



How Innovative Leadership Improves Primary School Service Quality: Evidence from Teacher Collaboration and Educational Data Management

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Abstract

Educational service quality has become a strategic indicator of school effectiveness, requiring principals to adopt innovative leadership approaches while strengthening collaborative professional practices and evidence-based educational management. This study aimed to analyze the direct and indirect effects of innovative leadership on elementary school service quality through the mediating roles of teacher collaboration and educational data management. A quantitative explanatory survey design with a cross-sectional approach was employed. The study involved 114 teachers from public elementary schools in Talun District, Pekalongan Regency, Indonesia, selected through proportional random sampling. Data were collected using validated questionnaires and analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS 4. The findings revealed that innovative leadership had a positive and significant effect on service quality, teacher collaboration, and educational data management. Teacher collaboration and educational data management also significantly enhanced school service quality. Furthermore, both variables functioned as partial mediators in the relationship between innovative leadership and service quality, with educational data management demonstrating a stronger mediating effect than teacher collaboration. These findings indicate that improving school service quality requires not only innovative leadership but also organizational mechanisms that foster professional collaboration and data-informed decision-making. This study contributes to the educational leadership literature by proposing an integrated model that explains how innovative leadership enhances school service quality through organizational collaboration and effective educational data management. The findings provide practical implications for strengthening principal professional development, collaborative school culture, and data-driven leadership to support continuous school improvement.

Introduction

School service quality has become one of the primary indicators for evaluating the effectiveness of educational provision, driven by increasing expectations for schools to deliver services that are adaptive, accountable, and responsive to the needs of students and other stakeholders (Prima et al., 2025; Eddy-Spicer et al., 2016; Isilebo et al., 2024). The concept of service quality in education is no longer confined to administrative efficiency but encompasses instructional quality, evidence-based decision making, responsiveness to change, parental satisfaction, and the school's capacity to foster a culture of continuous improvement. Previous studies have demonstrated that schools with high quality services tend to exhibit greater organizational effectiveness, higher stakeholder satisfaction, and improved academic outcomes (Mulyani et al., 2020; Hidayat & Wulandari, 2020; Afandi et al., 2021; Espinoza-Montes et al.,

2025; Muhammad, 2026). Simultaneously, rapid advances in digital transformation, the growing adoption of Artificial Intelligence (AI), and the implementation of Indonesia's *Merdeka Belajar* policy have compelled schools to shift from traditional administrative management toward innovative, collaborative, and data-informed governance models (Adams & Thompson, 2025; Rusdinal et al., 2024; Hojeij, 2024; Sucipto et al., 2024).

Within this context, innovative school leadership has emerged as a strategic determinant of an educational organization's ability to respond effectively to increasingly complex challenges (Syafiq et al., 2026). Innovative leadership extends beyond achieving organizational goals by emphasizing the leader's capacity to establish a shared vision, stimulate creativity, integrate technological innovation, cultivate organizational learning, and create a work environment that supports sustainable innovation (Hojeij, 2024; Teng et al., 2024; Pata et al., 2022). Principals who successfully integrate innovation into school governance have been shown to be more effective in strengthening organizational capacity, enhancing readiness for change, and promoting continuous school improvement (Adolfsson, 2024; Nehez & Håkansson Lindqvist, 2024; Rusdinal et al., 2024). Furthermore, leadership approaches that combine instructional, transformational, and spiritual dimensions significantly contribute to improving teacher performance and overall school effectiveness (Gunawan & Adha, 2021; Mulyani et al., 2020). Therefore, improving school service quality in the era of educational transformation cannot be separated from principals' ability to exercise innovative leadership capable of driving systematic and sustainable organizational change (Dewi, 2021; Hardianto et al., 2025).

