


## Optimal Solutions for Enhancing Teachers' Innovation through SITOREM Analysis

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### ABSTRACT

This study aims to determine the optimal solution based on existing solutions due to limitations in management resources. The method used in this study involves analyzing variables using Path Analysis, while indicators were analyzed using SITOREM (Scientific Identification Theory to Conduct Operations Research in Education Management). Based on the results of expert adjustments by two experts, the following indicator analysis results were obtained for each variable: There are 9 revised indicators in the following order: 1st Improving the Quality of Learning (21.6%), 2nd Changing Teaching Methods (19.6%), 3rd New Ideas (19.4%), 4th Paying Attention to Teachers' Professional Goals (19.7%), 5th Working Conditions (19.4%), 6th Interpersonal Relationships (18.0%), 7th Applying Knowledge (22.3%), 8th Utilizing Organizational Support (19.5%), 9th Transferring Knowledge (18.7%). Meanwhile, the order of priority for indicators to be maintained or developed is as follows: 1st Technology Application (21.8%), 2nd Collaboration with Students and Colleagues (18.6%), 3rd Experimentation in Learning (18.4%), 4th Combining ideas into something new (21.2%), 5th Valuing teachers' creative work (20.2%), 6th Exploring interests (20.0%), 7th Taking risks (19.2%), 8th Helping teachers overcome teaching challenges (21.2%), 9th Appreciating teachers' creative work (19.9%), 10th Caring about teachers' well-being (19.9%), 11th Appreciating teachers' contributions to the development of learning methods (19.2%), 12th Self-development (22.0%), 13th Rewards (20.7%), 14th Achievement fulfillment (19.9%), 15th Acquiring knowledge (20.0%), 16th Receiving knowledge (19.5%).

**Keywords:** Optimal Solutions; SITOREM; Teacher Innovation; Resource Management; Improvement.

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### INTRODUCTION

Strategies for enhancing teacher innovation through the strengthening of learning organizations, creativity, self-efficacy, and job satisfaction. This quantitative study shows that teacher innovation can be significantly enhanced when teachers are part of a work ecosystem that supports continuous learning and professional reflection (Apriliyana et al., 2024). Therefore, it is necessary to strengthen teachers' innovativeness through various research variables in order to improve the quality of graduates. This study examines the factors that influence teachers' innovativeness through a literature review. The results of the study indicate that innovativeness is influenced by three main dimensions: individual characteristics (such as self-efficacy and achievement motivation), organizational support (facilities, rewards, and leadership), and opportunities for professional development (Verniati et al., 2023). Innovativeness does not simply arise naturally; rather, it must be fostered through the interaction between individual factors and the work environment. Therefore, creating a

collaborative atmosphere and an innovative culture in schools is an essential prerequisite for strengthening teachers' innovativeness (Hariyanti & Izzati, 2024).

Creativity was found to be a mediating variable that bridges the effects of self-efficacy and learning organization on innovativeness. This finding reinforces the view that the development of innovativeness cannot be separated from institutional support and teachers' personal competencies (Febriyanti et al., 2025). Teachers' innovation is influenced by internal factors such as self-efficacy, creativity, and goal orientation, as well as external factors such as organizational culture, support from the principal, and the intensity of knowledge sharing (Marlinawati et al., 2024). The importance of teachers' self-confidence in taking risks and trying new approaches, reinforced by the guidance and support of a visionary principal. These findings indicate that teachers' innovation flourishes in an environment that provides freedom, trust, and motivation to act creatively in teaching (Suhendar et al., 2022).

Teacher Innovation in Addressing Learning Challenges in the Digital Age. This study found that the integration of technology does not automatically enhance teacher innovation in teaching, but rather depends heavily on digital competency, an open attitude toward change, and support from the work environment (Fauzi et al., 2024). The success of innovation at the teacher level cannot be separated from the active involvement of school organizations in creating a support system that allows teachers to innovate without bureaucratic obstacles. Thus, teacher innovation requires a strong structural foundation in addition to personal factors (Adhinugraha et al., 2024). Teachers' creativity flourishes in an environment that provides the freedom, trust, and motivation to act creatively in the classroom (Simangunsung, 2023). Teachers who are able to assess learning needs and are willing to try new approaches are more likely to be innovative. This study shows that innovation is the result of a readiness to adapt to technology, combined with reflective and creative thinking in instructional planning (Gresinta & Tukiran, 2024).

