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STRATEGIES FOR IMPROVING TEACHER COMPETENCE THROUGH LOCAL CULTURAL APPROACHES AND DIGITAL LITERACY

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Abstract

This study employs a mixed-methods sequential exploratory approach using the POP-SDM (Modeling and Optimization of Human Resource Management Strengthening) method to improve teacher performance as a key determinant of educational quality in vocational education. The research population consists of all civil servant teachers working at Centers of Excellence Vocational High Schools in Banten Province, Indonesia. A sample of 254 teachers from 28 schools was selected using proportional random sampling. Data were collected through document analysis, interviews, questionnaires, and observations. Qualitative data were analyzed using thematic analysis to identify key performance indicators, while quantitative data were analyzed using path analysis and POP-SDM optimization analysis to test the constellation model and research hypotheses. The findings indicate that optimal strategies for improving teacher performance involve maintaining strong performance indicators while systematically strengthening weaker ones. Priority improvement areas include knowledge acquisition, knowledge processing, knowledge distribution, communication ethics, and work quantity. This study contributes a data-driven and systematic framework for enhancing teacher performance, particularly in vocational education contexts aligned with industry needs.

Keywords Information Technology Literacy, Local Wisdom, Teacher Performance.

INTRODUCTION

The rapid development of education, supported by advances in information technology, requires the education sector to continue innovating and improving the quality of its teaching staff. Teachers, as the spearhead of the learning process (Gifari, 2023), must adapt to the demands of the times to produce competent, creative, and high-quality students. According to (Ahmad & Richardson, 2021a), the adaptive and innovative competencies of teachers are key factors in improving the quality of education, especially in facing future challenges. In the Indonesian context, civil servant teachers at the vocational school level have a strategic role in preparing a competent and competitive national and international workforce (Elih Sudiapermana et al., 2025). The Banten Province Centre of Excellence SMK is one of the educational centers that is expected to produce highly competitive graduates(Habibuddin & Apriana, 2023). However, the facts on the ground indicate that teacher competence at this SMK still needs improvement, particularly in mastering digital technology and applying local cultural values in the learning process (Widya Rini, 2024).

Data from the Banten Provincial Education Office shows that most civil servant teachers at the Center of Excellence SMK still face obstacles in achieving adequate digital competence (Utami et al., 2026). They tend to use conventional learning methods, do not utilize digital technology creatively and critically, and have not fully integrated local culture into teaching and learning activities. This situation highlights the need for comprehensive, context-specific competence improvement strategies (Herdiaty, 2025). The development of teacher competencies is not limited to improving pedagogical and professional skills, but must also include strengthening local cultural aspects and digital literacy. According to (Hadi & Wibowo, 2021) strengthening local culture can foster national identity and character in students, while enriching their knowledge of regional cultural wealth. Therefore, strategies that can integrate both are needed to make the learning process more relevant and meaningful (Almerich & Orellana, 2021).

Education experts agree that a local cultural approach can improve students' moral foundation and identity (Anggoro et al., 2023). They state that strengthening local culture in learning is one of the keys to preserving cultural heritage and strengthening national character. On the other hand, digital literacy is an equally important competency. According to (Dwiningrum et al., 2023), 'Teachers must be able to utilize digital technology critically, creatively, and innovatively to make the learning process more interesting and effective.' Furthermore, (Huda, 2020) emphasis that strengthening digital competence must be accompanied by strengthening local culture. They argue

that ‘the synergy between the two will result in contextual and meaningful learning, as well as improve students' overall competence (Aliddin et al., 2024).’ This indicates that integrating these two approaches is a strategic solution for improving the quality of learning and teacher competence in a sustainable manner (Budiyanto, 2025).

Facts in the field show that although most civil servant teachers at the Center of Excellence Vocational School already have basic knowledge of technology, they are not yet able to optimally utilize it in learning that integrates local culture (Arif et al., 2025). This condition indicates the need for training and professional development oriented towards strengthening both simultaneously and continuously (Susilowati et al., 2025). Based on this reality, the development of a strategy to improve teacher competence that focuses on the integration of local culture and digital literacy is very importan (Bogler & Somech, 2023). This strategy will help teachers create a learning process that is not only grounded in technical content but also has contextual meaning and fosters students' character and regional identity (Amilusholihah, 2024). Academically and practically, research on this strategy is expected to yield concrete, applicable solutions to improve the quality of education at the Banten Province Center of Excellence Vocational School. This aligns with the demands of the education sector, which prioritize innovation and relevance, as well as adaptation to the evolving needs of local and global communities (Aliddin et al., 2024).

