

AI-ASSISTED RUPELINDA 2.0 TO MITIGATE KNOWLEDGE GAPS IN REGIONAL INNOVATION GOVERNANCE

Rossa Damayanti

Research and Innovation Division, Regional Development Planning, Research and Innovation Agency (Bapperida) of North
Bengkulu Regency, Indonesia

Corresponding author: rossadamayantimavro@gmail.com

Abstract

Knowledge transfer gaps in regional innovation management have become a critical challenge, particularly due to high operator turnover, which affects the quality of innovation maturity documents. This study aims to analyze the utilization of the AI-assisted Rupelinda 2.0 platform in mitigating these gaps and supporting the sustainability of regional innovation in North Bengkulu Regency. This study employed a quantitative approach using a one-group pretest–posttest design involving 33 operators from regional government agencies. Data were analyzed using a paired sample t-test. The results show a significant increase in the mean score from 34.54 to 43.24 ($\Delta = 8.70$; $t = -7.15$; $p < 0.001$), with a strong correlation ($r = 0.847$). These findings indicate that the AI-assisted platform effectively enhances operators' technical capacity while functioning as an institutional memory system to bridge knowledge transfer gaps and sustain regional innovation performance. Furthermore, this study provides practical insights into how local governments can transition from human-dependent to system-dependent knowledge management, offering a scalable model for smart governance in developing regions.

Keyword: *artificial intelligence, regional innovation, knowledge transfer, sustainability, Rupelinda 2.0*

Introduction

Digital transformation in the public sector has evolved from a mere technological shift into a national mandate. This transformation is strictly regulated under the Electronic-Based Government System (SPBE) framework, which is fundamentally aligned with Law Number 23 of 2014 concerning Regional Government and Government Regulation Number 38 of 2017 concerning Regional Innovation. In today's dynamic bureaucratic landscape, innovation is no longer an option but a critical resilience instrument designed to deliver effective, efficient, and inclusive public services. From a public administration perspective, investing in governance innovation aims to optimize organizational workflows and streamline the management of strategic regional resources.

However, significant challenges remain in ensuring that regional innovations achieve maturity standards that deliver tangible and measurable impacts. (Rahmanda, 2022) emphasizes that the low quality of regional innovation is often rooted in the limited technical competence of officials in meeting complex documentation requirements. On the other hand, high administrative workloads in the reporting process frequently trigger professional burnout within innovation management units, accumulatively degrading the quality of the overall regional innovation ecosystem (Sigalingging & Kartika, 2025).

This phenomenon triggers what is academically termed institutional amnesia (Laihonen et al., 2024). In the context of regional governance, when an experienced innovation assessor is transferred to another agency due to high employee turnover, the tacit knowledge and technical nuances of documenting innovation maturity are often lost with them. Consequently, new operators are forced to start from scratch, leading to repetitive errors and a lack of continuity in regional innovation development. This alignment matches the cognitive perspective that human memory is inherently prone to transience and decay over time (Schacter et al., 2012); hence, relying solely on individuals without systemic backups creates organizational amnesia. The loss of knowledge due to rotation represents a form of structural capacity loss that generates operational inefficiencies and slows down organizational performance through repetitive learning processes (Walsh, 1995).

Conversely, the emergence of Artificial Intelligence (AI) has begun to offer transformative solutions for bureaucratic efficiency (Komarudin et al., 2025). In the Society 5.0 era, the implementation of AI in public management functions as a primary driver of efficiency, enabling government agencies to operate more inclusively and responsively (Simanjuntak, 2023). Through the automation of routine administrative tasks, AI provides space for officials to shift their focus toward strategic public service problem-solving and high-level policy design (Bokhari & Myeong, 2022). Nevertheless, the adoption of AI in the public sector is not without obstacles; it still faces various technical and organizational challenges (Sun & Medaglia, 2019).

North Bengkulu Regency has demonstrated a strong commitment to this innovative path, consistently earning the "Innovative" predicate in the Regional Innovation Index (IID) (Bapperida Kabupaten Bengkulu Utara, 2025). However, a closer look at the data reveals a worrying anomaly between the quantity of innovations generated and the quality scores achieved between 2021 and 2025, which is detailed in Table 1.