## METHOD

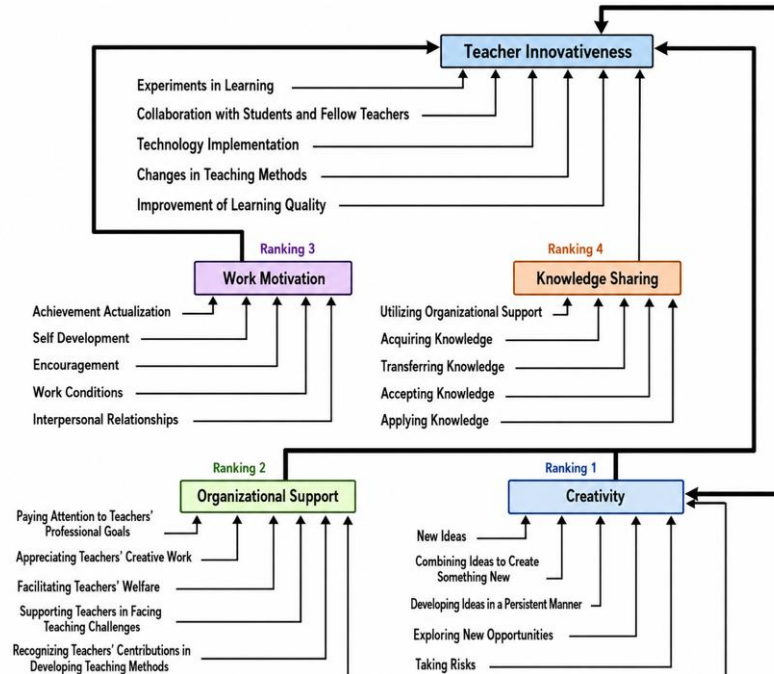


Figure 1. The Analytical Framework of the Scientific Identification Theory for Conducting Operations Research in Education Management (SITOREM) (Hardhienata, 2017)

This study employs a quantitative analysis, beginning with an analysis of the research variables using path analysis, followed by an analysis of the research indicators using SITOREM (Scientific Identification Theory to Conduct Operations Research in Education Management) (Hakim et al., 2020; Hanum & Hermawan, 2025a, 2025b; Sunaryo et al., 2020). The assessment was conducted by two experts in educational management to review and compare the experts'

assessment results with the findings of empirical studies, thereby establishing a priority ranking for indicators that need improvement and those that should be retained or further developed. The assessment criteria in SITOREM are: 1) cost, 2) benefit, 3) urgency, and 4) importance.

## RESULT AND DISCUSSION



**Figure 2: Results of the SITOREM Analysis**

Based on Figure 2, the results of the SITOREM analysis show that there are nine indicators that need to be developed and maintained, namely: 1st, Improving the Quality of Learning (21.6%); 2nd, Changing Teaching Methods (19.6%); 3rd, New Ideas (19.4%); 4th, Focusing on Teachers' Professional Goals (19.7%), 5th Working Conditions (19.4%), 6th Interpersonal Relationships (18.0%), 7th Applying Knowledge (22.3%), 8th Utilizing Organizational Support (19.5%), 9th Transferring Knowledge (18.7%). Meanwhile, the order of priority for indicators to be maintained or developed is: 1st Technology Application (21.8%), 2nd Collaboration with Students and Colleagues (18.6%), 3rd Experimentation in Learning (18.4%), 4th Combining ideas into something new (21.2%), 5th Valuing teachers' creative work (20.2%), 6th Exploring interests (20.0%), 7th Taking risks (19.2%), 8th Helping teachers overcome teaching challenges (21.2%), 9th Appreciating teachers' creative work (19.9%), 10th Caring about teachers' well-being (19.9%), 11th Appreciating teachers' contributions to the development of learning methods (19.2%), 12th Self-development (22.0%), 13th Rewards (20.7%), 14th Achievement fulfillment (19.9%), 15th Acquiring knowledge (20.0%), 16th Receiving knowledge (19.5%).