In the past two years, research on teacher competency development has become increasingly diverse and in-depth, including an emphasis on social collaboration and the use of innovative technology. For example, a study conducted by (Sukriono et al., 2024) examined the influence of social media as an alternative learning tool for secondary school teachers. They found that social media can accelerate the learning process and increase student participation (Widya Rini, 2024). Teachers who manage social media effectively show increased pedagogical competence and confidence in integrating digital technology into everyday learning. On the other hand,(Wijayanti et al., 2025) conducted research on the development of teacher competencies through community-based training programs. They emphasised the importance of professional collaboration and active discussion in improving teachers' pedagogical insights and skills (Achmad fauzi 2021). The results showed that the success of the training depended heavily on the active involvement of teachers in the learning community, as well as the application of innovations that kept pace with technological developments and student needs (Nuro, 2023).

In addition, research conducted by (Lasrin et al., 2025) examined the use of augmented reality (AR) in science learning in primary and secondary schools. They found that using AR increased students' interest and understanding of scientific concepts and improved teachers' digital competence in implementing this cutting-edge technology (Heitink & Poortman, 2022). This study shows that teachers' mastery of AR technology can open new opportunities for interactive, engaging learning. Apart from technological development, character building is also a focus in recent research (Ahmad & Richardson, 2021b)C. Conducted research on local culture-based learning that utilizes digital applications to instill national character values. They emphasized that using applications that highlight local cultural wealth can strengthen national identity while improving teachers' competence in managing culture-based digital media (Gumelar, 2024).

These studies show that the development of teacher competencies is not only limited to technical and knowledge aspects, but also includes the ability to manage social media, learning communities, and the use of cutting-edge technologies such as AR and culture-based applications (Anwar & Dihan, 2023). The success of this approach depends heavily on training, mentoring, and adequate technological facilities. With the diversity of aspects examined, these recent studies provide a broad picture of the innovative needs in teacher competency development to face the dynamics of education today and in the future (World Economic Forum, 2023). If you would like a complete list of references in a specific format or other adjustments.

Finally, this study aims to formulate comprehensive and applicable strategies to strengthen civil servant teachers' competencies at the Banten Province Center of Excellence Vocational School. This strategy is expected to strengthen teachers' professionalism in integrating local culture. This improvement in competence is also expected to create a more contextual and innovative teaching and learning process that can respond to the needs of the times and enhance the competitiveness of graduates of the Banten Province Center of Excellence Vocational School. With proper implementation, this strategy can serve as a model for targeted teacher professional development to improve the quality of vocational education at the national and regional levels.

METHOD

This study employed a mixed-methods approach with an exploratory sequential design to develop and test a constellation model of civil servant teacher performance at Centers of Excellence Vocational High Schools in Banten Province, Indonesia. This design was selected because the study

began with a qualitative exploration of teacher performance indicators and was followed by quantitative testing of the model and research hypotheses. The research population consisted of all civil servant teachers working at Centers of Excellence Vocational High Schools in Banten Province. From this population, 254 teachers from 28 schools were selected using proportional random sampling, ensuring each school was represented in proportion to the number of civil servant teachers. The data used in this study comprised qualitative and quantitative data from both primary and secondary sources. Primary data were collected directly from teachers and school stakeholders, as well as through field observations. In contrast, secondary data were obtained from relevant institutional documents, school records, policy documents, and teacher performance reports. The details of the research population and sample distribution are presented in the following table.

Data collection was conducted through document analysis, interviews, questionnaires, and observations. Document analysis was used to identify formal policies, institutional standards, and existing teacher performance indicators. Interviews were conducted to explore contextual factors influencing teacher performance, while observations were carried out to examine actual practices in the school environment. Questionnaires were distributed to measure the variables included in the proposed constellation model. The qualitative data were analyzed using thematic analysis to identify recurring patterns, key themes, and performance indicators relevant to civil servant teachers at Centers of Excellence Vocational High Schools.

Meanwhile, the quantitative data were analyzed using path analysis to examine the relationships among variables and test the research hypotheses. In addition, a POP-SDM optimization analysis was conducted to determine the most effective strategy for improving teacher performance. The findings from the qualitative and quantitative phases were then integrated to formulate, validate, and strengthen the constellation model of civil servant teacher performance.