However, the influence of innovative leadership on school service quality is not entirely direct. Rather, it operates through organizational processes that strengthen the school's capacity to achieve its educational objectives. One of the most influential mechanisms is teacher collaboration. Within the framework of the Professional Learning Community (PLC), teachers are viewed as members of a professional community who actively exchange knowledge, reflect on instructional practices, collaboratively solve educational problems, and collectively develop pedagogical innovations. Numerous studies have demonstrated that a strong collaborative culture enhances teachers' professional competence, collective efficacy, instructional quality, and schools' capacity to adapt to change (Oppi & Eisenschmidt, 2022; Liu et al., 2022; Chen et al., 2023; Wang & An, 2023; Huijboom et al., 2023). Moreover, the sustainability of professional learning communities largely depends on principals who can establish a shared vision, foster mutual trust, facilitate knowledge exchange, and promote goal interdependence among teachers, enabling collaboration to evolve into an organizational culture that supports continuous school improvement (Van den Boom-Muilenburg et al., 2023; Oude Groote Beverborg, 2024; Denée, 2024; Ghamrawi et al., 2024; Mthembu et al., 2025; De Jong et al., 2025).

In addition to teacher collaboration, the transformation of educational governance has highlighted the increasing importance of educational data management as the foundation for strategic decision-making. Contemporary schools are expected to manage both academic and non-academic data systematically to support planning, implementation, evaluation, and continuous quality improvement. Existing literature consistently emphasizes that data literacy among teachers and principals is a prerequisite for data-driven school improvement, as the ability to collect, analyze, interpret, and utilize educational data enables schools to formulate policies that are more accurate, evidence-based, and responsive to students' needs (Hegestedt et al., 2023; Michos et al., 2023; Lee et al., 2024). Likewise, the effective utilization of information systems and digital technologies strengthens evidence-based decision-making when supported by adaptive leadership and a collaborative organizational culture (Supriadi et al., 2021; Prasjo & Yuliana, 2021; Alonzo et al., 2024; Hase & Kuhl, 2024; Lee et al., 2025).

Consequently, teacher collaboration and educational data management represent two complementary organizational mechanisms through which innovative leadership is translated into more effective, adaptive, and sustainable school service quality.

Although numerous studies have established that school leadership, teacher collaboration, and educational data utilization are important determinants of educational effectiveness, empirical evidence integrating these three variables to explain elementary school service quality remains limited. Previous research has primarily focused on the direct effects of leadership on teacher performance or overall school effectiveness (Mulyani et al., 2020; Hidayat & Wulandari, 2020; Gunawan & Adha, 2021; Nellitawati et al., 2024), whereas studies on teacher collaboration have generally examined its relationship with professional competence and instructional innovation (Oppi & Eisenschmidt, 2022; Liu et al., 2022; Ghamrawi et al., 2024). Similarly, investigations into educational data management have largely concentrated on data literacy, information systems, or digital technologies in school decision-making without integrating these dimensions with innovative leadership and collaborative organizational practices into a unified explanatory framework (Supriadi et al., 2021; Michos et al., 2023; Alonzo et al., 2024; Lee et al., 2024; Lee et al., 2025). Consequently, a significant research gap remains regarding how innovative leadership enhances school service quality through the simultaneous mediating roles of teacher collaboration and educational data management.

This gap is also reflected in the conditions of public elementary schools in Talun District, Pekalongan Regency. Preliminary observations indicated that school service quality, innovative leadership, teacher collaboration, and educational data management had not yet reached optimal levels, particularly regarding the utilization of educational data as the basis for school decision-making. These findings suggest that improving school service quality requires not only principals capable of initiating organizational change but also a collaborative professional culture and effective data governance that support sustainable planning, implementation, and evaluation processes. Accordingly, this study offers a novel conceptual model integrating innovative leadership, teacher collaboration, and educational data management to explain elementary school service quality. Unlike previous studies that have tended to examine these variables separately, this study simultaneously investigates the direct effect of innovative leadership on school service quality and the mediating roles of teacher collaboration and educational data management within a single integrated structural model. The findings are expected to enrich educational management theory by providing a deeper understanding of the organizational mechanisms underlying school service quality improvement while offering empirical recommendations for school principals and policymakers in designing more collaborative, innovative, and data-driven strategies for enhancing the quality of elementary education.

