tally marks, 2) examining the dominant variables proposed by the informants, 3) examining the dominant variables based on theories, models, 4) determining dominant variables, 5) compiling the research constellation, 6) expert assessment of the constellation.

Based on the flow of the hypothesis formulation procedure, the constellation model of the research was determined as follows:

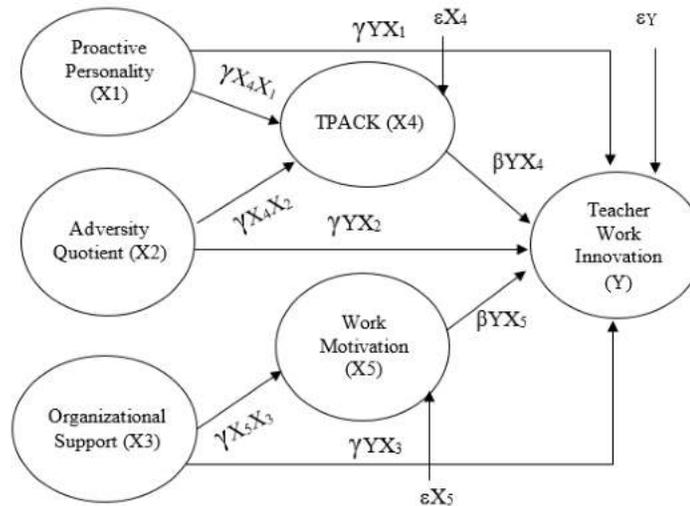


Figure-1. Research Constellation Model

The structural model is divided into 3 (three) substructural models, namely:

- The direct influence of proactive personality (X1), adversity quotient (X2), organizational support (X3), technological pedagogical content knowledge (X4) and work motivation (X5) on teacher work innovation (Y). Substructural Equation 1:  $Y = \gamma_{YX_1} + \gamma_{YX_2} + \gamma_{YX_3} + \beta_{YX_4} + \beta_{YX_5} + \varepsilon_Y$

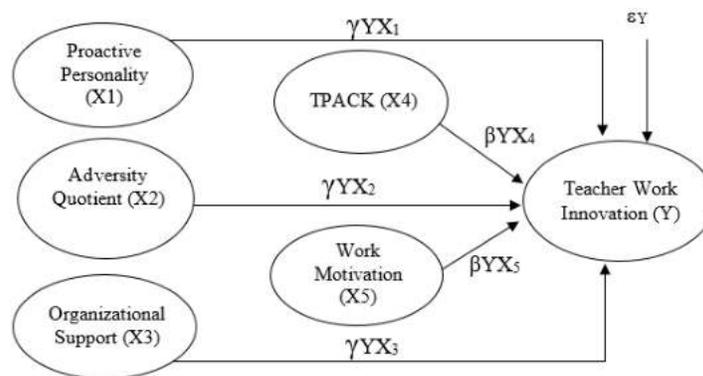


Figure-2. Substructural Model 1

- The direct influence of proactive personality (X1) and adversity quotient (X2) on technological pedagogical content knowledge (X4). Substructural Equation 2  $X_4 = \gamma_{X_4 X_1} + \gamma_{X_4 X_2} + \varepsilon_{X_4}$

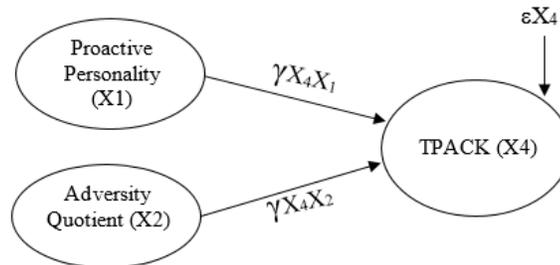


Figure-3. Substructural Model 2

c. The direct effect of organizational support (X3) on work motivation (X5). Substructural Equation 3  $X_5 = \gamma_{53}X_3 + \sum_5$

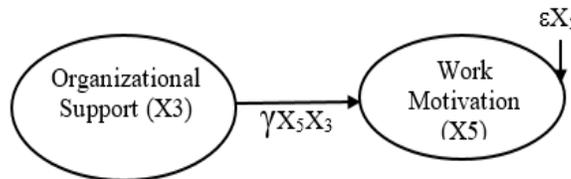


Figure-4. Substructural Model 3

Based on the flow of hypothesis preparation that has been done, the research hypotheses are as follows:

- a) There is a direct positive effect of proactive personality (X1) on teacher work innovation (Y).
- b) There is a direct positive influence of adversity quotient (X1) on teacher work innovation (Y).
- c) There is a direct positive effect of organizational support (X3) on teacher work innovation (Y).
- d) There is a direct positive effect of proactive personality (X1) on technological pedagogical content knowledge (X4).
- e) There is a direct positive effect of adversity quotient (X2) on technological pedagogical content knowledge (X4).
- f) There is a direct positive effect of organizational support (X3) on work motivation (X5).
- g) There is a direct positive influence of technology pedagogical content knowledge (X4) on teacher work innovation (Y).
- h) There is a direct positive effect of work motivation (X5) on teacher work innovation (Y).
- i) There is an indirect positive influence of proactive personality (X1) through technological pedagogical content knowledge (X4) on teacher work innovation (Y)
- j) There is an indirect positive influence on adversity quotient (X2) through technological pedagogical content knowledge (X4) on teacher work innovation (Y)

- k) There is an indirect positive effect of organizational support (X3) through work motivation (X5) on teacher work innovation (Y)

Quantitative research was carried out at 58 private vocational schools in Depok City for 7 months starting from the preparation of instruments, testing instruments, distributing instruments, processing data to testing hypotheses. The population of the study was 257 private vocational high school teachers with permanent teacher foundation status (GTY). Sampling using proportional random sampling technique, the sample size was calculated using the Slovin formula, so that a sample of 157 teachers was obtained. The instrument trial was conducted on 30 teachers outside the research sample. The research data was obtained through the distribution of questionnaires filled out by private vocational high school teachers in the city of Depok, consisting of six instruments to measure variables: 1) proactive personality, 2) adversity quotient, 3) organizational support, 4) technological pedagogical content knowledge, 5) motivation work, and 6) teacher work innovation. The instrument trial was conducted on 30 vocational high school teachers who were not included in the selected sample group.

Inferential statistical analysis using Structural Equation Modeling-Partial Least Square (SEM-PLS). The reasons for using SEM PLS in statistical analysis are: 1) research departs from qualitative exploratory or not to test theory; 2) the purpose of the analysis is more predictive orientation and model development based on the results of exploratory research. Data analysis includes: 1) Evaluation of the measurement model (convergent validity, discriminant validity, composite reliability); 2) Evaluation of the structural model (coefficient of determination test, goodness of fit test, and hypothesis testing).

## RESULT AND DISCUSSION

### Simultaneous Coefficient of Determination Test

Referring to the R-Square value to measure how much the endogenous variables are influenced by exogenous variables in the model being tested, the following results are obtained.