FINDINGS AND DISCUSSION

Findings

The findings of this study are presented in several tables: the research population and sample, research variables, predictive model testing, direct hypothesis testing, indirect hypothesis testing, and a summary of hypothesis testing results. The tables present the processed data used to examine the constellation model of teacher performance improvement among civil servant teachers at the Centre of Excellence Vocational Schools in Banten Province.

Table 1. Research Population and Sample

No.	Description	Data
1	Population of civil servant teachers at the Banten Province Centre of Excellence Vocational School	696
2	Number of schools	28
3	Sample of civil servant teachers	254
4	Sampling technique	Simple proportional random sampling
5	Sample size formula	Taro Yamane formula

Source: Data processed by the researcher, 2026.

Table 2 presents the variables analyzed in this study. Teacher Performance was the dependent variable, while Banten Local Leadership, Religiosity, Empowerment, Knowledge Management, Sabilulungan, and Information Technology Literacy were the independent and intervening variables in the constellation model.

Figure 1. Constellation of Teacher Performance Improvement Models

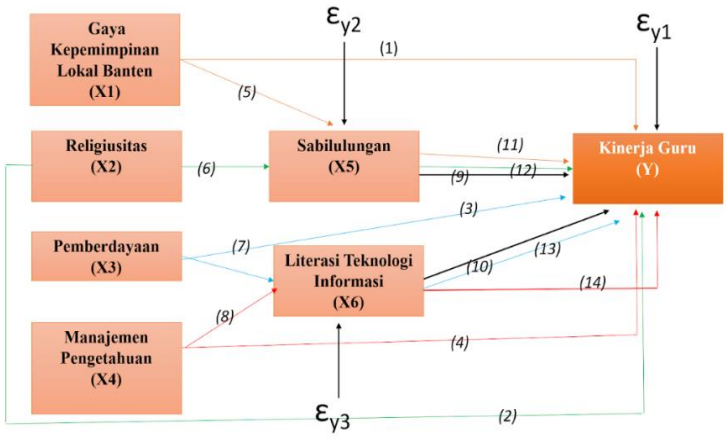


Figure 1 presents the constellation model of teacher performance improvement. The model illustrates the relationship among Banten Local Leadership, Religiosity, Empowerment, Knowledge Management, Sabilulungan, Information Technology Literacy, and Teacher Performance.

Figure 2. Outer Model

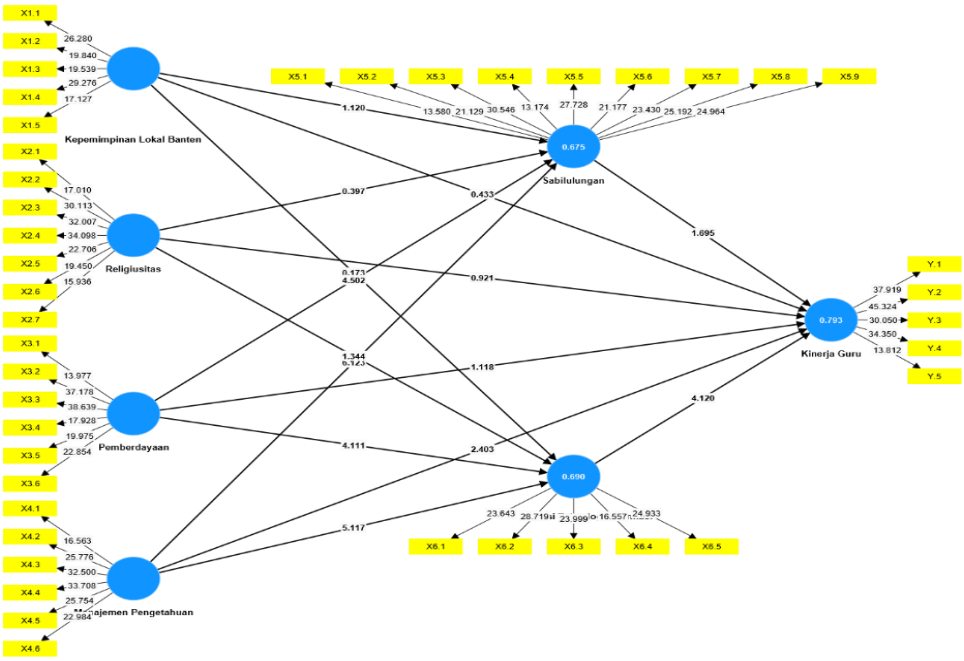


Figure 2 presents the outer model used in the PLS-SEM analysis. The model shows the relationship between latent variables and their indicators in the structural model.