Methods

This study employed a quantitative explanatory survey design with a cross-sectional approach. Data were collected at a single point in time to examine the relationships and predictive contributions among innovative leadership, teacher collaboration, educational data management, and primary school service quality. Because the study did not manipulate any variables and used cross-sectional data, the findings are interpreted as statistical relationships and predictive contributions rather than definitive causal effects. The study was conducted in 21 public elementary schools in Talun District, Pekalongan Regency, Central Java, Indonesia, from January to May 2026. The population comprised 162 teachers, and the individual teacher was the unit of analysis because all constructs were measured through teachers' perceptions.

The sample size was determined using the Krejcie and Morgan approach, which produced 114.15 respondents for a population of 162; therefore, 114 teachers were selected as the final sample. Proportional random sampling was used to ensure representation across the 21 schools. The number of respondents allocated to each school was determined using $nh = (N_h/N) \times n$, where nh represents the sample allocated to school h , N_h the number of teachers in school h , $N=162$ the total population, and $n=114$ the total sample. Within each school, eligible teachers were assigned identification numbers and selected randomly until the proportional quota was reached. The population consisted of 21 schools with seven or eight teachers per school. The original sampling table contained an inconsistency because its rounded school-level allocation totaled 120 although the calculated final sample was 114; therefore, the manuscript reports 114 as the final sample and the school-level allocation should be adjusted to total 114.

The questionnaire was adapted to the Indonesian public elementary school context from theoretically grounded constructs. Innovative leadership (X) was measured through four dimensions leader creativity, risk-taking ability, support for innovation, and change-oriented leadership comprising 51 items. Teacher collaboration (M1) comprised four dimensions continuity and cross-teacher interaction, depth of collaboration, focus on student learning and teaching, and preconditions and supporting structures with 36 items. Educational data management (M2) comprised 36 items covering data collection, data storage, data processing, and data dissemination. Primary school service quality (Y) was measured using the five SERVQUAL dimensions tangibles, reliability, responsiveness, assurance, and empathy with 45 items. Thus, the final questionnaire contained 168 items. All items used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The instruments were pilot-tested with 30 teachers who were not included in the final sample. Item validity was assessed using Pearson product-moment correlations with $r_{table}=0.361$, and all retained items exceeded the required criterion. Reliability testing produced Cronbach's Alpha coefficients of 0.980 for innovative leadership, 0.987 for teacher collaboration, 0.993 for educational data management, and 0.991 for service quality, indicating excellent internal consistency.

Data were collected through self-administered questionnaires after institutional permission had been obtained. Before participation, teachers were informed about the study objectives, the voluntary nature of participation, and their right to decline participation. Informed consent was obtained from all respondents. No personally identifying information was included in the analytical dataset, and responses were treated confidentially and reported in aggregate form. The research procedure included a formal permission stage before data collection. If formal ethical approval was not required by the relevant institution, this should be stated explicitly rather than reporting an approval number that was not obtained.

Data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS 4. The measurement model was evaluated through outer loadings, Average Variance Extracted (AVE), Composite Reliability, Cronbach's Alpha, Fornell-Larcker criterion, and HTMT. Outer loadings above 0.70, AVE above 0.50, and reliability coefficients above 0.70 were considered acceptable, while HTMT values below 0.85 indicated discriminant validity.

The structural model was evaluated using VIF, R^2 , f^2 , Q^2 , SRMR, and PLSpredict. VIF values below 5 indicated the absence of critical multicollinearity; R^2 assessed explained variance; Q^2 values above zero indicated predictive relevance; f^2 values of approximately 0.02, 0.15, and 0.35 represented small, medium, and large effects, respectively; and SRMR values below 0.08 indicated acceptable model fit. PLSpredict was used to assess out-of-sample predictive

performance by comparing PLS-SEM prediction errors with the linear-model benchmark; positive Q^2 predict values and lower PLS-SEM RMSE or MAE indicated predictive performance.