Table 1. of R Square ( $R^2$ ) Value and Interpretation

Model	Variable	$R^2$ Value	Effect
Substructural 1	Teacher Work Innovation	0,753	High
Substructural 2	TPACK	0,355	Moderate
Substructural 3	Work Motivation	0,417	Moderate
Criteria $R^2 > 0,67 =$ High, $0,33 - 0,67 =$ Moderate, $< 0,33 =$ Low			

Based on the table above explained:

- 1) The magnitude of teacher work innovation can be explained by the influence of proactive personality, adversity quotient, organizational support, knowledge technological pedagogical content knowledge and work motivation  $R^2$  of 0.753 (75.3% High category).
- 2) The amount of technological pedagogical content knowledge can be explained by the influence of proactive personality and adversity quotient  $R^2$  of 0.355 (35.5% moderate category).
- 3) The amount of work motivation can be explained by the influence of organizational support  $R^2$  of 0.417 (41.7% moderate category).

Partial Coefficient of Determination Test

The partial determination coefficient test refers to the value of f Square (f<sup>2</sup>).

Table 2 Value of f Square (f<sup>2</sup>) and Interpretation

No	Variables	<i>f Square</i>	%	Note
1	Proactive personality -> Teacher work innovation	0,107	10,7	Low
2	Adversity quotient -> Teacher work innovation	0,139	13,9	Low
3	Organizational support -> Teacher work innovation	0,682	68,2	High
4	Proactive personality ->TPACK	0,359	35,9	Low
5	Adversity quotient -> TPACK	0,173	17,3	High
6	Organizational support -> Work motivation	0,377	37,7	High
7	TPACK -> Teacher work innovation	0,151	15,1	Low
8	Work Motivation -> Teacher work innovation	0,129	12,9	High
Category <i>f Square/f<sup>2</sup></i> (Cohen, 2015: 9) 0,02 > ≤ 0,15 (Low), 0,15 > ≤ 0,35 (Low/Moderate), > 0,35 (High)				

Based on the table above, it can be explained:

1. The percentage of the contribution of proactive personality to teacher work innovation is 10.7% (weak). The remaining 89.3.% by other variables.
2. The percentage of the contribution of adversity quotient to teacher work innovation is 13.9% (weak). The remaining 86.1% by other variables.
3. The percentage of organizational support contribution to teacher work innovation is 68.2% (strong). The remaining 31.8% by other variables.
4. The percentage of proactive personality contribution to technological pedagogical content knowledge is 35.9% (strong). The remaining 64.1% by other variables.
5. The percentage of the contribution of adversity quotient to technological pedagogical content knowledge is 17.3% (enough). The remaining 82.7% by other variables.

6. The percentage contribution of organizational support to work motivation is 37.7% (strong). The remaining 62.3% by other variables.
7. The percentage of the contribution of technological pedagogical content knowledge to teacher work innovation is 15.1% (Enough). The remaining 84.9% by other variables.
8. The percentage of work motivation contribution to teacher work innovation is 12.9% (weak). The remaining 87.1% by other variables.

#### Model Goodness Test (Goodness of Fit)

The results of the calculation of the Goodness of Fit value obtained are 0.734 (Good). This means that the diversity of the research data that can be explained by the research model is 73%. As much as 27% is explained by other factors that are outside the research model.

#### Hypothesis testing

The results of hypothesis testing are presented in the following table.

Table 3. Hypothesis Testing Results

No	Variable	Original Sample	T Statistic	P Values
1	The direct influence of Proactive personality on Teacher work innovation	0,154	1,982	0,042
2	The direct influence of Adversity quotient on Teacher work innovation	0,259	2,046	0,032
3	The direct influence of Organizational support on Teacher work innovation	0,579	24,97	0,000
4	The direct influence of Proactive personality on TPACK	0,408	5,662	0,000
5	The direct influence of Adversity quotient on TPACK	0,303	4,197	0,010
6	The direct influence of Organizational support on Work motivation	0,465	7,296	0,000
7	The direct influence of TPACK on Teacher work innovation	0,274	2,300	0,025
8	The direct influence of work motivation on Teacher work innovation	0,226	1,995	0,037
9	The indirect influence of Proactive personality on Teacher work innovation through	$0,154 \times 0,274 = 0,042$		

	TPACK	
10	The indirect influence of Adversity quotient on Teacher work innovation through TPACK	$0,259 \times 0,274 = 0,070$
11	The indirect influence of Organizational support on Teacher work innovation through Work motivation	$0,465 \times 0,226 = 0,105$

Based on the data presented in the table above, it can be explained:

1. Proactive personality has a direct effect on teacher work innovation with a path coefficient value of  $YX1 = 0.154$  (positive), and is significant as indicated by the T Statistics value of 1.982 and P Values of 0.042.
2. Adversity quotient has a direct effect on teacher work innovation with a path coefficient value of  $YX2 = 0.259$  (positive), and is significant as indicated by the T statistic value of 2.046 and P Values of 0.032.
3. Organizational support has a direct effect on teacher work innovation with a path coefficient value of  $YX3 = 0.579$  (positive), and is significant as indicated by the T Statistics value of 24.977 and P Values of 0.000.
4. Proactive personality has a direct effect on technological pedagogical content knowledge with a path coefficient value of  $X4X1 = 0.408$  (positive), and is significant as indicated by the T statistic value of 5.662 and P Values of 0.000.
5. Adversity quotient has a direct effect on technological pedagogical content knowledge with a path coefficient value of  $X4X2 = 0.303$  (positive), and is significant as indicated by the T Statistics value of 4.197 and P Values of 0.010.
6. Organizational support has a direct effect on work motivation with the path coefficient value  $X5X3 = 0.465$  (positive), and is significant as indicated by the T statistic value of 7.296 and P Values of 0.000.
7. Technological pedagogical content knowledge has a direct effect on teacher work innovation with a path coefficient value of  $YX4 = 0.274$  (positive), and is significant as indicated by the T Statistics value of 2.300 and P Values of 0.025.
8. Work motivation has a direct effect on teacher work innovation with a path coefficient value of  $YX5 = 0.226$  (positive), and is significant as indicated by the T Statistics value of 1.995 and P Values of 0.037.
9. Proactive personality has no indirect effect on teacher work innovation through technological pedagogical content knowledge with a path coefficient value of  $YX1 \cdot \gamma X4X1 = 0.042$  (smaller than  $YX1 = 0.154$ ).
10. Adversity quotient does not indirectly affect teacher work innovation through technological pedagogical content knowledge with a path coefficient value of  $YX2 \cdot \gamma X4X2 = 0.070$  (smaller than  $YX2 = 0.259$ ).
11. Organizational support has no indirect effect on teacher work innovation through work motivation with a path coefficient value of  $YX3 \cdot \beta X3X5 = 0.105$  (smaller than  $YX3 = 0.579$ ).

The summary of hypothesis testing can be seen in the following table.

