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Teacher Innovation through Knowledge Management and Personality Strengthening

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Abstract:

This study aims to increase teacher innovation by examining knowledge management and personality relationships. The method used is a combination of correlation approaches and Sitorem analysis. There were 271 samples from a population of 1684 elementary school teachers with civil servant status using multistage proportional sampling. Data analysis comprised normality, homogeneity, linearity, and multiple regression tests. The study's results prove a solid or significant relationship between knowledge management and personality and teacher innovation, as indicated by the correlation coefficient ry123 = 0.652. SITOREM analysis shows that based on the order of priority, improvements that need to be increased include knowledge dissemination, awareness, openness, personal consideration, and business and organizational innovation. At the same time, the indicators that are maintained and developed are influence, product innovation, emotional stability, process innovation, inspirational motivation, application of knowledge, knowledge storage, agreeableness, service innovation, knowledge acquisition, intellectual stimulation, extraversion, and knowledge evaluating.

Keywords: *Innovation, Knowledge Management, Personality*

Abstrak:

Penelitian ini bertujuan untuk meningkatkan inovasi guru dengan mencari hubungan dengan knowledge management dan kepribadian. Metode yang digunakan adalah kombinasi pendekatan korelasi dan analisis Sitorem. Sampel sebanyak 271 dari populasi 1684 guru Sekolah Dasar berstatus Pegawai Negeri Sipil dengan menggunakan multistage proportional sampling. Analisis data terdiri dari uji normalitas, homogenitas, linieritas, dan regresi berganda. Hasil penelitian membuktikan bahwa terdapat hubungan yang kuat atau signifikan antara knowledge management dan kepribadian dengan inovasi guru yang ditunjukkan dengan koefisien korelasi ry123 = 0,652. Analisis SITOREM menunjukkan bahwa berdasarkan urutan prioritas perbaikan yang perlu ditingkatkan diantaranya indikator berkaitan dengan diseminasi pengetahuan, kesadaran, keterbukaan, petimbangan pribadi, inovasi bisnis dan organisasi. Sedangkan indikator yangn tetap dipertahankan dan dikembangkan, yaitu pengaruh, inovasi produk, stabilitas emosional, inovasi proses, motivasi inspirasional, penerapan pengetahuan, penyimpanan pengetahuan, agreeablenes, service innovation, knowledge acquisition, intellectual stimulation, extraversion, dan knowledge evaluating.

Kata Kunci: *Inovasi, Manajemen Pengetahuan, Kepribadian*

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INTRODUCTION

Technology has significantly changed the field of education. As part of education, teachers experience technology's impact on learning. Teachers must create a pleasant learning atmosphere and produce graduates who align with educational goals (Valtonen et al., 2021). Innovations made by teachers can improve student learning outcomes. Teachers must be innovative and creative in creating tools to achieve learning objectives. In other words, teachers must be innovative in learning. The era of rapid technology expects teachers to innovate in learning (Ninlawan, 2015; Nugultham, 2012; Şen & Eren, 2012). The presence of platform 4.0 has an impact on innovations that need to be carried out by teachers. The presence of platform 4.0 based on cyber systems, supported by rapid technological advances, information base, knowledge, innovation, and networks, marked the emergence of a creative era (Yilmaz & Bayraktar, 2014; Lourmpas & Dakopoulou, 2014; Mooi, 2010).

It is a necessity that teachers must be aware of implementing innovation in various fields, with the hope of producing harmony in the learning process so that learning objectives can be achieved. However, to do all of this requires toughness, perseverance, and seriousness in carrying it out because the duties and responsibilities of teachers are very complex and varied. The results of observations in several elementary schools in the city of Bogor obtained information about the innovativeness of SDN teachers in the city of Bogor and several related factors, including knowledge management, transformational leadership, and personality. The problem regarding teacher innovation is an attraction for research (Sukmanasa et al., 2019). Research on innovation has also attracted researchers' attention (Gault, 2018; Ragazzi et al., 2012; Zhurakovskaya et al., 2020). However, have differences in variables and research findings. Therefore, further research on innovation and its relationship with knowledge management, transformational leadership, and personality variables is needed.

Furthermore, the concept of innovation is defined as actions taken by teachers to create learning tools or products to improve them (Dong et al., 2018; Jumagalieva et al., 2014). Innovation in the concept put forward by J. Greenberg and R.A. Baron (2008) is defined as the act (process) of making a change from something that has been formed into something new. Then in the opinion of Schermerhorn, Jr. (2005), innovation is the act of processing new ideas to be transformed into something that has a practical use, with the dimensions of product innovation, namely new goods, products or services and process innovation, namely procedures or methods. Furthermore, Mary Uhl-Biel et al. (2014) argue that innovation creates and puts new ideas into practice. This innovation is a means of creative ideas that someone can implement in daily practice, namely practices that improve customer service or organizational productivity (Grogan et al., 2021; Haug & Mork, 2021; Sahin, 2009).