Table 1. Regional Innovation Index Achievement of North Bengkulu Regency

Year	Number of Innovations	Regional Innovation Index Score
2021	50	52.61
2022	38	55.42
2023	29	48.16
2024	29	55.39
2025	60	54.37

Source: *Regional Development Planning Agency of North Bengkulu, 2026.*

The data in Table 1 indicates that in 2025, there was a sharp increase in the number of innovation proposals in North Bengkulu Regency, reaching 60 units. Paradoxically, the overall index score decreased compared to the achievement in 2024. The drop in scores during several previous assessment periods serves as a crucial empirical lesson that a large volume or quantity of innovation proposals without adequate evidence-based maturity documentation will yield lower "maturity parameters" and accumulatively decrease the overall Regional Innovation Index (IID) value.

Factually, the innovation ecosystem in North Bengkulu Regency is vast, encompassing Regional Government Agencies (OPD), sub-districts, and regional technical implementation units. Through conventional counseling methods that have relied on the physical presence of personnel from the Research and Innovation Division of Bapperida, the guidance and verification process for all these entities has reached a saturation point. This saturation point not only hinders the effectiveness of guidance but also triggers significant administrative time allocation inefficiencies. From a public management perspective, such conventional governance no longer meets the principles of administrative agility to accommodate assistance for innovation documents scattered across the regency.

Therefore, in 2026, the implementation of offline face-to-face regional innovation governance technical guidance was deliberately focused and prioritized on 33 primary OPDs as an upstream intervention in the regional innovation governance ecosystem. This strategy was objectively adopted to improve the efficiency of the span of control in guidance, while optimizing the standardization of collective innovation maturity document fulfillment.

As stated by (Laihonen et al., 2024), organizational knowledge continuity is a critical component of effective public administration, particularly in environments characterized by institutional complexity and dynamic administrative changes. To bridge the limitations of space, time, and guidance accessibility in North Bengkulu Regency, the transition from conventional counseling to Rupelinda 2.0 represents a paradigm shift from human-dependent knowledge management to system-dependent governance. Through the development of a microsite platform with AI-assisted features, Rupelinda 2.0 serves as a smart counseling center that provides interactive guidance services independently and sustainably. The presence of this platform not only assists the Bapperida innovation advisory team in maintaining institutional memory continuity so that it remains accessible at all times but also supports the fulfillment of innovation maturity indicators by Assessors in a more independent, precise, and sustainable manner. Based on the background described, this study explicitly addresses a fundamental research question: how effective is the application of the AI-assisted Rupelinda 2.0 platform in enhancing the technical capacity of Regional Innovation Assessors in North Bengkulu Regency.

Methods

This research evaluates the implementation of the AI-assisted Rupelinda 2.0 platform by using a quantitative approach with a pre-experimental design, specifically a one-group pretest-posttest approach. This design is systematically selected to examine the statistical mean score differences in the technical capacities of regional innovation assessors before and after the system intervention. The research locus is situated within North Bengkulu Regency, Bengkulu Province, focusing on the Development Planning, Research, and Innovation Agency (Bapperida) along with 33 primary Regional Government Agencies (OPD) as the executing entities of district-level governance.

The primary data used in this study consists of pretest and posttest structural capacity scores. These scores were gathered using a structured questionnaire containing 15 indicators, distributed directly to participants for independent fulfillment before and after system utilization. The sample size encompasses 33 individuals, establishing a total sampling or census technique due to the highly restricted population size and the homogeneous structural responsibilities of innovation assessors in North Bengkulu Regency. Incorporating the entire target population ensures every primary agency receives direct benefits from the platform intervention. The selection of a pre-experimental design without a control group is driven by practical administrative

constraints within local government structures, where isolating an independent control group is organizationally unfeasible. As argued by (Sugiyono, 2019), a pre-experimental design is highly appropriate for initial effectiveness testing in real-world settings where strict experimental controls or control groups are impractical to implement. Therefore, this approach aligns with experimental standards in public sector environments where pure random assignment cannot be established due to universal public service requirements.