Table 4 : Recapitulation of Hypothesis Testing Results

Hypothesis		Coefficient	Conclusion
1	H0: $\gamma_{YX1} \leq 0$ H1: $\gamma_{YX1} > 0$	0,154	H1 Accepted: There is a direct influence of proactive personality on teacher work innovation.
2	H0: $\gamma_{YX2} \leq 0$ H1: $\gamma_{YX2} > 0$	0,259	H1 Accepted: There is a direct influence of adversity quotient on teacher work innovation.
3	H0: $\gamma_{YX3} \leq 0$ H1: $\gamma_{YX3} > 0$	0,579	H1 Accepted: There is a direct influence of organizational support on teacher work innovation
4	H0: $\gamma_{X4X1} \leq 0$ H1: $\gamma_{X4X1} > 0$	0,408	H1 Accepted: There is a direct influence of proactive personality on TPACK
5	H0: $\gamma_{X4X2} \leq 0$ H1: $\gamma_{X4X2} > 0$	0,303	H1 Accepted: There is a direct influence of adversity quotient on TPACK
6	H0: $\gamma_{X5X3} \leq 0$ H1: $\gamma_{X5X3} > 0$	0,465	H1 Accepted: There is a direct influence of organizational support on work motivation
7	H0: $\beta_{YX4} \leq 0$ H1: $\beta_{YX4} > 0$	0,274	H1 Accepted: There is a direct effect of TPACK on Teacher work innovation
8	H0: $\beta_{YX5} \leq 0$ H1: $\beta_{YX5} > 0$	0,226	H1 Accepted: There is a direct influence of work motivation on Teacher work innovation
9	H0: $\gamma_{YX1} \cdot \gamma_{X4X1} \leq \gamma_{YX1}$ H1: $\gamma_{YX1} \cdot \gamma_{X4X1} > \gamma_{YX1}$	0,042 < 0,154	H0 Accepted: There is no indirect effect of proactive personality on teacher work innovation through TPACK
10	H0: $\gamma_{YX2} \cdot \gamma_{X4X2} \leq \gamma_{YX2}$ H1: $\gamma_{YX2} \cdot \gamma_{X4X2} > \gamma_{YX2}$	0,070 < 0,259	Ho Accepted: There is no indirect effect of adversity quotient on teacher work innovation through

			TPACK
11	H0: $\gamma_{YX3} \cdot \beta_{X3X5} \leq \gamma_{YX3}$ H1: $\gamma_{YX3} \cdot \beta_{X3X5} > \gamma_{YX3}$ $\gamma_{YX3}$	$0,105 < 0,579$	H0 Accepted: There is no indirect effect of organizational support on teacher work innovation through work motivation.

Based on the results of hypothesis testing, mathematical equations are arranged according to the substructural model tested in the study as follows:

(1) Mathematical equation of substructural model 1

$$Y = 0,514X_1 + 0,259X_2 + 0,579 X_3 + 0,274X_4 + 0,226 X_5 + 0.497$$

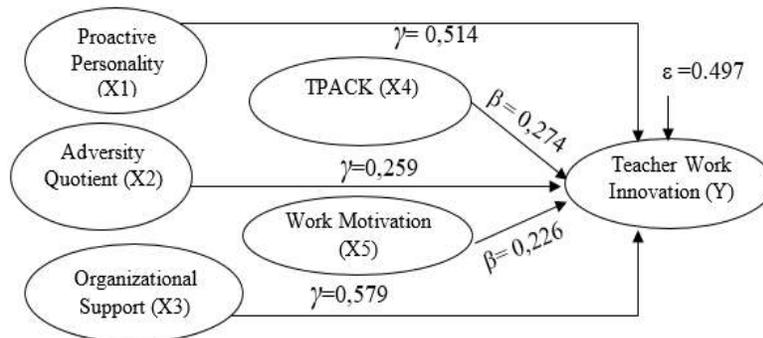


Figure-6. Hypothesis Test Results Substructural Model 1

(2) Substructural model math equation 2  $X_4 = X_4 = 0,408X_1 + 0,303X_2 + 0,803$

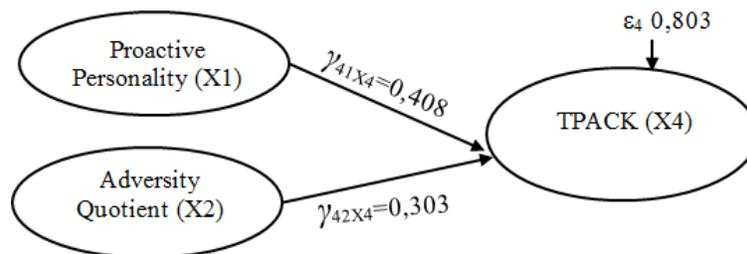


Figure-7. Results of Hypothesis Testing for Substructural Model 2

(3) Substructural model math

equation 3  $X_5 = 0,465X_3 + 0,764$

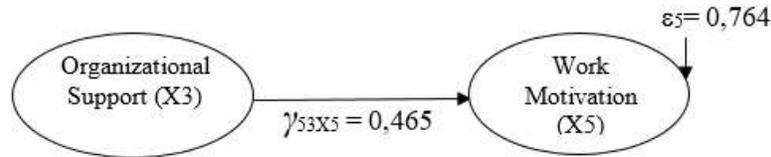
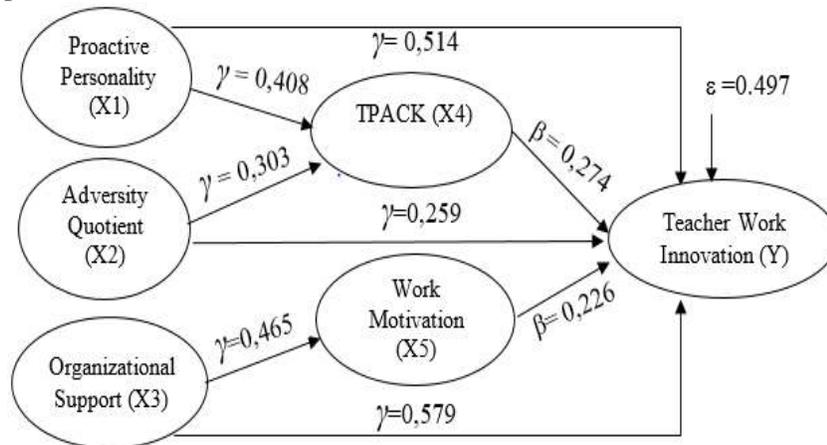


Figure-8. Results of Hypothesis Testing for Substructural Model 3

The complete combination of the three substructural models above is the following chart.