Hypothesis testing used 5,000 bootstrap resamples, with path coefficients (β), t -statistics, and p -values reported. Relationships were considered significant when $|t| > 1.96$ and $p < 0.05$. Mediation was assessed using specific indirect effects through teacher collaboration and educational data management. In addition to β , t , and p , 95% bootstrap confidence intervals were reported; an indirect effect was considered significant when the confidence interval did not include zero. Given the cross-sectional design, mediation results were interpreted as statistical indirect associations rather than evidence of temporal or causal mediation.

Results and Discussion

This study involved 114 teachers from public elementary schools in Talun District, Pekalongan Regency, Indonesia. The data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS 4. The analysis consisted of descriptive statistics, measurement model evaluation, structural model evaluation, hypothesis testing, and mediation analysis to examine the relationships among innovative leadership, teacher collaboration, educational data management, and school service quality.

Descriptive Statistics

Descriptive statistics were first calculated to describe the respondents' perceptions of the four research constructs. All variables were measured using five-point Likert-scale items. Therefore, the mean scores reported in Table 1 represent total construct scores rather than mean scores per item. Innovative leadership was measured using 51 items, teacher collaboration using 36 items, educational data management using 36 items, and school service quality using 45 items. Accordingly, the possible total-score ranges were 51–255, 36–180, 36–180, and 45–225, respectively.

The classification of “Very High” was based on the percentage of the maximum possible score, with scores falling within the highest category interpreted as very high. Thus, the mean scores should be interpreted relative to the maximum possible score of each construct rather than compared directly across constructs with different numbers of items.

Table 1. Descriptive Statistics of the Research Variables

Variable	Number of Items	Possible Score Range	Mean	SD	Dominant Category
Innovative Leadership	51	51–255	205.20	41.15	Very High
Teacher Collaboration	36	36–180	153.90	30.15	Very High
Educational Data Management	36	36–180	153.90	30.28	Very High
School Service Quality	45	45–225	192.38	36.69	Very High

The mean score for innovative leadership was 205.20, corresponding to approximately 80.47% of the maximum possible score. The mean scores for teacher collaboration and educational data management were both 153.90, corresponding to approximately 85.50% of their respective maximum scores. Similarly, the mean score for school service quality was 192.38, corresponding to approximately 85.50% of its maximum possible score. These findings indicate generally favorable perceptions across all four constructs. However, the absolute mean scores should not be directly compared because the constructs consisted of

different numbers of items. The original results reported the same mean and standard deviation values but did not specify the corresponding score ranges.

Measurement Model Evaluation

The measurement model was evaluated using outer loadings, Average Variance Extracted (AVE), discriminant validity, and construct reliability. All indicators demonstrated satisfactory outer loadings, ranging from 0.772 to 0.925, while the AVE values ranged from 0.707 to 0.782. Composite Reliability and Cronbach's Alpha values were also above the recommended thresholds, indicating satisfactory internal consistency and convergent validity of the measurement model. Discriminant validity was assessed using the Fornell–Larcker criterion and the Heterotrait–Monotrait Ratio (HTMT). The Fornell–Larcker criterion requires the square root of each construct's AVE to be greater than its correlations with other constructs, whereas HTMT values below 0.85 indicate satisfactory discriminant validity (Henseler et al., 2015). The results indicated that both criteria were satisfied, supporting the distinctiveness of the four constructs. Because only three tables are presented in this article, the detailed Fornell–Larcker and HTMT matrices are not reproduced separately. Nevertheless, these results should be retained in the supplementary SmartPLS output or supporting materials to allow verification of discriminant validity.

Structural Model Evaluation

The structural model was evaluated using Variance Inflation Factor (VIF), coefficient of determination (R^2), predictive relevance (Q^2), effect size (f^2), and the Standardized Root Mean Square Residual (SRMR). The VIF values ranged from 1.000 to 1.335, indicating that multicollinearity was not a critical concern. The SRMR value was 0.052, indicating an acceptable model fit. The R^2 value for school service quality was 0.739, while its Q^2 value was 0.508, indicating substantial explanatory and predictive relevance. The effect-size results indicated that educational data management had a strong contribution to school service quality, with $f^2 = 0.684$, while innovative leadership also demonstrated a strong contribution to school service quality, with $f^2 = 0.467$. The complete SmartPLS output should also be retained for the other structural paths to provide a comprehensive assessment of the model.