Table 3. Predictive PLS and LM Models on Endogenous Variable Indicators

	Local Leadership in Banten	Teacher Performance	Information Technology Literacy	Knowledge Management	Empowerment	Religiosity	Sabilulungan
X1.1	**0,766**	0,502	0,568	0,592	0,517	0,662	0,559
X1.2	**0,774**	0,496	0,534	0,569	0,550	0,594	0,538
X1.3	**0,749**	0,518	0,490	0,557	0,502	0,622	0,460
X1.4	**0,817**	0,615	0,532	0,594	0,517	0,627	0,573
X1.5	**0,750**	0,545	0,466	0,563	0,524	0,600	0,461
X2.1	0,687	0,597	0,537	0,602	0,519	**0,721**	0,513
X2.2	0,566	0,548	0,535	0,611	0,543	**0,812**	0,492
X2.3	0,652	0,645	0,636	0,705	0,637	**0,848**	0,631
X2.4	0,667	0,635	0,644	0,740	0,662	**0,846**	0,608
X2.5	0,652	0,571	0,605	0,677	0,632	**0,807**	0,529
X2.6	0,588	0,534	0,563	0,569	0,566	**0,737**	0,502
X2.7	0,615	0,612	0,534	0,642	0,551	**0,729**	0,573
X3.1	0,650	0,629	0,561	0,659	**0,719**	0,653	0,621
X3.2	0,606	0,610	0,611	0,616	**0,866**	0,630	0,594
X3.3	0,572	0,632	0,642	0,608	**0,855**	0,617	0,605
X3.4	0,538	0,553	0,590	0,531	**0,775**	0,556	0,554
X3.5	0,589	0,623	0,604	0,644	**0,781**	0,624	0,631
X3.6	0,640	0,637	0,658	0,737	**0,767**	0,651	0,618
X4.1	0,542	0,684	0,620	**0,722**	0,522	0,603	0,626
X4.2	0,655	0,656	0,616	**0,818**	0,623	0,680	0,605

X4.3	0,609	0,690	0,669	**0,841**	0,678	0,712	0,679
X4.4	0,651	0,648	0,632	**0,854**	0,661	0,707	0,635
X4.5	0,586	0,613	0,636	**0,803**	0,629	0,689	0,610
X4.6	0,586	0,677	0,703	**0,825**	0,669	0,640	0,691
X5.1	0,530	0,593	0,540	0,681	0,596	0,568	**0,686**
X5.2	0,618	0,637	0,579	0,678	0,632	0,642	**0,749**
X5.3	0,585	0,695	0,662	0,674	0,670	0,624	**0,811**
X5.4	0,493	0,502	0,548	0,564	0,498	0,550	**0,682**
X5.5	0,468	0,674	0,697	0,586	0,616	0,517	**0,796**
X5.6	0,449	0,557	0,615	0,473	0,576	0,436	**0,761**
X5.7	0,481	0,600	0,703	0,531	0,533	0,449	**0,790**
X5.8	0,445	0,611	0,627	0,544	0,531	0,432	**0,796**
X5.9	0,538	0,678	0,713	0,671	0,623	0,569	**0,800**
X6.1	0,549	0,695	**0,821**	0,664	0,592	0,591	0,657
X6.2	0,563	0,697	**0,824**	0,686	0,685	0,612	0,691
X6.3	0,576	0,704	**0,776**	0,646	0,604	0,636	0,622
X6.4	0,488	0,647	**0,752**	0,546	0,574	0,533	0,628
X6.5	0,517	0,732	**0,925**	0,645	0,624	0,565	0,709
Y.1	0,588	**0,878**	0,792	0,696	0,693	0,646	0,737
Y.2	0,599	**0,883**	0,753	0,718	0,681	0,648	0,727
Y.3	0,602	**0,868**	0,694	0,703	0,651	0,663	0,674
Y.4	0,593	**0,860**	0,702	0,716	0,644	0,679	0,693
Y.5	0,569	**0,752**	0,651	0,575	0,615	0,561	0,609

Source: Data processed by the researcher, 2026.

Table 3 presents the comparison between the Partial Least Squares model and the Linear Model using RMSE, MAE, and Q^2_predict values. These values indicate the predictive strength and relevance of the model.