.Figure-9. Structural Model Hypothesis Test Results

## CONCLUSION

This research has succeeded in finding efforts or strategies to increase teacher work innovation by using the model (constellation):

- The model for improving teacher work innovation, namely: The influence of proactive personality variables, adversity quotient, organizational support, technological pedagogical content knowledge, and work motivation on teacher work innovation ( $R^2$  0.753) with the form of the equation  $Y = 0.514X_1 + 0.259X_2 + 0.579 X_3 + 0.274 X_4 + 0.226 X_5 + 0.497$
- Model of increasing technological pedagogical content knowledge: The effect of proactive personality and adversity quotient on technological pedagogical content knowledge. ( $R^2$  0.355) with the form of the equation  $X_4 = 0.408X_1 + 0.303X_2 + 0.803$
- Model of increasing work motivation: The effect of organizational support on work motivation ( $R^2$  0.417) with the form of the equation  $X_5 = 0.465X_3 + 0.764$
- The resulting teacher work innovation improvement model has a Gof value of 0.73 (73% good category)

Based on the research model mentioned above, this study has succeeded in identifying the magnitude of the direct and indirect effects between variables based on the research constellation.

- There is a direct, positive, significant and weak influence ( $\gamma_{YX1}=0.154$ ) proactive personality on

- teacher work innovation, so that strengthening the proactive personality can increase teacher work innovation.
2. There is a direct, positive, significant and weak influence ( $\gamma_{YX2}=0.259$ ) adversity quotient on teacher work innovation, so strengthening adversity quotient can increase teacher work innovation.
  3. There is a direct, positive, significant and strong influence ( $\gamma_{YX3}=0.579$ ) organizational support on teacher work innovation, so that strengthening organizational support can increase teacher work innovation.
  4. There is a direct, positive, significant and strong influence ( $\gamma_{X4X1} = 0.408$ ) proactive personality on technological pedagogical content knowledge, so that proactive personality strengthening can increase technological pedagogical content knowledge.
  5. There is a direct positive, significant and moderate/moderate effect ( $\gamma_{X4X2}=0.303$ ) on adversity quotient on technological pedagogical content knowledge, so that strengthening adversity quotient can increase technological pedagogical content knowledge.
  6. There is a direct, positive, significant and strong influence ( $\gamma_{X5X3}=0.465$ ) of organizational support on work motivation, so that strengthening organizational support can increase work motivation.
  7. There is a direct positive, significant and moderate/moderate effect ( $\beta_{YX4}=0.274$ ) technological pedagogical content knowledge on teacher work innovation, so that strengthening technological pedagogical content knowledge can increase teacher work innovation.
  8. There is a direct positive, significant and weak influence ( $\beta_{YX5}=0.226$ ) work motivation on teacher work innovation, so that strengthening work motivation can increase teacher work innovation.
  9. There is no indirect effect of proactive personality on teacher work innovation through technological pedagogical content knowledge ( $\gamma_{YX1}.\gamma_{X4X1} = 0.042 < YX1 = 0.154$ ), so that strengthening proactive personality through technological pedagogical content knowledge cannot increase teacher work innovation. The improvement of teacher work innovation is more effective through direct strengthening of proactive personality rather than indirect reinforcement through technological pedagogical content knowledge.
  10. There is no indirect effect of adversity quotient on teacher work innovation through technological pedagogical content knowledge ( $\gamma_{YX2}.\gamma_{X4X2} = 0.070 < YX1 = 0.259$ ), so strengthening adversity quotient through technological pedagogical content knowledge cannot increase teacher work innovation. Improving teacher work innovation is more effective through strengthening adversity quotient directly rather than indirectly strengthening through technological pedagogical content knowledge.
  11. There is no indirect effect of organizational support on teacher work innovation through work motivation ( $\gamma_{YX3}.\beta_{YX5} = 0.105 < YX3 = 0.579$ ), so strengthening organizational support through work motivation cannot increase teacher work innovation. Increasing teacher work innovation is more effective through strengthening direct organizational support rather than indirectly strengthening through work motivation.

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**REKAPITULASI PENILAIAN SEJAWAT SEBIDANG / PEER REVIEW  
KARYA ILMIAH : JURNAL ILMIAH**

Judul Jurnal Ilmiah (Artikel) : *Modeling and Optimization Teacher Work Innovation: an Epmirical Studing Using POP-SDM Approach on Vocational Teachers of Private Vocational Schools in Depok*

Jumlah Penulis : 3 Penulis

Status Pengusul : Penulis Ketiga

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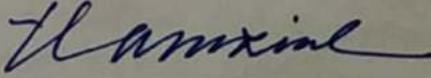
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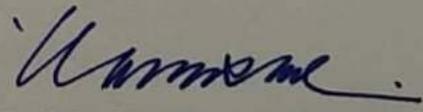
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## Modeling and Optimization Teacher Work Innovation: An Empirical Study Using POP-SDM Approach on Vocational Teachers of Private Vocational Schools in Depok

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### ABSTRACT

The research aims to find ways and strategies to improve teacher work innovation by analyzing the influence of other variables that influence it. Research using the Modeling and Optimization of Resource Management Approach (POP-SDM). At the initial stage Qualitative exploratory research was conducted on 7 principals of SMK to find variables that affect teacher work innovation. Based on the dominant variables found, a constellation model of research was built through theoretical studies and expert judgment. Furthermore, the research constellation model was tested through quantitative research using SEM-PLS on 157 vocational teachers of SMK. The sub structural models tested were: 1) The direct influence of proactive personality, adversity quotient, organizational support, technological pedagogical content knowledge, and work motivation on teacher work innovation; 2) The direct influence of proactive personality and adversity quotient on technological pedagogical content knowledge; 3) The direct influence of organizational support on work motivation. The study found: 1) Teacher work innovation can be explained by the influence of proactive personality, adversity quotient, organizational support, technological pedagogical content knowledge and work motivation,  $R^2 = 0.753$  (75.3%) with the structural equation  $Y = 0.514X_1 + 0.259X_2 + 0.579X_3 + 0.274X_4 + 0.226X_5 + \varepsilon 0.497$ ; 2) technological pedagogical content knowledge can be explained by the influence of proactive personality and adversity quotient,  $R^2 = 0.355$  (35.5%) with structural equation  $X_4 = 0.408X_1 + 0.303X_2 + \varepsilon 0.803$ ; 3) Work motivation can be explained by the influence of organizational support,  $R^2 = 0.417$  (41.7%) with the structural equation  $X_4 = 0.408X_1 + 0.303X_2 + \varepsilon 0.803$ . The value of  $Q^2 = 0.734$  indicates the model has a GoF of 73%. (Good category). The results of hypothesis testing also concluded that the variables of technological pedagogical content knowledge and work motivation were not effective as intervening variables. Thus, the improvement of teacher work innovation is more effectively carried out directly through strengthening proactive personality, adversity quotient, organizational support, technological pedagogical content knowledge and work motivation. Sitorem's analysis concluded that organizational support variables and knowledge of pedagogical content had a major influence on teacher work innovation. As a follow-up to the research results, strengthening the indicators that are still weak in these two variables is a priority to be improved immediately.

**Keywords:** Proactive personality, adversity quotient, organizational support, technological pedagogical content knowledge, work motivation, teacher work innovation, Sitorem.