The analysis also included PLSpredict as part of the planned analytical procedure. However, because the complete PLSpredict output is not presented in the available results, including Q^2_{predict} and the RMSE/MAE comparison with the linear-model benchmark, the interpretation of predictive performance should be based only on the reported Q^2 results unless the complete PLSpredict output is available.

Hypothesis Testing

The direct relationships among the constructs were examined using a bootstrapping procedure with 5,000 resamples. For appropriate statistical reporting, p-values previously displayed as 0.000 are reported as $p < 0.001$. The results of the hypothesis testing are presented in Table 2.

Table 2. Results of Hypothesis Testing for Direct Structural Relationships

Relationship	β	t	p	Decision
Innovative Leadership → School Service Quality	0.383	7.216	<0.001	Supported
Innovative Leadership → Teacher Collaboration	0.262	2.526	0.012	Supported
Innovative Leadership → Educational Data Management	0.392	4.043	<0.001	Supported

Teacher Collaboration → School Service Quality	0.246	4.240	<0.001	Supported
Educational Data Management → School Service Quality	0.489	8.860	<0.001	Supported

As shown in Table 2, all proposed structural relationships were statistically significant. Innovative leadership was positively related to school service quality ($\beta = 0.383$, $t = 7.216$, $p < 0.001$), indicating that higher levels of innovative leadership were associated with higher levels of school service quality. Innovative leadership was also positively related to teacher collaboration ($\beta = 0.262$, $t = 2.526$, $p = 0.012$) and educational data management ($\beta = 0.392$, $t = 4.043$, $p < 0.001$). Furthermore, teacher collaboration was positively related to school service quality ($\beta = 0.246$, $t = 4.240$, $p < 0.001$). Educational data management demonstrated the strongest direct relationship with school service quality ($\beta = 0.489$, $t = 8.860$, $p < 0.001$). This result suggests that effective educational data management is an important predictor of school service quality within the proposed model. Overall, the findings support all proposed direct relationships. However, because the study employed a cross-sectional design, these findings should be interpreted as statistical relationships or predictive contributions rather than causal effects.

Mediation Analysis

Mediation analysis was conducted using specific indirect effects generated through the bootstrapping procedure in SmartPLS 4. The analysis examined whether teacher collaboration and educational data management mediated the relationship between innovative leadership and school service quality. The results are presented in Table 3.

Table 3. Specific Indirect Effects and Mediation Analysis

Mediation Path	β	t	p	95% Bootstrap CI	Interpretation
Innovative Leadership → Teacher Collaboration → School Service Quality	0.064	2.069	0.039	[0.004, 0.125]	Significant
Innovative Leadership → Educational Data Management → School Service Quality	0.191	3.795	<0.001	[0.092, 0.290]	Significant

As shown in Table 3, both indirect effects were statistically significant. The indirect relationship between innovative leadership and school service quality through teacher collaboration was significant ($\beta = 0.064$, $t = 2.069$, $p = 0.039$), with a 95% bootstrap confidence interval of [0.004, 0.125]. Because the confidence interval does not include zero, the mediating effect of teacher collaboration was statistically significant.

Similarly, educational data management significantly mediated the relationship between innovative leadership and school service quality ($\beta = 0.191$, $t = 3.795$, $p < 0.001$), with a 95% bootstrap confidence interval of [0.092, 0.290]. The indirect effect through educational data management was therefore statistically significant. The magnitude of the indirect effect through educational data management ($\beta = 0.191$) was greater than that through teacher collaboration ($\beta = 0.064$). This indicates that educational data management provided a stronger mediating pathway between innovative leadership and school service quality than teacher collaboration. The finding highlights the importance of strengthening data-management practices as part of the relationship between innovative leadership and the quality

of school services. Because the direct relationship between innovative leadership and school service quality remained significant after the mediating variables were included ($\beta = 0.383$, $p < 0.001$), both teacher collaboration and educational data management can be interpreted as partial mediators. Nevertheless, these findings indicate mediation relationships rather than causal mechanisms because the study used a cross-sectional research design.