Table 4. Hypothesis Testing Results

No	Path	Original Sample (O)	T Statistics (O/STDEV)	P Values
1	Local Leadership of Banten → Teacher Performance	0.026	0.889	0.374
2	Local Leadership of Banten → ICT Literacy	0.011	0.352	0.725
3	Local Leadership of Banten → Sabilulungan	0.084	2.223	0.026
4	ICT Literacy → Teacher Performance	0.378	8.313	0
5	Knowledge Management → Teacher Performance	0.204	4.865	0
6	Knowledge Management → ICT Literacy	0.437	10.483	0
7	Knowledge Management → Sabilulungan	0.494	12.553	0
8	Empowerment → Teacher Performance	0.091	2.274	0.023
9	Empowerment → ICT Literacy	0.324		

Source: Data processed by the researcher, 2026.

Table 4 presents the results of direct hypothesis testing. The table presents the path coefficients, t-statistics, and p-values for each relationship in the structural model.

Table 5. Hypothesis Test of Indirect Effect

No	Path	Original Sample (O)	T Statistics (O/STDEV)	P Values
1	Knowledge Management → ICT Literacy → Teacher Performance	0.165	6.439	0
2	Empowerment → ICT Literacy → Teacher Performance	0.123	6.391	0
3	Local Leadership of Banten → Sabilulungan → Teacher Performance	0.017	1.617	0.106
4	Religiousness → Sabilulungan → Teacher Performance	0.007	0.788	0.431

Source: Data processed by the researcher, 2026.

Table 5 presents the results of the indirect effect testing. The table shows the indirect relationships among variables through ICT Literacy and Sabilulungan as intervening variables.

Table 6. Summary of Hypothesis Testing Results

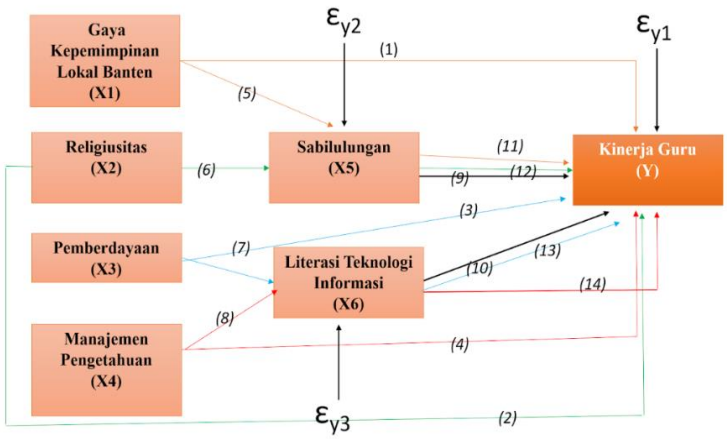
No	Hypothesis	Path Coefficient	Statistical Test	Decision	Conclusion
1	Local Leadership of Banten (X_1) on Teacher Performance (Y)	0.026	H_0: $\beta y_1 \leq 0$ **H_1: $\beta y_1 > 0$**	H_0 accepted H_1 rejected	No Direct Positive Effect
2	Religiousness (X_2) on Teacher Performance (Y)	0.074	H_0: $\beta y_2 \leq 0$ **H_1: $\beta y_2 > 0$**	H_0 accepted **H_1 rejected**	No Direct Positive Effect
3	Empowerment (X_3) → Teacher Performance (Y)	0.091	H_0: $\beta y_3 \leq 0$ H_1: $\beta y_3 > 0$	H_0 rejected H_1 accepted	Direct Positive Effect
4	Knowledge Management (X_4) → Teacher Performance (Y)	0.204	H_0: $\beta y_4 \leq 0$ H_1: $\beta y_4 > 0$	H_0 rejected H_1 accepted	Direct Positive Effect
5	Sabilulungan (X_5) → Teacher Performance (Y)	0.199	H_0: $\beta y_5 \leq 0$ H_1: $\beta y_5 > 0$	H_0 rejected H_1 accepted	Direct Positive Effect
6	ICT Literacy (X_6) → Teacher Performance (Y)	0.378	H_0: $\beta y_6 \leq 0$ H_1: $\beta y_6 > 0$	H_0 rejected H_1 accepted	Direct Positive Effect
7	Local Leadership of Banten (X_1) → Sabilulungan (X_5)	0.084	H_0: $\beta x5x1 \leq 0$ H_1: $\beta x5x1 > 0$	H_0 rejected H_1 accepted	Direct Positive Effect
8	Religiousness (X_2) → Sabilulungan (X_5)	0.033	H_0: $\beta x5x2 \leq 0$ H_1: $\beta x5x2 > 0$	H_0 accepted H_1 rejected	No Direct Positive Effect
9	Empowerment (X_3) → ICT Literacy (X_6)	0.324	H_0: $\beta x6x3 \leq 0$ H_1: $\beta x6x3 > 0$	H_0 rejected H_1 accepted	Direct Positive Effect
10	Knowledge Management (X_4) → ICT Literacy (X_6)	0.437	H_0: $\beta x6x4 \leq 0$ H_1: $\beta x6x4 > 0$	H_0 rejected H_1 accepted	Direct Positive Effect