In a professional work setting, motivation does boost energy and task focus, but innovation requires more than just internal drive. Innovative behavior typically demands environmental support, opportunities to try new things, and autonomy in work practices; therefore, motivation alone does not directly lead to tangible innovation (Amabile & Pratt, 2016). This is consistent with research that found that innovation is influenced by a combination of individual and situational factors, not just intrinsic motivation alone (Newman et al., 2020). Motivated teachers may demonstrate a high level of dedication, but they do not always have the space, time, or organizational support to innovate, so their motivation does not translate into innovative actions (Gyu Park et al., 2017). Organizational conditions, work culture, and leadership have a more direct impact on innovation than internal motivation (B. Afsar &

Umrani, 2019). Other studies have also shown that motivation is often more closely linked to performance on routine tasks than to innovative performance, because innovation requires a willingness to take risks, experiment, and be creative—all of which require structural support (Li et al., 2021). If a teacher's work environment is bureaucratic or constrained by certain rules, innovation is unlikely to emerge even if work motivation is high (T.-M. Nguyen et al., 2022). This finding is also consistent with recent research showing that creativity acts as a mediator in the relationship between motivation and innovation, meaning that motivation alone will not lead to innovation without a creative thinking process (Cai et al., 2018). Your research findings support this, as work motivation is significant only when creativity serves as a mediating variable. Overall, the research findings demonstrate that motivation is important, but its effect on innovation is indirect and highly dependent on the role of creativity and the support of the school environment (Qammar et al., 2023). Thus, enhancing teachers' innovation requires synergy between internal motivation and external factors such as organizational culture, leadership support, and an adaptive work system.

Research over the past decade has shown that creativity is influenced more by a combination of internal and external factors, such as work autonomy, organizational support, a creative climate, and opportunities to experiment (Hughes et al., 2018). When these external factors are not optimal, high work motivation does not automatically lead to new creativity in teaching practices (Li & Bai, 2015). Several studies have also confirmed that motivation plays an indirect role in creativity, particularly through engagement in the creative process or perceptions of self-competence (Zhang et al., 2020). Motivation tends to increase teachers' effort and persistence, but it does not necessarily lead to new ideas or innovative approaches without adequate environmental support (Gong et al., 2012). In addition, teachers' creativity often flourishes when they have the freedom, opportunities to experiment, and access to learning resources (Anderson et al., 2014). If a school's structure tends to be rigid, bureaucratic, or constrained by certain rules, it will be difficult to transform intrinsic motivation into creative action (Choi et al., 2016). Your research findings are also consistent with other findings that creativity is more closely related to social factors such as transformational leadership, a collaborative culture, and knowledge sharing, rather than solely to individual motivation (Shafi et al., 2020). Thus, work motivation remains important, but it is not strong enough to directly foster teachers' creativity in an unsupportive environment. Recent research also shows that creativity often emerges through mediating processes such as creative self-efficacy or psychological empowerment (Javed et al., 2019). Without these psychological mediators, intrinsic motivation alone cannot produce clear creative output. Your research findings further confirm that creativity requires a broader set of supporting conditions, and that work motivation serves only as an initial driving factor—not the primary determinant—in fostering teachers' creativity. (M. Kim & Park, 2021).

Recent research shows that knowledge sharing does indeed build professional capacity, but its impact on innovation is often indirect or mediated by other variables such as creativity, self-efficacy, or organizational learning (Al Harthy et al., 2020). Without an adequate creative mental process, the knowledge that is shared cannot yet be transformed into innovation (Foss et al., 2023). Other studies suggest that innovation requires the courage to take risks, the freedom to experiment, and a supportive work environment—none of which automatically result from knowledge-sharing activities (Donate & de Pablo, 2015). In other words, teachers can share information with one another, but they may not necessarily have the space or structural support to implement innovative new ideas (T. N. Nguyen et al., 2019). Several studies have also found that knowledge sharing tends to have a greater impact on organizational performance or team collaboration than on individual innovative performance (Park et al., 2017). This is because innovation requires a more complex process of knowledge transformation, such as the processing of ideas, the integration of insights, and the modification of learning practices (Akram et al., 2018). Furthermore, in the school setting, a rigid work culture, administrative burdens, and strict curriculum policies often limit teachers' opportunities to implement new knowledge gained from knowledge sharing (Farooq, 2018). Situations like this explain why teachers who actively share knowledge do not necessarily generate innovation. Other research