## INTRODUCTION

Vocational High School (SMK) aims to prepare graduates to be ready to enter the workforce. This is stated in Article 15 of the National Education System Law that the purpose of vocational education is to prepare students to work in certain fields. To achieve this goal, the educational process must equip students with competencies that are in accordance with the needs of graduate users. Based on data from the Central Statistics Agency released in February 2020, SMK graduates are in the highest position at 8.49%. The highest position also occurred in the same month in 2018 at 8.92% and in 2019 at 8.63%. (Source: Official Statistics News: Indonesia's Labor Situation February 2020). This is a challenge for SMK stakeholders to link and match vocational education with the needs of graduate users.

Vocational teachers play an important role in realizing the goals of vocational education. The development of new job competencies requires teachers to be proactive in aligning the national curriculum with actual work needs. The ability of teachers to make breakthroughs and innovations through material development or modification of learning procedures and strategies that reflect the world of work is needed to accommodate the demands of real work competencies. The importance of vocational teacher innovations is increasingly visible from the latest revised curriculum of SMK in 2021. This curriculum that prioritizes an independent educational philosophy gives teachers great autonomy in developing learning outcomes, learning objectives, material scope, learning strategies and assessments taking into account the real world needs. The importance of vocational teacher innovation is stated by Surya Darna et al. (2013: 182) that the development of human resources must be built through vocational teachers who have innovation in implementing learning. Innovative teachers are not only required to develop knowledge and skills, but are also able to give birth to new and different things as a form of creative ideas that are useful for students.

As a learning agent, the work of vocational teachers can be realized at the planning, process, and evaluation stages of learning and other activities in accordance with their main duties as educators. In the product dimension, teacher work innovation can be realized in the results of developing or modifying lesson plans or learning equipment products that are in accordance with work world standards. In the process dimension, teacher work innovation can be realized in the creation, development and modification of learning procedures and strategies that reflect the world of work. While in the service dimension, teacher work innovation can be realized from renewal efforts in interaction with various stakeholders.

The UNESCO report in the 2016 Global Education Monitoring (GEM) Report shows that teacher innovation in Indonesia is still at a low rank. Haris Iskandar as Director at the Directorate General of Secondary Education of the Ministry of Education and Culture stated that of the 5.6 million teachers in Indonesia, only about 2% of teachers are innovative, while 98% are not yet innovative (Source: <https://silabus.org/create-inovasi-and-creativity-teacher/> downloaded on December 12, 2019, at 8.30 WIB). The results of Basar's (2021: 208-218) study on the problems of distance learning during the Covid-19 pandemic concluded that 51% of students were less interested in participating in learning because it was less interesting and less varied. Teacher innovation is highly demanded so that learning is not only focused on delivering material through presentations or giving monotonous tasks that dominate distance learning.

Teachers who have high work innovation are the expectations of all schools, especially for private schools whose existence and organizational sustainability are highly dependent on independent managerial abilities. Private schools that have teachers with high work innovation can be a competitive



advantage so that it becomes a special attraction to attract public interest. Therefore, it is important for all schools to ensure the availability of teachers with high work innovation to realize organizational goals.

The reality on the ground, based on the results of an initial survey of 30 private vocational high school teachers in the Depok City area in January 2019 indicates that teacher work innovation is still problematic.

1. There are still 50% of teachers who have problems in developing or modifying new learning plans.
2. There are still 53% of teachers with problems in developing or modifying new teaching aids and media products.
3. There are still 57% of teachers who have problems in innovating the application of learning models/methods.
4. There are still 50% of teachers who have problems in learning evaluation innovations that refer to competency standards and standards of the world of work.
5. There are still 67% of teachers who have problems with innovation in developing new ways to provide services to students, parents and colleagues.

Based on the results of the initial survey, it is indicated that the work innovation of private vocational high school teachers in Depok City is still problematic. Whereas teacher work innovation has an important role in realizing the goals of vocational education. Vocational teachers with high work innovation can be seen from their continuous efforts to generate added value and novelty in products, processes, and services to produce graduates who are competitive in the world of work. Based on these initial findings, it is necessary to pursue a more in-depth study to uncover and analyze what variables affect teacher work innovation. Improvement and improvement of teacher work innovation is carried out through strengthening the positive and dominant variables that affect teacher work innovation.

The research aims to find ways and strategies to improve teacher work innovation by analyzing the effect of other variables on the teacher's work innovation. Furthermore, the methods and strategies for improving teacher work innovation were found to be used as recommendations to related parties, namely the education office, principals, school supervisors, and vocational teachers in Depok City.

## METHOD

The qualitative research was carried out at 7 private vocational schools in the Depok City area from October to December 2019. The research informants were 7 principals from vocational schools. Collecting data using interview techniques. The purpose of the interview is to find data on variables that have a positive and dominant influence on the work innovation of vocational teachers in SMK. Data analysis of the actual condition of vocational teachers' work innovations refers to the Miles and Huberman Model which consists of stages of data reduction, data display, and verification or drawing conclusions. While the data analysis of variables that affect teacher work innovation is carried out by: 1) compiling tally marks, 2) examining the dominant variables proposed by the informants, 3) examining the dominant variables based on theories, models, 4) determining dominant variables, 5) compiling the research constellation, 6) expert assessment of the constellation.

Based on the flow of the hypothesis formulation procedure, the constellation model of the research was determined as follows:

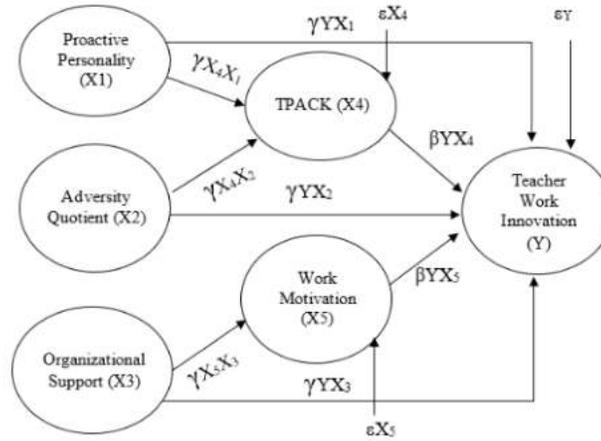


Figure-1. Research Constellation Model

The structural model is divided into 3 (three) substructural models, namely:

- a. The direct influence of proactive personality (X1), adversity quotient (X2), organizational support (X3), technological pedagogical content knowledge (X4) and work motivation (X5) on teacher work innovation (Y). Substructural Equation 1:  $Y = \gamma Y X_1 + \gamma Y X_2 + \gamma Y X_3 + \beta Y X_4 + \beta Y X_5 + \sum Y$