11	Local Leadership of Banten (X_1) → Teacher Performance (Y) through Sabilulungan (X_5)	0.017	H_0: $\beta x5y_1 \leq 0$ H_1: $\beta x5y_1 > 0$	H_0 accepted H_1 rejected	No Positive Indirect Effect
12	Religiousness (X_2) → Teacher Performance (Y) through Sabilulungan (X_5)	0.007	H_0: $\beta x5y_2 \leq 0$ H_1: $\beta x5y_2 > 0$	H_0 accepted H_1 rejected	No Positive Indirect Effect

Source: Data processed by the researcher, 2026.

Table 6 summarizes the results of direct and indirect hypothesis testing. The table shows which hypotheses were accepted and rejected based on the path coefficients and statistical testing results.

Figure 1. Constellation of Teacher Performance Improvement Models



Discussion

According to (Arif et al., 2025), the population is the entire research. The population is a generalization area consisting of subjects or objects that have certain qualities and characteristics determined by the researcher to be studied, and then conclusions are drawn (Maulana & Sugianto, 2022). The population in this study was 696 civil servant teachers at the Banten Province Centre of Excellence Vocational School. A sample is a part or representative of the population being studied (Sugiyono, 2021). This study used a simple random sampling method, which is a method of sampling from members of the population using random selection without regard to the strata level of the largest population members (Creswell & Creswell, 2017). The sample was determined using a simple proportional random.

Proportional random sampling is a sampling technique in which all members have an equal chance of being selected according to the size of the population (Sugiyono, 2013). The sample size is

the number of civil servant teachers at the Banten Province Center of Excellence Vocational School, the research location, calculated using the Taro Yamane formula. In this study, the margin of error and confidence level used is 5%. The following is the Taro Yamane formula (Setyaningsih, 2021). Therefore, the sample size used in this study was **254** civil servant teachers at the Banten Province Center of Excellence Vocational School. The variables studied in this research are Teacher Performance (Y), Banten Local Leadership (X1), Religiosity (X2), Empowerment (X3), Knowledge Management (X4), Sabilulungan (X5), and Information Technology Literacy (X6).

The results of the research survey were analyzed using path analysis to analyze the causal relationships between variables and estimate the coefficients of several linear structural equations representing the hypothesized causal relationships. In a linear structural equation (Fullan, 2007), the influence of independent variables on the dependent variable can be direct and indirect. The indirect effect of independent variables on the dependent variable can be tested through intervening variables. The total effect of independent variables on the dependent variable is the sum of the direct and all indirect effects. SITOREM analysis was then used to strengthen the path analysis results by providing more detail on the research variable indicators, to identify indicators that need immediate improvement, maintenance, or development. These priority indicators are research findings used to develop the Action Plan (Hardhienata, 2017).

This section summarizes the information collected in a statistical-descriptive form. In addition, the authors must present the results of relevant inferential statistical analyses, for example, hypothesis testing, applied to the data (Anggoro et al., 2023). Report the results in detail so that the reader can see which statistical analysis you are using and why, and to justify your conclusions (Chandra et al., 2023). State all relevant findings, including those that contradict the hypothesis you proposed. Present your findings briefly, but each provides sufficient detail to justify the tone of the conclusions. This allows the reader to understand precisely what you are doing in analyzing the data and why (Afsar & Umrani, 2022).

Model estimation in *Partial Least Squares Structural Equation Modeling* (PLS-SEM) (Hair et al., 2021) refers to the process of calculating the model parameters needed to estimate the relationships between variables in a structural model (Andi Hermawan et al., 2023). This estimation is carried out using empirical data collected from the sample under study, and the purpose of model estimation is to produce a model that provides a good understanding of the relationships between variables within the established model constellation (Anggoro et al., 2023).