Innovative Leadership and School Service Quality

The findings indicate a positive and significant relationship between innovative leadership and elementary school service quality ($\beta = 0.383$, $p < 0.001$). The result indicates that innovative leadership is positively associated with service quality rather than establishing a definitive causal effect, given the cross-sectional design. The R^2 value of 0.739 for school service quality indicates that the structural model, incorporating innovative leadership, teacher collaboration, and educational data management, explains 73.9% of the variance in service quality.

These findings support the theoretical perspective that innovative leadership extends beyond administrative management by positioning principals as change agents who cultivate adaptive organizational cultures, encourage continuous learning, and promote sustainable improvement. In elementary schools, innovative principals create environments that stimulate instructional innovation, strengthen communication with stakeholders, encourage the adoption of digital technologies, and improve school governance. Such leadership practices contribute to educational services that are more responsive, transparent, accountable, and centered on stakeholder needs

The present findings are consistent with previous studies emphasizing that innovative school leadership is fundamental to improving educational quality. Rusdinal et al. (2024) highlighted the importance of e-leadership and leaders' readiness for change in fostering instructional innovation. Similarly, Suryaman et al. (2024) demonstrated that change-oriented leadership strengthens digital learning implementation through enhanced teacher commitment and organizational readiness. Hojeij (2024) further argued that innovation-oriented leadership promotes school ecosystems characterized by creativity, collaboration, and continuous learning, while Pata et al. (2022) and Adolfsson (2024) emphasized that sustainable school improvement depends on leaders' ability to integrate organizational innovation, technology, and learning culture into school management. From a practical perspective, these findings suggest that improving school service quality requires principals to embed innovation throughout educational management by fostering creativity, utilizing digital technologies for evidence-based decision-making, and nurturing a culture of continuous improvement.

Innovative Leadership, Teacher Collaboration, and Educational Data Management

The findings also show positive and significant relationships between innovative leadership and teacher collaboration ($\beta = 0.262$, $p = 0.012$) and between innovative leadership and educational data management ($\beta = 0.392$, $p < 0.001$). The stronger coefficient for educational data management suggests that innovative leadership has a stronger predictive contribution to data-management practices than to teacher collaboration within this model.

Conceptually, innovative leadership combines organizational vision, human resource empowerment, and technology utilization to improve school effectiveness. Innovative principals facilitate teacher collaboration through joint planning, lesson study, professional learning communities, reflective supervision, and professional dialogue focused on instructional improvement. Simultaneously, they promote data-informed decision making by

integrating educational report cards, assessment results, attendance records, and student achievement data into school planning and evaluation.

The present findings are consistent with previous studies demonstrating that leadership plays a central role in developing collaborative professional cultures (Chen et al., 2023; Huijboom et al., 2023; Pan, 2023; Dennee, 2024; Ghamrawi et al., 2024; Mthembu et al., 2025; De Jong et al., 2025). Likewise, studies on data-informed educational leadership emphasize that effective school leaders improve organizational performance by strengthening data literacy, educational information systems, and evidence-based decision-making (Hegestedt et al., 2023; Michos et al., 2023; Alonzo et al., 2024; Hase & Kuhl, 2024; Lee et al., 2024; Lee et al., 2025).

Teacher Collaboration, Educational Data Management, and Service Quality

Teacher collaboration and educational data management were both positively associated with school service quality. The path coefficient for educational data management ($\beta = 0.489$, $p < 0.001$) was larger than that for teacher collaboration ($\beta = 0.246$, $p < 0.001$), indicating a stronger predictive contribution of educational data management within the model.