Data preparation and structural analysis are performed through a systematic sequence to ensure accuracy, validity, and analytical objectivity. The first stage involves data preparation consisting of editing for complete and consistent responses, coding to convert qualitative instrument weights into standardized quantitative values, and tabulating entries into computerized spreadsheets. The second stage addresses instrument quality verification through validity and reliability testing. Instrument validity is assessed on the pretest dataset across the 15 indicators using the Pearson Product-Moment formula, where items are declared valid if the calculated correlation coefficient (r_{count}) exceeds the critical table threshold ($r_{\text{table}} = 0.344$) at a 5% significance level ($n = 33$). Reliability is confirmed using Cronbach's Alpha, where internal consistency is verified when the alpha value (α) ≥ 0.60 .

Hypothesis testing is executed in the third stage using a paired sample t-test to evaluate statistical differences between the mean scores of assessors before (μ_1) and after (μ_2) using the AI-assisted platform. The statistical hypotheses are structured as follows:

$$H_0 : \mu_1 = \mu_2$$

$$H_a : \mu_1 \neq \mu_2$$

The null hypothesis (H_0) states that the posttest mean capacity score equals the pretest score, indicating no significant system effect. The alternative hypothesis (H_a) establishes that the mean scores differ, demonstrating a significant improvement. Decision-making relies on the two-tailed significance value; if the p-value is less than 0.05, the null hypothesis is rejected in favor of the alternative hypothesis.

Results and Discussions

Research Data Description This study involved 33 respondents serving as innovation operators across 33 Regional Government Agencies (OPD) in North Bengkulu Regency. Based on the initial baseline data, the understanding levels among these operators prior to utilizing the Rupelinda 2.0 platform varied widely. The data demonstrated a distinct tendency toward low comprehension scores, particularly regarding the complex technical aspects required to fulfill regional innovation maturity indicators. This initial variance underscores the presence of knowledge gaps within the local bureaucratic ecosystem before the systemic intervention was introduced.

Instrument Requirement Test Results The research instruments were tested using the pretest dataset to ensure rigorous standards of validity and reliability before proceeding to hypothesis evaluation. The construct validity assessment showed that all 15 operational items possessed calculated correlation values (r_{count}) reaching 0.848, which significantly exceed the critical statistical table threshold ($r_{\text{table}} = 0.344$) at a 5% significance level. Additionally, the internal consistency testing yielded a Cronbach's Alpha value of 0.982, substantially higher than the standard reliability threshold ($\alpha > 0.60$). These diagnostic results confirm that the measurement instrument is highly valid, stable, and reliable for evaluating the overall effectiveness of the platform.

Effectiveness Analysis of Rupelinda 2.0 To evaluate the operational effectiveness of the platform, statistical score comparisons were executed between the pretest and posttest implementation stages. The statistical descriptive results and the paired difference testing parameters are summarized in Table 2.

Table 2. Paired Sample t-Test Results: Pre-Test and Post-Test Mean Scores

Parameter	Variable 1 (Pre-test)	Variable 2 (Post-test)
Mean	34.54545455	43.24242424
Variance	164.2556818	85.81439394
Observations	33	33
Pearson Correlation	0.84798129	-
Hypothesized Mean Diff.	0	-
Df	32	-
t Stat	-7.157825049	-
P(T≤t) one-tail	1.99619E-08	-
t Critical one-tail	1.693888748	-
P(T≤t) two-tail	3.99238E-08	-
t Critical two-tail	2.036933343	-

Source: Research Results, 2026.

The empirical results presented in Table 2 demonstrate highly significant capacity shifts. The mean technical score increased from 34.545 during the pretest to 43.242 in the posttest phase, indicating an absolute improvement of 8.70 points in operator comprehension. The two-tailed significance value, $P(T \leq t) = 3.992 \times 10^{-8}$, is substantially smaller than the standard alpha threshold ($\alpha = 0.05$), confirming that the capacity enhancement is highly significant. Furthermore, the absolute value of the calculated t-statistic $|-7.158| = 7.158$ is greater than the critical t-table threshold (2.037), thereby providing empirical justification to reject the null hypothesis (H_0). The Pearson correlation coefficient yields a value of 0.848, approaching a perfect positive relationship, which indicates that operators with initially low performance bounds demonstrated consistent improvements alongside their peers, validating the stable performance of the platform across diverse operator characteristics. Consequently, the alternative hypothesis (H_a) is accepted, proving that the AI-assisted Rupelinda 2.0 platform effectively enhances the technical capacity of public officials in preparing evidence-based innovation documentation.