PLS Predict is a model validation stage that assesses the extent to which the proposed PLS model has optimal predictive power. Model strength is evaluated by comparing the PLS algorithm with the regression values from the linear model (LM) using Root Mean Square Error (RMSE), Mean Absolute Error (MAE), and Q2_predict. The following table shows the Root Mean Square Error (RMSE), Mean Absolute Error (MAE), and Q2_predict values from the PLS and linear models (LM).

The results indicate that all variables, ICT implementation effectiveness (X1), servant leadership (X2), knowledge management (X3), interpersonal communication (X4), and job satisfaction (X5), have positive and significant effects on teacher service quality (Y). The high indicator correlations within each variable, compared with those with other variables, confirm strong convergent validity, ensuring that all constructs are reliably measured.

Comparing the Partial Least Squares (PLS) model with the Linear Model (LM), the PLS model demonstrates lower Root Mean Square Error (RMSE) and Mean Absolute Error (MAE) values. Specifically, the minimum RMSE in PLS is 18, compared to 5 in LM, and the MAE averages 15 in PLS versus 8 in LM, suggesting that PLS produces more accurate and consistent predictions. The positive Q^2 predict values further confirm the model's strong predictive relevance, indicating that it can reliably forecast teacher service quality outcomes in practical settings.

The direct positive effects show that ICT effectiveness ($\beta y1 = 0.186$), servant leadership ($\beta y2 = 0.140$), knowledge management ($\beta y3 = 0.257$), interpersonal communication ($\beta y4 = 0.150$), and job satisfaction ($\beta y5 = 0.191$) significantly enhance teacher service quality. These findings align with established theories: effective ICT use supports interactive and efficient teaching(Zhang et al., 2024), servant leadership promotes motivation and collaboration(Shahzad et al., 2024), knowledge management improves organizational performance (Nonaka & Takeuchi, 1995), and effective communication strengthens coordination and relational trust (Robbins & Judge, 2017).

Although job satisfaction demonstrates positive indirect effects, the direct effects of X1 and X4 remain stronger, indicating that interventions should simultaneously enhance structural, managerial, and relational factors alongside teacher motivation. Overall, this study provides robust empirical evidence that the PLS model is both valid and highly predictive, offering valuable insights for educational leaders seeking to improve teacher service quality through technological, managerial, and interpersonal strategies (Choong & Ng, 2024).

CONCLUSION

The findings of this study indicate that the effectiveness of ICT implementation (X1), servant leadership (X2), knowledge management (X3), interpersonal communication (X4), and job satisfaction (X5) have positive and significant effects on teacher service quality (Y). The direct positive effect of ICT implementation ($\beta y1 = 0.186$) indicates that teachers who effectively utilize ICT can deliver more interactive, efficient, and high-quality educational services, in line with UNESCO (2021) and Al Hakim et al. (2021), and emphasizes the role of digital literacy in education.

Servant leadership also positively affects teacher service quality ($\beta y2 = 0.140$), supporting (Asih, 2024) theory that leaders who prioritize staff development and well-being enhance performance (Asih, 2024). Similarly, knowledge management positively influences service quality ($\beta y3 = 0.257$), reflecting Budiyanto's(Budiyanto, 2025) notion that knowledge sharing and management increase organizational effectiveness. Interpersonal communication ($\beta y4 = 0.150$) strengthens collaboration and coordination among teachers, consistent with organizational communication theories (Colquitt et al., 2018).

Job satisfaction positively affects service quality ($\beta y5 = 0.191$), in line with Adhinugraha (2024), suggesting that satisfied teachers are more committed, motivated, and willing to provide quality services. Furthermore, ICT, servant leadership, knowledge management, and interpersonal communication positively affect job satisfaction, indicating that supportive work environments and resources enhance teacher motivation and engagement.

Mediation analysis reveals that job satisfaction has a positive but limited indirect effect, suggesting that while it contributes to service quality, the direct effects of X1 and X4 are stronger. This implies that interventions to improve teacher service quality should focus not only on enhancing job satisfaction but also on strengthening ICT use, leadership, knowledge management, and communication directly. Overall, this study contributes to theory by integrating technological, managerial, and relational factors into the study of educational service quality and offers practical guidance for school leaders to enhance teacher performance.

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