Teachers working within collaborative environments are more likely to exchange instructional strategies, jointly develop learning materials, evaluate student learning outcomes, and provide constructive feedback, thereby enhancing instructional consistency and service quality. These findings are consistent with previous studies demonstrating that collaborative professional cultures promote instructional innovation, strengthen professional learning communities, and improve overall school effectiveness (Chen et al., 2023; Huijboom et al., 2023; Pan, 2023; Dennee, 2024; Ghamrawi et al., 2024; Mthembu et al., 2025; De Jong et al., 2025).

The stronger contribution of educational data management highlights the growing importance of data-informed decision-making in contemporary school governance. The systematic use of student achievement data, attendance records, assessment results, educational report cards, and program evaluations enables schools to develop more objective, responsive, and evidence-based policies. This finding is consistent with studies by Hegestedt et al. (2023), Michos et al. (2023), Alonzo et al. (2024), Hase and Kuhl (2024), and Lee et al. (2024, 2025), which conclude that data literacy and integrated educational information systems enhance school effectiveness and support continuous quality improvement.

Mediating Role of Teacher Collaboration and Educational Data Management

The findings demonstrate significant indirect relationships through both mediators. The indirect pathway through teacher collaboration was $\beta = 0.064$ ($p = 0.039$), whereas the pathway through educational data management was $\beta = 0.191$ ($p < 0.001$). Thus, educational data management showed a stronger indirect predictive contribution than teacher collaboration.

From a theoretical perspective, these findings support the Resource-Based View (RBV) and Dynamic Capability Theory, which emphasize that organizational performance depends not only on leadership quality but also on the effective development and integration of internal organizational resources. Within the school context, innovative leadership provides strategic direction, teacher collaboration strengthens collective professional learning, and educational data management ensures that planning, implementation, and evaluation are guided by reliable evidence. The interaction among these organizational capabilities enables schools to provide educational services that are more effective, responsive, and student-centered. The present findings are consistent with previous studies showing that collaborative school cultures enhance teachers' professional learning and instructional improvement (Chen et al., 2023;

Ghamrawi et al., 2024; Mthembu et al., 2025; De Jong et al., 2025). Likewise, research on data-informed educational leadership has demonstrated that data literacy and evidence-based decision-making significantly improve organizational effectiveness and continuous school improvement (Hegstedt et al., 2023; Michos et al., 2023; Alonzo et al., 2024; Hase & Kuhl, 2024; Lee et al., 2024; Lee et al., 2025).

Conclusion

This study concludes that innovative leadership is a strategic determinant of improving elementary school service quality, both directly and indirectly through the strengthening of teacher collaboration and educational data management. The SEM-PLS analysis revealed that innovative leadership has positive and significant effects on school service quality, teacher collaboration, and educational data management. These findings indicate that principals who are capable of establishing a shared vision for change, promoting innovation, empowering teachers, and cultivating an adaptive organizational culture are more successful in enhancing the quality of educational services. Furthermore, both teacher collaboration and educational data management were found to have significant positive effects on school service quality. Compared with teacher collaboration, educational data management demonstrated a stronger contribution, highlighting that data informed decision-making has become a critical driver of service quality improvement in the era of digital transformation. The findings also confirmed that teacher collaboration and educational data management function as partial mediators in the relationship between innovative leadership and school service quality. Therefore, improving school service quality depends not only on principals' leadership capacity but also on schools' ability to foster collaborative professional cultures and establish effective educational data management systems that support continuous quality improvement through evidence-based decision-making.

Based on these findings, schools should strengthen principals' innovative leadership capacity through professional development programs emphasizing change leadership, collaborative leadership, and data-driven leadership. In addition, schools should establish sustainable professional learning communities, enhance educators' data literacy, and optimize the use of Educational Report Cards (*Rapor Pendidikan*) and school information systems to support evidence-based planning, implementation, and program evaluation. Future research is recommended to develop a more comprehensive model by incorporating additional variables, such as organizational culture, school digital transformation, innovation climate, organizational capacity, or stakeholder satisfaction as mediating or moderating variables. Expanding future studies across different educational levels and broader geographical contexts would improve the generalizability of the findings while contributing to the advancement of educational management theory, particularly regarding the organizational mechanisms through which innovative leadership enhances educational service quality.

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