Discussions Theoretically, the success of Rupelinda 2.0 in mitigating regional knowledge gaps aligns with the smart governance framework, where technology functions not merely as an automation tool but as an instrument for public value creation through digital integration. Furthermore, using AI as an intelligent assistant validates contemporary knowledge management theories in the public sector, which emphasize that organizational amnesia due to high staff turnover constitutes a primary challenge that disrupts the continuity of public service improvements. In this empirical context, Rupelinda 2.0 functions effectively as a digital institutional memory that permanently preserves technical standards and best practices regardless of personnel reassignments. The empirical increase of 8.70 points confirms that AI-assisted counseling successfully levels up competence among newly rotated operators who previously required months of manual coaching. This outcome supports the principle that AI implementation in public administration must reduce cognitive workloads for civil servants through structured knowledge repositories.

Four integrated functional pillars explain why Rupelinda 2.0 effectively closes institutional knowledge gaps. First, the AI Assistant, operating under the system moniker “Si Rupel”, acts as an externalization medium that helps operators transform implicit, unstructured ideas into explicit documentation, thereby preventing capacity loss caused by limited individual communication skills. Second, the integration of structured prompts establishes a cognitive thinking framework, ensuring consistent data logic and quality standards even when managed by newly assigned or novice staff. Third, the built-in data banks and standardized templates serve as an explicit knowledge repository that permanently stores regulations and evidence formats, which eliminates organizational amnesia when experienced employees rotate out of the organization. Fourth, the admin accessibility channel bridges automated AI efficiency with necessary human oversight via integrated communication channels, maintaining optimal quality control.

By transitioning from human-dependent knowledge management to system-dependent governance, Rupelinda 2.0 shifts the conventional bureaucratic work model; instead of relying heavily on individual expertise, operational documentation quality is directly guaranteed by the system framework itself (Silitonga et al., 2026). This supports the national mandate of the Electronic-Based Government System (SPBE) by proving that impactful digital transformation can be achieved through targeted, operationally efficient solutions rather than relying on high-capital investments. Beyond the immediate local scope of North Bengkulu Regency, these findings provide broader policy implications for many regions across Indonesia facing identical systemic challenges, such as high staff turnover, low documentation quality, and inconsistent innovation index performance. The implementation of Rupelinda 2.0 demonstrates that an AI-assisted smart counseling model can be replicated nationally as a standard administrative instrument to support sustainable and inclusive regional innovation governance.

Research Limitations This study possesses structural limitations, primarily within its pre-experimental design which did not incorporate an independent control group, thereby preventing direct comparison with operators completely isolated from the platform intervention. Additionally, external confounding variables such as prior individual administrative experience or varying digital literacy levels could potentially influence the initial baseline scores. Nevertheless, the exceptionally high correlation value ($r = 0.848$) provides strong statistical evidence that the observed technical capacity improvements are dominantly driven by the platform intervention itself, effectively minimizing the analytical threat of external variables.

Conclusion and Recommendations

Conclusion This study concludes that the AI-assisted Rupelinda 2.0 platform significantly improves the technical competence of regional innovation operators in North Bengkulu Regency. Through its integrated AI assistant, comprehensive knowledge bank, and structured guidance features, the platform successfully functions as an institutional memory system, effectively bridging the knowledge transfer gaps caused by high personnel turnover. This capacity shift is empirically proven by an absolute average score increase of 8.70 points and a highly significant statistical result ($P < 0.05$). Consequently, Rupelinda 2.0 successfully transforms the structural challenges of human resource dynamics into an organizational strength, ensuring consistent

quality of innovation maturity documents and supporting the long-term sustainability of regional innovation performance.