has found that, in order to generate innovation, knowledge sharing must be accompanied by a work environment that supports creativity, leadership that encourages renewal, and trust among individuals (Hao et al., 2020; Shujahat et al., 2017). Without these supporting factors, knowledge sharing has no significant impact on innovation. Your research findings are also consistent with studies indicating that innovation arises when knowledge sharing is followed by a process of reflection and continuous experimentation (Imran et al., 2019). Otherwise, knowledge sharing remains merely an exchange of information without producing innovative outcomes. Overall, it can be concluded that knowledge sharing is an important foundation, but it is not a direct determinant of teachers' innovativeness. Its influence is only felt when it involves mediating factors such as creativity, collaboration, or organizational support, which enable that knowledge to be translated into tangible innovations..

Recent research shows that knowledge sharing enables individuals to gain a broader perspective and enhances the cognitive capacity needed to foster creativity (Radelli et al., 2016). When teachers share ideas, experiences, and teaching strategies with one another, they have more resources to draw on to develop more effective creative approaches (Suppiah & Singh, 2016). In addition, sharing knowledge fosters collective learning, which strengthens individuals' ability to modify, combine, and develop new ideas (Wang et al., 2021). Collaborative processes such as discussions, mentoring, and teamwork can enhance creativity by stimulating ideas and fostering collective problem-solving (Amayah, 2015). Other studies confirm that knowledge sharing creates an environment that fosters creativity due to a sense of mutual trust, mutual support, and openness among members of an organization (S. Kim & Yun, 2022). This environment encourages teachers to be more willing to explore new ideas without fear of failure or criticism. The research results are also consistent with findings that individuals who are actively involved in knowledge-sharing activities tend to have higher creative self-efficacy, making them more confident in generating and executing creative ideas (Mittal & Dhar, 2015). With this increased self-confidence, the potential for creativity also grows. Furthermore, knowledge sharing contributes to accelerating organizational learning, which ultimately fosters innovation and creativity in an educational context. When information flows rapidly among teachers, they are better prepared to face technological and pedagogical changes that require creative adaptation. Your findings are also consistent with research indicating that knowledge sharing enhances individuals' analytical and reflective abilities, thereby fostering the capacity to find creative solutions in complex learning situations (Ogunmokun et al., 2020). This underscores that knowledge sharing is one of the key factors that foster creativity in knowledge-based work environments such as schools. Overall, the research findings reinforce the view that knowledge sharing is an important foundation for the development of teachers' creativity, as it provides access to a variety of ideas, experiences, and perspectives that stimulate new ways of thinking.

Recent research shows that organizational support is a key factor in fostering innovative behavior among employees, including teachers. Organizations that provide emotional and instrumental support, as well as opportunities for development, create a psychologically safe environment where individuals can experiment and generate new ideas (Eisenberger et al., 2020). When teachers feel valued and supported, they are more motivated to try innovative teaching methods (T. Nguyen et al., 2021). Another study reveals that support from leadership and the organization strengthens individuals' willingness to take risks, which is a key component of the innovation process (Agarwal, 2019). Teachers who feel supported are more willing to make changes in their teaching practices because they believe their actions will not result in negative consequences. In addition, organizational support has been shown to foster innovative behavior by boosting teachers' self-confidence and commitment to their work (U. A. Afsar, 2019). A supportive environment will provide adequate resources, enabling teachers to develop their ideas into innovations that can be implemented. Recent research also emphasizes that innovation arises when organizations provide autonomy, opportunities for professional development, and flexible work structures that allow for the exploration of creative ideas (Albrecht et al., 2023). With this support, teachers are better able to identify opportunities for innovation in learning. In addition, organizational support plays a significant role in

fostering a climate of innovation within the school, which serves as the foundation for positive change in teaching practices (Li et al., 2022). Schools that provide recognition, guidance, and constructive supervision are more likely to foster sustained teacher innovation. Other research has shown that organizational support strengthens social relationships and collaboration among teachers, which in turn encourages the emergence of new ideas through shared discussion and reflection (Chang et al., 2019). This collaboration is crucial for fostering innovation in the educational setting. Your research findings are consistent with various other studies, indicating that organizational support not only provides resources but also influences teachers' psychological well-being, making them more prepared to innovate. Thus, it can be concluded that organizational support is a critical factor in shaping teachers' innovativeness.