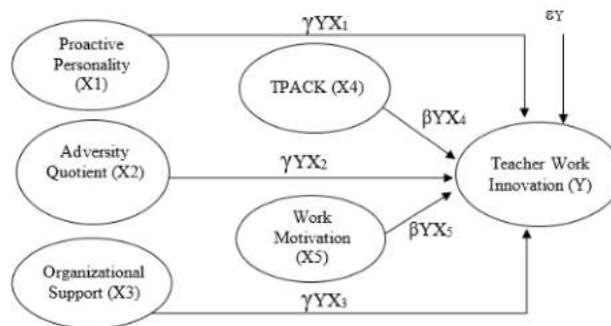


Figure-2. Substructural Model 1

- b. The direct influence of proactive personality (X1) and adversity quotient (X2) on technological pedagogical content knowledge (X4). Substructural Equation 2  $X_4 = 41X_4 + 42X_4 + 4$

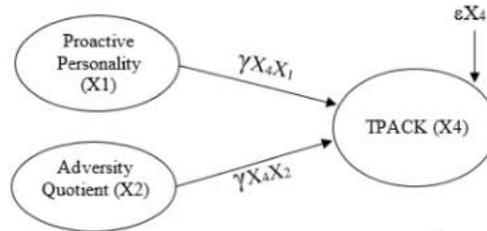


Figure-3. Substructural Model 2

c. The direct effect of organizational support (X3) on work motivation (X5). Substructural Equation 3  $X_5 = \gamma_{53}X_3 + \sum_5$

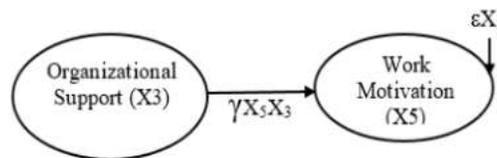


Figure-4. Substructural Model 3

Based on the flow of hypothesis preparation that has been done, the research hypotheses are as follows:

- a) There is a direct positive effect of proactive personality (X1) on teacher work innovation (Y).
- b) There is a direct positive influence of adversity quotient (X1) on teacher work innovation (Y).
- c) There is a direct positive effect of organizational support (X3) on teacher work innovation (Y).
- d) There is a direct positive effect of proactive personality (X1) on technological pedagogical content knowledge (X4).
- e) There is a direct positive effect of adversity quotient (X2) on technological pedagogical content knowledge (X4).
- f) There is a direct positive effect of organizational support (X3) on work motivation (X5).
- g) There is a direct positive influence of technology pedagogical content knowledge (X4) on teacher work innovation (Y).
- h) There is a direct positive effect of work motivation (X5) on teacher work innovation (Y).
- i) There is an indirect positive influence of proactive personality (X1) through technological pedagogical content knowledge (X4) on teacher work innovation (Y).
- j) There is an indirect positive influence on adversity quotient (X2) through technological pedagogical content knowledge (X4) on teacher work innovation (Y).



- k) There is an indirect positive effect of organizational support (X3) through work motivation (X5) on teacher work innovation (Y)

Quantitative research was carried out at 58 private vocational schools in Depok City for 7 months starting from the preparation of instruments, testing instruments, distributing instruments, processing data to testing hypotheses. The population of the study was 257 private vocational high school teachers with permanent teacher foundation status (GTY). Sampling using proportional random sampling technique, the sample size was calculated using the Slovin formula, so that a sample of 157 teachers was obtained. The instrument trial was conducted on 30 teachers outside the research sample. The research data was obtained through the distribution of questionnaires filled out by private vocational high school teachers in the city of Depok, consisting of six instruments to measure variables: 1) proactive personality, 2) adversity quotient, 3) organizational support, 4) technological pedagogical content knowledge, 5) motivation work, and 6) teacher work innovation. The instrument trial was conducted on 30 vocational high school teachers who were not included in the selected sample group.

Inferential statistical analysis using Structural Equation Modeling-Partial Least Square (SEM-PLS). The reasons for using SEM PLS in statistical analysis are: 1) research departs from qualitative exploratory or not to test theory; 2) the purpose of the analysis is more predictive orientation and model development based on the results of exploratory research. Data analysis includes: 1) Evaluation of the measurement model (convergent validity, discriminant validity, composite reliability); 2) Evaluation of the structural model (coefficient of determination test, goodness of fit test, and hypothesis testing).

## RESULT AND DISCUSSION

### Simultaneous Coefficient of Determination Test

Referring to the R-Square value to measure how much the endogenous variables are influenced by exogenous variables in the model being tested, the following results are obtained.

Table 1. of R Square ( $R^2$ ) Value and Interpretation

Model	Variable	$R^2$ Value	Effect
Substructural 1	Teacher Work Innovation	0,753	High
Substructural 2	TPACK	0,355	Moderate
Substructural 3	Work Motivation	0,417	Moderate
Criteria $R^2 > 0,67 =$ High, $0,33 - 0,67 =$ Moderate, $< 0,33 =$ Low			

Based on the table above explained:

- 1) The magnitude of teacher work innovation can be explained by the influence of proactive personality, adversity quotient, organizational support, knowledge technological pedagogical content knowledge and work motivation  $R^2$  of 0.753 (75.3% High category).
- 2) The amount of technological pedagogical content knowledge can be explained by the influence of proactive personality and adversity quotient  $R^2$  of 0.355 (35.5% moderate category).
- 3) The amount of work motivation can be explained by the influence of organizational support  $R^2$  of 0.417 (41.7% moderate category).



Partial Coefficient of Determination Test

The partial determination coefficient test refers to the value of f Square ( $f^2$ ).

Table 2 Value of f Square ( $f^2$ ) and Interpretation

No	Variables	<i>f Square</i>	%	Note
1	Proactive personality -> Teacher work innovation	0,107	10,7	Low
2	Adversity quotient -> Teacher work innovation	0,139	13,9	Low
3	Organizational support -> Teacher work innovation	0,682	68,2	High
4	Proactive personality ->TPACK	0,359	35,9	Low
5	Adversity quotient -> TPACK	0,173	17,3	High
6	Organizational support -> Work motivation	0,377	37,7	High
7	TPACK -> Teacher work innovation	0,151	15,1	Low
8	Work Motivation -> Teacher work innovation	0,129	12,9	High
Category <i>f Square</i> / $f^2$ (Cohen, 2015: 9) 0,02 > ≤ 0,15 (Low), 0,15 > ≤ 0,35 (Low/Moderate), > 0,35 (High)				

Based on the table above, it can be explained:

1. The percentage of the contribution of proactive personality to teacher work innovation is 10.7% (weak). The remaining 89.3.% by other variables.
2. The percentage of the contribution of adversity quotient to teacher work innovation is 13.9% (weak). The remaining 86.1% by other variables.
3. The percentage of organizational support contribution to teacher work innovation is 68.2% (strong). The remaining 31.8% by other variables.
4. The percentage of proactive personality contribution to technological pedagogical content knowledge is 35.9% (strong). The remaining 64.1% by other variables.
5. The percentage of the contribution of adversity quotient to technological pedagogical content knowledge is 17.3% (enough). The remaining 82.7% by other variables.