Recommendations Based on the empirical findings, several strategic recommendations are proposed to enhance the future development and sustainability of the system. First, regarding system updates, the innovation template database and guidance content within the platform should be continuously updated in strict accordance with the latest national regulations and assessment standards. Second, in terms of advanced feature development, future engineering should incorporate predictive analysis capabilities to automatically detect potential evidence-based document errors before the final submission to the national index system. Third, concerning scale-up implementation, this smart counseling model should be widely replicated in other regencies and cities across Indonesia to support the national digital transformation agenda. Finally, for future research directions, subsequent studies are highly recommended to expand this empirical baseline by conducting a comprehensive cost-efficiency analysis of the platform's implementation budget and investigating the long-term structural impact of routine institutional staff rotations on the sustainability of digital knowledge transfer.

Acknowledgement

The author expresses sincere gratitude to the Head of the Regional Development Planning, Research, and Innovation Agency (Bapperida) of North Bengkulu Regency for providing the necessary data, research facilities, and institutional support throughout this study. Special thanks are also extended to all regional innovation operators across the 33 Regional Government Agencies (OPD) who actively participated, utilized the platform, and provided the empirical data for this research.

References

- Bapperida Kabupaten Bengkulu Utara. (2025). *Evaluasi Penerapan Inovasi Daerah Kabupaten Bengkulu Utara*. Badan Perencanaan Pembangunan, Riset, dan Inovasi Daerah.
- Bokhari, S. A. A., & Myeong, S. (2022). Artificial Intelligence-Based Technological-Oriented Knowledge Management, Innovation, and E-Service Delivery in Smart Cities: Moderating Role of E-Governance. *Applied Sciences*, 12(17), 8732. <https://doi.org/10.3390/app12178732>
- Komarudin, D., Baharuddin, M., & Tjenreng, Z. (2025). Peran Kecerdasan Buatan Dalam Meningkatkan Efisiensi Pelayanan Publik Di Indonesia. *Jurnal Ilmiah Ilmu Pemerintahan*, 11(2).
- Laihonen, H., Kork, A.-A., & Sinervo, L.-M. (2024). Advancing public sector knowledge management: Towards an understanding of knowledge formation in public administration. *Knowledge Management Research & Practice*, 22(3), 223–233. <https://doi.org/10.1080/14778238.2023.2187719>
- Rahmanda, A. Z. (2022). Tata Kelola Dan Tantangan Penyelenggaraan Inovasi Daerah Di Indonesia. *Jurnal Transformasi Administrasi*, 12(02), 176–192.
- Schacter, D. L., Guerin, S. A., & St. Jacques, P. L. (2012). Memory distortion: An adaptive perspective. *Trends in Cognitive Sciences*, 16(2), 93–97. <https://doi.org/10.1016/j.tics.2011.11.014>
- Sigalingging, M., & Kartika, R. S. (2025). Policy strengthening strategy for regional innovation based on Government Regulation No. 38/2017: CIPP model. *Journal of Governmental Science and Policy*, 8(1), 45–62.
- Silitonga, A. F., Manalu, J. K., & Manalu, D. (2026). AI implementation in management information systems in digital era (Pt. 885-891). *Journal of Management and Economic Research*, 3(2). [<https://doi.org/10.61722/jrme.v3i2.9074>]
- Simanjuntak, H. (2023). Implementasi Kecerdasan Buatan dalam Era Society 5.0 di Sektor Publik. *Jurnal Ekonomi Publik*, 7(1), 50–65.
- Sugiyono. (2019). *Quantitative, Qualitative, and R&D Research Methods*. Alfabeta.
- Sun, T. Q., & Medaglia, R. (2019). Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare. *Government Information Quarterly*, 36(2), 368–383. <https://doi.org/10.1016/j.giq.2018.09.008>
- Walsh, K. (1995). *Public Services and Market Mechanisms: Competition, Contracting and the New Public Management*. Macmillan Press. (<https://link.springer.com/book/10.1007/978-1-349-24216-0>).

Author's Biography

Rossa Damayanti was born in Manna, South Bengkulu, on July 17, 1975. She earned her Bachelor's degree in Development Studies from the Faculty of Economics and Business at Universitas Bengkulu, Indonesia, and subsequently completed her Master's degree in Management from the same institution. She currently serves as a junior researcher and innovation analyst at the Regional Development Planning, Research, and Innovation Agency (Bapperida) of North Bengkulu Regency. Her primary research interests encompass regional innovation governance, MSMEs development, and public policy analytics.