Previous research has confirmed that organizational support creates a psychological environment that is safe and conducive to creativity (Amabile & Pratt, 2016). When teachers feel valued, trusted, and provided with adequate resources, they are more likely to explore new methods and try creative approaches to teaching (Newman et al., 2020). In addition, organizational support enhances psychological empowerment, which has been shown to increase individual engagement in the creative process. Teachers who feel supported will be more confident in generating and executing innovative creative ideas. Other research has found that supportive leadership and an open organizational climate influence creativity by increasing a sense of security and freedom of expression (Chen & Hou, 2016). Support like this encourages teachers not only to follow instructions but also to dare to create alternative teaching methods. In addition, organizations that provide a variety of training and professional development opportunities significantly enhance teachers' creativity, as they gain new knowledge that can be combined to generate ideas. Organizational support has also been shown to strengthen social cohesion and collaboration among teachers, which can spark the creative process through discussion, the sharing of insights, and shared reflection (Chang et al., 2019). A social context like this plays a significant role in fostering teachers' creativity. Recent studies even show that a supportive work environment facilitates engagement in the creative process – that is, the mental process involving problem exploration, idea generation, and evaluation of alternatives, which forms the foundation of creative behavior (Li et al., 2022). Overall, your research findings reinforce the existing literature that organizational support is one of the most important factors in fostering creativity in educational settings. Teachers are better able to generate creative ideas when they receive adequate structural and emotional support, as well as sufficient resources, from their schools.

Creativity is the cornerstone of innovation, because innovation is essentially the application of creative ideas in real-world practice (Anderson et al., 2014). Creative teachers tend to be better able to evaluate existing teaching methods and then improve them or replace them with new, more effective approaches (Zhou et al., 2017). Recent research shows that creativity increases individuals' tendency to take risks, try new alternatives, and reflectively reevaluate work practices – all of which are key characteristics of innovative behavior (Hughes et al., 2018). With strong creativity, teachers are better prepared to implement changes in their teaching practices. In addition, creativity plays a role in improving problem-solving skills, making it easier for teachers to find innovative solutions in complex learning situations (Gong et al., 2012). Creative teachers are able to modify instructional materials, create new learning resources, and adapt to various classroom conditions. Furthermore, research has found that creativity influences innovation by enhancing cognitive processes such as idea exploration, evaluation of alternatives, and integration of new information (Li et al., 2021). This mental process is essential for creating relevant and effective learning innovations. Other studies confirm that teachers' creativity enhances their ability to innovate by creating learning environments that are engaging, active, and tailored to students' needs (Shen et al., 2020). Creativity also encourages the use of contemporary teaching methods such as project-based learning and digital technology. Recent research shows that creativity is one of the strongest predictors of teacher innovation, particularly in the context of technology-based education (Rahman et al., 2023). This is consistent with your findings that creativity makes the largest contribution in the model. Overall, the results of this study reinforce the notion that creativity is

a key component in shaping teachers' innovative behavior. Creativity not only serves as a source of new ideas but also encourages teachers to apply those ideas in their teaching practices, thereby contributing significantly to enhancing teachers' innovativeness.

## CONCLUSION

Based on the results and discussions, it can be concluded that, given the limitations of management resources, an optimal solution is needed to identify the indicators that need to be improved, maintained, or developed. There are 9 indicators that need improvement and 16 indicators that need to be maintained or developed. For the indicators that need improvement, based on the priority ranking established by experts, various activities are required to enhance these indicators; policies can be implemented by school principals and department heads to foster greater innovation among teachers.

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