6. The percentage contribution of organizational support to work motivation is 37.7% (strong). The remaining 62.3% by other variables.
7. The percentage of the contribution of technological pedagogical content knowledge to teacher work innovation is 15.1% (Enough). The remaining 84.9% by other variables.
8. The percentage of work motivation contribution to teacher work innovation is 12.9% (weak). The remaining 87.1% by other variables.

#### Model Goodness Test (Goodness of Fit)

The results of the calculation of the Goodness of Fit value obtained are 0.734 (Good). This means that the diversity of the research data that can be explained by the research model is 73%. As much as 27% is explained by other factors that are outside the research model.

#### Hypothesis testing

The results of hypothesis testing are presented in the following table.

Table 3. Hypothesis Testing Results

No	Variable	Original Sample	T Statistic	P Values
1	The direct influence of Proactive personality on Teacher work innovation	0,154	1,982	0,042
2	The direct influence of Adversity quotient on Teacher work innovation	0,259	2,046	0,032
3	The direct influence of Organizational support on Teacher work innovation	0,579	24,97	0,000
4	The direct influence of Proactive personality on TPACK	0,408	5,662	0,000
5	The direct influence of Adversity quotient on TPACK	0,303	4,197	0,010
6	The direct influence of Organizational support on Work motivation	0,465	7,296	0,000
7	The direct influence of TPACK on Teacher work innovation	0,274	2,300	0,025
8	The direct influence of work motivation on Teacher work innovation	0,226	1,995	0,037
9	The indirect influence of Proactive personality on Teacher work innovation through	0,154 x 0,274 = 0,042		



	TPACK	
10	The indirect influence of Adversity quotient on Teacher work innovation through TPACK	$0,259 \times 0,274 = 0,070$
11	The indirect influence of Organizational support on Teacher work innovation through Work motivation	$0,465 \times 0,226 = 0,105$

Based on the data presented in the table above, it can be explained:

1. Proactive personality has a direct effect on teacher work innovation with a path coefficient value of  $YX1 = 0.154$  (positive), and is significant as indicated by the T Statistics value of 1.982 and P Values of 0.042.
2. Adversity quotient has a direct effect on teacher work innovation with a path coefficient value of  $YX2 = 0.259$  (positive), and is significant as indicated by the T statistic value of 2.046 and P Values of 0.032.
3. Organizational support has a direct effect on teacher work innovation with a path coefficient value of  $YX3 = 0.579$  (positive), and is significant as indicated by the T Statistics value of 24.977 and P Values of 0.000.
4. Proactive personality has a direct effect on technological pedagogical content knowledge with a path coefficient value of  $X4X1 = 0.408$  (positive), and is significant as indicated by the T statistic value of 5.662 and P Values of 0.000.
5. Adversity quotient has a direct effect on technological pedagogical content knowledge with a path coefficient value of  $X4X2 = 0.303$  (positive), and is significant as indicated by the T Statistics value of 4.197 and P Values of 0.010.
6. Organizational support has a direct effect on work motivation with the path coefficient value  $X5X3 = 0.465$  (positive), and is significant as indicated by the T statistic value of 7.296 and P Values of 0.000.
7. Technological pedagogical content knowledge has a direct effect on teacher work innovation with a path coefficient value of  $YX4 = 0.274$  (positive), and is significant as indicated by the T Statistics value of 2.300 and P Values of 0.025.
8. Work motivation has a direct effect on teacher work innovation with a path coefficient value of  $YX5 = 0.226$  (positive), and is significant as indicated by the T Statistics value of 1.995 and P Values of 0.037.
9. Proactive personality has no indirect effect on teacher work innovation through technological pedagogical content knowledge with a path coefficient value of  $YX1.\gamma X4X1 = 0.042$  (smaller than  $YX1 = 0.154$ ).
10. Adversity quotient does not indirectly affect teacher work innovation through technological pedagogical content knowledge with a path coefficient value of  $YX2.\gamma X4X2 = 0.070$  (smaller than  $YX2 = 0.259$ ).
11. Organizational support has no indirect effect on teacher work innovation through work motivation with a path coefficient value of  $YX3.\beta X3X5 = 0.105$  (smaller than  $YX3 = 0.579$ ).

The summary of hypothesis testing can be seen in the following table.

Table 4 : Recapitulation of Hypothesis Testing Results

	Hypothesis	Coefficient	Conclusion
1	H0: $\gamma_{YX1} \leq 0$ H1: $\gamma_{YX1} > 0$	0,154	H1 Accepted: There is a direct influence of proactive personality on teacher work innovation.
2	H0: $\gamma_{YX2} \leq 0$ H1: $\gamma_{YX2} > 0$	0,259	H1 Accepted: There is a direct influence of adversity quotient on teacher work innovation.
3	H0: $\gamma_{YX3} \leq 0$ H1: $\gamma_{YX3} > 0$	0,579	H1 Accepted: There is a direct influence of organizational support on teacher work innovation
4	H0: $\gamma_{X4X1} \leq 0$ H1: $\gamma_{X4X1} > 0$	0,408	H1 Accepted: There is a direct influence of proactive personality on TPACK
5	H0: $\gamma_{X4X2} \leq 0$ H1: $\gamma_{X4X2} > 0$	0,303	H1 Accepted: There is a direct influence of adversity quotient on TPACK
6	H0: $\gamma_{X5X3} \leq 0$ H1: $\gamma_{X5X3} > 0$	0,465	H1 Accepted: There is a direct influence of organizational support on work motivation
7	H0: $\beta_{YX4} \leq 0$ H1: $\beta_{YX4} > 0$	0,274	H1 Accepted: There is a direct effect of TPACK on Teacher work innovation
8	H0: $\beta_{YX5} \leq 0$ H1: $\beta_{YX5} > 0$	0,226	H1 Accepted: There is a direct influence of work motivation on Teacher work innovation
9	H0: $\gamma_{YX1} \cdot \gamma_{X4X1} \leq \gamma_{YX1}$ H1: $\gamma_{YX1} \cdot \gamma_{X4X1} > \gamma_{YX1}$	0,042 < 0,154	Ho Accepted: There is no indirect effect of proactive personality on teacher work innovation through TPACK
10	H0: $\gamma_{YX2} \cdot \gamma_{X4X2} \leq \gamma_{YX2}$ H1: $\gamma_{YX2} \cdot \gamma_{X4X2} > \gamma_{YX2}$	0,070 < 0,259	Ho Accepted: There is no indirect effect of adversity quotient on teacher work innovation through

			TPACK
11	H0: $\gamma_{YX3} \beta_{X3X5} \leq \gamma_{YX3}$ H1: $\gamma_{YX3} \beta_{X3X5} > \gamma_{YX3}$	0,105 < 0,579	H0 Accepted: There is no indirect effect of organizational support on teacher work innovation through work motivation.