The view of Kinicki & William (2013; Ebersberger et al., 2021; Fayomi et al., 2019; Luck et al., 2012; Olokundun et al., 2018; Suleimanova, 2013) defines innovation as the activity of creating new ideas and transforming them into practical applications, especially new goods and services. (Detterbeck & Sciangula, 2017; Fidan & Oztürk, 2015; Kwangmuang et al., 2021) Innovation is

the process of thinking and implementing these thoughts to produce new things in products, services, business processes, methods, policies, etc. Innovation is at the heart of understanding the change process. With dimensions 1) novelty in the form of ideas or products; 2) creativity: creating products; and 3) change process: change in understanding of the organization.

The concepts or theories above can be synthesized that innovation is the act or activity of creating new ideas and implementing them into new products/services that have practical uses, with dimensions and indicators: 1) product innovation, namely Product Innovation Dimensions with indicators: creating new products, and improve/update existing/existing products. 2) Service Innovation Dimension with indicators: improving service facilities' quality and information technology use. 3) Process Innovation Dimension with indicators: renewal of work plans and development of work methods/methods. 4) Business Innovation Dimension with indicators: increasing competence and developing professionalism. 5) Dimensions of Organizational Innovation with indicators: improvement of work procedures and certification of educator competencies (Suleimanova, 2013).

Innovation has a relationship with knowledge management variables. The definition of knowledge management defined by (Chaithanapat et al., 2022) that Knowledge Management is a way for companies to identify, create, represent, distribute, and enable the adaptation of insights and experiences. This insight and experience consist of knowledge owned by individuals and knowledge attached to a standard process or procedure. These dimensions are 1) Identification of Knowledge; 2) Knowledge Reflection; 3) Knowledge Sharing; 4) Use of Knowledge. Then (Falah & Parestya, 2017; Firk et al., 2022; Husin, 2017; Prabowo, 2010; Puerta et al., 2021; Zhao et al., 2022) provide an understanding of knowledge management as a management function that can create knowledge, manage the flow of knowledge and ensure that knowledge is used effectively and efficiently for the long-term benefit of the organization.

Furthermore, another variable that has a relationship with innovation is transformational leadership. Colquitt, Lepine, and Wesson (2015) state that transformational leadership involves inspiring all members to commit to a shared vision that gives meaning to developing their potential and some problems from new perspectives. A transformational leader is a leader who pays attention to the problems his followers face and the development needs of each of his followers by providing encouragement and encouragement to achieve his goals.

Therefore knowledge management, transformational leadership, and personality are related to innovation. The opinion (Kulanthaivel & Ulagamuthalvi, 2020; Marin, 2012) states that Knowledge Management is a way for companies to identify, create, represent, distribute, and enable the adaptation of insights and experiences. This insight and experience consist of knowledge owned by individuals and knowledge attached to a standard process or procedure. These dimensions are 1) Identification of Knowledge; 2) Knowledge Reflection; 3) Knowledge Sharing; 4) Use of Knowledge. Robbins and Judge (2013) define personality as how individuals react and interact with others.

Personality dimensions, according to Robbins and Judge, include 1) Extraversion. Tends to be gregarious, assertive, and sociable; 2) Friendliness. Tendency to be subservient to others, pleasant, warm and trustworthy; 3) Consciousness. Be careful, responsible, organized, reliable and persistent; 4) Emotional stability. Can withstand stress, has the positive emotional stability, tends to be calm, confident, and safe; 5) Openness to experience. Very open, creative, curious and artistically sensitive.

Innovation also has a relationship with personality variables. This statement aligns with research (Dong et al., 2018), which found a relationship between personality and individual innovative behaviour at work. Previous research shows the results obtained by proving the hypothesis. This research refers to previous studies but has differences in terms of research subjects and research locations.

Based on this background, further research is needed to find a strong relationship between variables. Then followed up in the form of an action plan to improve and maintain the indicators of each variable. This study aims to determine the relationship between knowledge management, transformational leadership, and personality with innovation. The novelty of the research includes discovering a relationship between variables which is then analyzed using the SITOREM method. With the STOREM method, indicators that are still weak will be corrected, and indicators that are already strong will be maintained and developed. In addition, a new synthesis of innovation and strategy was found, which was realized as a pocketbook regarding the relationship between innovation variables and other variables, namely knowledge management, transformational leadership, and personality.

RESEARCH METHODS

This study uses a combination research method between correlational research and SITOREM analysis. This combined research methodology uses a correlational research flow which is analyzed using SITOREM analysis. Through SITOREM Analysis, the results of correlational research are analyzed in more detail on the indicators of research variables to find indicators that need to be corrected and maintained or developed immediately.

The population of this research is all teachers of Civil Servant Civil Servants (PNS) certified 1683 teachers with the number of SD Negeri 211. The sample used multistage proportional random sampling and obtained 271 teachers. Calculating the population that will be sampled uses multistage proportional random sampling. The multistage proportional random sampling technique was chosen because the population was large, spread over 6 (six) sub-districts in Bogor City.

The stages of determining the number of samples in this study are: a) Determination of the number of SD. The state accounts for 50% of the total SD. The state in Bogor City, namely 211 schools to 106 schools (rounding off). Furthermore, 50% of SD was randomly drawn from each district. Country b) Determination of the proportion of the research population, namely Certified PNS teachers in Public SDs by 50%, from 1683 teachers to 843 teachers, the

proportion in each sub-district is the same as the initial distribution, c) Determination of the number of samples in this study using the Slovin formula (Bungin, 2010). The research trial took 30 certified civil servant teachers who were part of the population outside the study sample.

The data analysis technique consisted of 1) statistical analysis prerequisite tests, including normality, homogeneity, and linearity tests. 2) Looking for the regression equation covering the innovativeness variable (Y) on knowledge management (X1) and personality (X2). 3) test the significance and linearity of simple regression equations. 4) Looking for multiple regression equations. 5) Looking for the correlation between variables. 6) Looking for multiple correlations. 7) Determine the contribution of each variable. Furthermore, SITOREM analysis is carried out to correct the weak indicators and maintain the already strong indicators. This analysis stage begins with analyzing the contribution of the innovativeness variables using the calculation formula for the coefficient of determination. The next stage is analyzing the variable research indicators, then analyzing each variable indicator's weight, analyzing the indicators' classification, and finally, the results of the SITOREM analysis (Hardhienata, 2019). The final results of the SITOREM analysis are depicted as a recapitulation image of the final SITOREM analysis results.

Table 1. SITOREM Analysis

INNOVATION		
Indicator In Initial State	**Indicators After Weighting by Experts**	**Indicator Value**
1. Product 2. Service 3. Process 4. Effort 5. Organization	1. Product (25%)	4,09
	2. Service (23%)	4,29
	3. Process (21%)	4,07
	4. Effort (17%)	3,77
	5. Organization (15%)	3,98
KNOWLEDGE MANAGEMENT		
Indicator In Initial State	**Indicators After Weighting by Experts**	**Indicator Value**
1. *Acquisition* 2. *Storing* 3. *Evaluating* 4. *Dissemination* 5. *Application*	1. *Application* (22%)	4,30
	2. *Storing* (22%)	4,07
	3. *Acquisition* (21%)	4,01
	4. *Evaluating* (17%)	4,37
	5. *Dissemination* (17%)	3,67
PERSONALITY		
Indicator In Initial State	**Indicators After Weighting by Experts**	**Indicator Value**
1. *Emotional Stability* 2. *Extraversion* 3. *Openness to Experience* 4. *Agreeableness* 5. *Conscientiousness*	1. *Emotional Stability* (24%)	4,46
	2. *Agreeableness* (21%)	4,20
	3. *Conscientiousness* (21%)	3,74
	4. *Extraversion* (18%)	4,00
	5. *Openness to Experience* (16%)	3,77

Table 1 explains the results of the SITOREM analysis showing that based on the priority order of improvements that need to be improved to serve as recommendations for improvement, namely: 1) Knowledge Dissemination, 2) Conscientiousness, 3) Openness to Experience, 4) Individualized Consideration, 5) Business Innovation, and 6) Organizational Innovation.

While the maintained order can be proposed to compile an action plan, namely: 1) Idealized Influenced, 2) Product Innovation, 3) Emotional Stability, 4) Process Innovation, 5) Inspirational Motivation, 6) Knowledge Application, 7) Knowledge Storing, 8) Agreeableness, 9) Service Innovation, 10) Knowledge Acquisition, 11) Intellectual Stimulation, 12) Extraversion, and 13) Knowledge Evaluating.

Based on this analysis, an action plan, which can be a seminar or training, is needed. The action plan program to increase teacher innovativeness based on the research results' conclusions, implications and suggestions is the implementation of training with the development of knowledge management to increase teacher innovativeness.