Based on the results of hypothesis testing, mathematical equations are arranged according to the substructural model tested in the study as follows:

(1) Mathematical equation of substructural model 1

$$Y = 0,514X_1 + 0,259X_2 + 0,579 X_3 + 0,274X_4 + 0,226 X_5 + 0.497$$

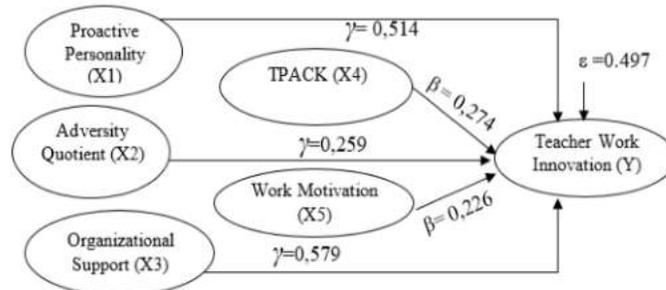


Figure-6. Hypothesis Test Results Substructural Model 1

(2) Substructural model math equation 2  $X_4 = X_4 = 0,408X_1 + 0,303X_2 + 0,803$

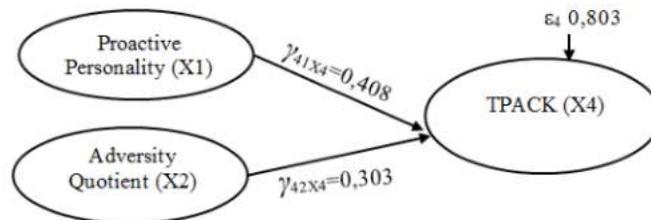


Figure-7. Results of Hypothesis Testing for Substructural Model 2

(3) Substructural model math

$$\text{equation 3 } X_5 = 0,465X_3 + 0,764$$

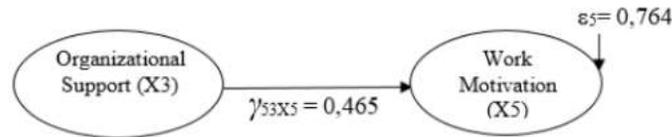


Figure-8. Results of Hypothesis Testing for Substructural Model 3

The complete combination of the three substructural models above is the following chart.

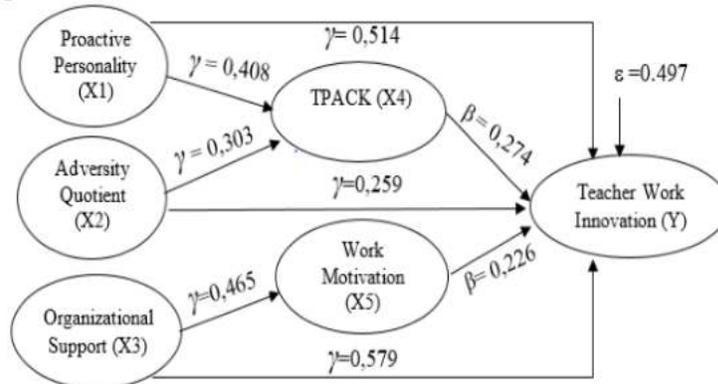


Figure-9. Structural Model Hypothesis Test Results

## CONCLUSION

This research has succeeded in finding efforts or strategies to increase teacher work innovation by using the model (constellation):

- The model for improving teacher work innovation, namely: The influence of proactive personality variables, adversity quotient, organizational support, technological pedagogical content knowledge, and work motivation on teacher work innovation ( $R^2 = 0.753$ ) with the form of the equation  $Y = 0.514X1 + 0.259X2 + 0.579X3 + 0.274X4 + 0.226X5 + 0.497$
- Model of increasing technological pedagogical content knowledge: The effect of proactive personality and adversity quotient on technological pedagogical content knowledge. ( $R^2 = 0.355$ ) with the form of the equation  $X4 = 0.408X1 + 0.303X2 + 0.803$
- Model of increasing work motivation: The effect of organizational support on work motivation ( $R^2 = 0.417$ ) with the form of the equation  $X5 = 0.465X3 + 0.764$
- The resulting teacher work innovation improvement model has a Gof value of 0.73 (73% good category)

Based on the research model mentioned above, this study has succeeded in identifying the magnitude of the direct and indirect effects between variables based on the research constellation.

- There is a direct, positive, significant and weak influence ( $\gamma_{YX1} = 0.154$ ) proactive personality on



- teacher work innovation, so that strengthening the proactive personality can increase teacher work innovation.
2. There is a direct, positive, significant and weak influence ( $\gamma_{YX2}=0.259$ ) adversity quotient on teacher work innovation, so strengthening adversity quotient can increase teacher work innovation.
  3. There is a direct, positive, significant and strong influence ( $\gamma_{YX3}=0.579$ ) organizational support on teacher work innovation, so that strengthening organizational support can increase teacher work innovation.
  4. There is a direct, positive, significant and strong influence ( $\gamma_{X4X1} = 0.408$ ) proactive personality on technological pedagogical content knowledge, so that proactive personality strengthening can increase technological pedagogical content knowledge.
  5. There is a direct positive, significant and moderate/moderate effect ( $\gamma_{X4X2}=0.303$ ) on adversity quotient on technological pedagogical content knowledge, so that strengthening adversity quotient can increase technological pedagogical content knowledge.
  6. There is a direct, positive, significant and strong influence ( $\gamma_{X5X3}=0.465$ ) of organizational support on work motivation, so that strengthening organizational support can increase work motivation.
  7. There is a direct positive, significant and moderate/moderate effect ( $\beta_{YX4}=0.274$ ) technological pedagogical content knowledge on teacher work innovation, so that strengthening technological pedagogical content knowledge can increase teacher work innovation.
  8. There is a direct positive, significant and weak influence ( $\beta_{YX5}=0.226$ ) work motivation on teacher work innovation, so that strengthening work motivation can increase teacher work innovation.
  9. There is no indirect effect of proactive personality on teacher work innovation through technological pedagogical content knowledge ( $\gamma_{YX1}.\gamma_{X4X1} = 0.042 < YX1 = 0.154$ ), so that strengthening proactive personality through technological pedagogical content knowledge cannot increase teacher work innovation. The improvement of teacher work innovation is more effective through direct strengthening of proactive personality rather than indirect reinforcement through technological pedagogical content knowledge.
  10. There is no indirect effect of adversity quotient on teacher work innovation through technological pedagogical content knowledge ( $\gamma_{YX2}.\gamma_{X4X2} = 0.070 < YX1 = 0.259$ ), so strengthening adversity quotient through technological pedagogical content knowledge cannot increase teacher work innovation. Improving teacher work innovation is more effective through strengthening adversity quotient directly rather than indirectly strengthening through technological pedagogical content knowledge.
  11. There is no indirect effect of organizational support on teacher work innovation through work motivation ( $\gamma_{YX3}.\beta_{YX5} = 0.105 < YX3 = 0.579$ ), so strengthening organizational support through work motivation cannot increase teacher work innovation. Increasing teacher work innovation is more effective through strengthening direct organizational support rather than indirectly strengthening through work motivation.

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