RESULTS AND DISCUSSION

The description of the research data begins with the presentation of descriptive statistical analysis data, which aims to describe the data from each research variable. The data analysis requirements test aims to determine the validity of using parametric statistics in hypothesis testing and inferential results to test the hypothesis. The data were obtained by measuring innovativeness variables, knowledge management, transformational leadership, and personality based on the respondents' responses to the questionnaire for each variable. The data collected came from a research sample of 271 certified civil servant teachers in SD Negeri Bogor City. The statistical description results are shown in the following table 2.

Table 2. Variable Descriptive Statistics

No	Description	Y	X_1	X_2
1.	Lots of data	271	271	271
2.	Mean	129	143	132,5
3.	Modus	127	142	135
4.	Standard Deviation	7,8	9	11
5.	Vairians	61	76	121
6.	Range	42	47	51
7.	Maximum score	150	166	155
8.	Minimum score	108	119	104
9.	Class length	9	9	9
10.	Many classes	5	6	6

Table 2 explains the calculation of statistical descriptions of the four variables: innovativeness, knowledge management, transformational leadership, and personality. Then calculate the data distribution, linearity, and regression and prove the hypothesis. The following is presented as a summary of the data hypothesis. Furthermore, calculating the distribution and obtaining data with normal distribution, linearity, and regression. The results of the calculation of

normality, then the resulting data has a number distribution, linearity and regression as well. Proof of hypothesis. The following is presented as a summary of the data hypothesis.

Table 3. Summary of research hypotheses

No	Description	Y	X_1	X_2
1.	Lots of data	271	271	271
2.	Mean	129	143	132,5
3.	Modus	127	142	135
4.	Standard Deviation	7,8	9	11
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Table 3 explains the calculation of statistical descriptions of the four variables: innovativeness, knowledge management, transformational leadership, and personality. Then calculate the data distribution, linearity, and regression and prove the hypothesis. The following is presented as a summary of the data hypothesis. Furthermore, calculated the data distribution and obtained data with normal distribution, linearity, and regression. The results of the calculation of normality, then the resulting data has a number distribution, linearity and regression as well. Proof of hypothesis. The following is presented as a summary of the data hypothesis.

Table 4 shows that from the results of processing and calculating research data, it is known that all accept the hypotheses proposed in this study. The relationship between research variables, both partially and simultaneously, is positive and very significant. The results of the first hypothesis test concluded that the relationship between Knowledge Management and Innovation is very significantly positive, as indicated by the value of $t_{count} > t_{table}$ (6.666 > 1.97) at a level a = 0.05. The resulting correlation equation means that every increase in one level of Knowledge Management will increase the innovation by 0.377 at a constant of 81,294. The relationship between personality and innovation is significantly positive, as indicated by the value of $t_{count} > t_{table}$ (5.633 > 1.97) at a level a = 0.05. The resulting correlation equation means that every increase in one level of personality will increase innovation by 0.325 at a constant of 98.933. Furthermore, the relationship between Knowledge Management and Personality and innovation is significantly positive, indicated by the value of Fcount > Ftable (28.934 > 3.04) at a level a = 0.05. The equation obtained shows that an increase in one level of Knowledge Management will increase innovation by 0.293 at a constant of 72.533. Each increase in one level of personality will increase innovation by 0.207 constantly of 72,533.

Table 4. Summary of Research Hypotheses

No	Correlation	Correlation Coefficient	Significance of Correlation			Conclusion
			t_{count}	t_{table}*) a= 0,05	t_{tabel}*) a= 0,01	
1	X_1 – Y	r_{y1} = 0,614	6,666	1,97	2,58	H_0 is rejected, H1 is accepted. There is a positive relationship between Knowledge Management and innovativeness
2	X_2 -Y	r_{y3} = 0,570	5,633	1,97	2,58	H_0 is rejected, H1 is accepted. There is a positive relationship between personality and innovativeness
3	X_1X_2 – Y	r_{y13} = 0,649	98,933	3,04	4,71	H_0 is rejected, H1 is accepted. There is a positive relationship between Knowledge Management and Personality with innovativeness
4	X_1X_2	R_{x12} = 0,581	28,934	3,04	4,71	H_0 is rejected, H1 is accepted. There is a positive relationship between Knowledge Management and Personality

The results of the SITOREM analysis show that based on the priority order of improvements that need to be improved to serve as recommendations for improvement, namely: 1) Knowledge Dissemination, 2) Conscientiousness, 3) Openness to Experience, 4) Individualized Consideration, 5) Business Innovation, and 6) Organizational Innovation.

While the maintained order can be proposed to compile an action plan, namely: 1) Idealized Influenced, 2) Product Innovation, 3) Emotional Stability, 4) Process Innovation, 5) Inspirational Motivation, 6) Knowledge Application, 7) Knowledge Storing, 8) Agreeableness, 9) Service Innovation, 10) Knowledge Acquisition, 11) Intellectual Stimulation, 12) Extraversion, and 13) Knowledge Evaluating.

The results prove that knowledge management, transformational leadership, and personality are related to teacher innovativeness. Research findings regarding the relationship between transformational leadership and innovation are also investigated (Sherine et al., 2019). The result is that transformational leadership suits organizations around more innovative products and processes and team members engaged in more creative team environments (Suleimanova, 2013; Luck et al., 2012). Individuals with open

personalities have experiences that lead to innovation (Hsieh et al., 2011; Paulsen et al., 2013). Knowledge management has a relationship with teacher innovativeness, that knowledge management, which includes knowledge creation, knowledge organization, knowledge storage, knowledge sharing and knowledge utilization, has a relationship and even influences teacher innovativeness. Teachers must be able to create, organize, store, share, and use knowledge (Nawab et al., 2015; Beni, 2016; Hsieh et al., 2011; Hamdy et al., 2019; Yesil & Sozbilir, 2013).

The findings obtained in this study identify that if the teacher has high Knowledge Management, good Transformational leadership and a good personality, these three variables contribute to increasing innovativeness. Partial correlation analysis has been carried out to find out the pure contribution of each independent variable to the dependent variable. The pure contribution of each variable is known by controlling for other independent variables.

First, a partial relationship between Knowledge Management and Innovation if Transformational leadership is in constant conditions, obtained ry1-2 of 0.349 with weak criteria, shows that Knowledge Management is not the only variable/factor with a relationship with innovation. There are other variables. The other variable is Transformational Leadership. This is in line with the research that has been done (Bastidas et al., 2023; Bunjak et al., 2022; Greimel et al., 2023; Mai et al., 2022; Majali et al., 2022; Rafique et al., 2022; Sudibjo & Prameswari, 2021). That there is a relationship between innovation and transformational leadership. The strength of the relationship between variables evidences this. Second, the partial relationship between Knowledge Management and Innovation if Personality is constant is obtained ry1-3 of 0.284 with weak criteria, this indicates that Knowledge Management is not the only variable/factor with a strong relationship with innovation, but there are other variables, namely personality. The findings of this study are different from the research (Alvarez et al., 2022; Ebrahimi et al., 2016; Firk et al., 2022; Lam et al., 2021a; Sudibjo & Prameswari, 2021; Wang et al., 2022; Zhao et al., 2022) who found that innovation has a strong relationship with knowledge management and personality. Third, a partial relationship between Transformational Leadership and Innovation, if personality is in stable condition, obtained ry2-3 of 0.098 with very weak criteria; this shows that personality is not one of the variables that have a relationship with teacher innovation.

The findings obtained in this study identify that if the teacher has high Knowledge Management, good Transformational leadership and a good personality, these three variables contribute to an increase in innovativeness. This study's findings differ from previous studies (Abdel Hadi et al., 2023; Fandos-Herrera et al., 2023; Lam et al., 2021a; Stock et al., 2016; Zhurakovskaya et al., 2020). Previous research found the strength of the relationship between innovation and knowledge management, transformational leadership, and personality, as evidenced by the analysis results.

Thus this study found a strong relationship between innovation and knowledge management, transformational leadership, and personality. These findings are shown by analysing the relationship between the three independent

and dependent variables. The results of the study found a weak relationship between variables. This can be interpreted that other factors have a relationship besides knowledge management, transformational leadership, and personality. Meanwhile, several previous studies (Bastidas et al., 2023; Bunjak et al., 2022; Chaithanapat et al., 2022, 2022; Ebrahimi et al., 2016; Lam et al., 2021; Mai et al., 2022; Rafique et al., 2022) among others, found the strength of the relationship between innovation and knowledge management, innovation with transformational leadership, and innovation with personality. This shows a need for further research to prove the strength of a significant relationship between variables.

CONCLUSION

The study's results show that this study has found efforts to increase the innovativeness of certified civil servant teachers in SD Negeri Bogor City through strengthening knowledge management, transformational leadership, and personality. In this study, the findings must be improved so that the innovativeness of the teachers can be maximally increased. Research suggestions for already good indicators can be maintained, while indicators that are not good for improvement. In this study, the findings must be improved so that the innovativeness of teachers can be maximally increased. Research suggestions for already good indicators can be maintained, while indicators that are not good for improvement.

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