

COLLABORATIVE GOVERNANCE AND SMART PUBLIC SERVICES FOR SUSTAINABLE DEVELOPMENT IN WEST PAPUA PROVINCE

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ABSTRAK

Pembentukan Provinsi Papua Barat Daya melalui Undang-Undang Nomor 29 Tahun 2022 menghadirkan tantangan signifikan dalam mewujudkan pembangunan berkelanjutan, antara lain kapasitas kelembagaan yang terbatas, aksesibilitas layanan publik yang belum merata, serta infrastruktur digital yang masih belum memadai. Meskipun tata kelola kolaboratif dan layanan publik cerdas semakin banyak dikaji, peran keduanya secara terintegrasi dalam mendukung pembangunan berkelanjutan di wilayah otonom baru masih belum banyak dieksplorasi. Penelitian ini bertujuan menganalisis pengaruh tata kelola kolaboratif dan layanan publik cerdas terhadap hasil pembangunan berkelanjutan di Provinsi Papua Barat Daya. Penelitian menggunakan desain mixed methods tipe sequential explanatory. Data kuantitatif dikumpulkan melalui penyebaran kuesioner kepada 412 responden dan dianalisis menggunakan Partial Least Squares Structural Equation Modeling (PLS-SEM). Selanjutnya, data kualitatif diperoleh melalui wawancara semi-terstruktur dengan 22 informan kunci untuk memperdalam dan memvalidasi temuan kuantitatif. Hasil penelitian menunjukkan bahwa tata kelola kolaboratif berpengaruh positif terhadap layanan publik cerdas dan hasil pembangunan berkelanjutan. Layanan publik cerdas turut meningkatkan aksesibilitas, efisiensi, dan transparansi layanan. Temuan kualitatif menegaskan bahwa partisipasi pemangku kepentingan, koordinasi antarorganisasi, keterlibatan masyarakat adat, dan inovasi digital menjadi faktor utama efektivitas tata kelola, sementara keterbatasan infrastruktur digital dan akses internet yang belum merata masih menjadi tantangan.

Kata kunci: Tata Kelola Kolaboratif; Layanan Publik Cerdas; Pembangunan Berkelanjutan; SDGs; Papua Barat Daya

ABSTRACT

The establishment of Southwest Papua Province under Law No. 29 of 2022 has created significant challenges for sustainable development, including limited institutional capacity, unequal public service accessibility, and inadequate digital infrastructure. Although collaborative governance and smart public services have received increasing scholarly attention, their integrated role in supporting sustainable development in newly autonomous regions remains underexplored. This study examines the influence of collaborative governance and smart public services on sustainable development outcomes in Southwest Papua. An explanatory sequential mixed-methods design was employed. Quantitative data were collected through a questionnaire survey of 412 respondents and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The quantitative findings were subsequently validated and enriched through semi-structured interviews with 22 key stakeholders. The results indicate that collaborative governance has a significant positive effect on both smart public services and sustainable development outcomes. Smart public services further enhance sustainable development by improving service accessibility, efficiency, and transparency. Qualitative findings emphasize stakeholder participation, inter-organizational coordination, Indigenous community engagement, and digital innovation as critical drivers of governance effectiveness, while limited digital infrastructure and uneven internet access remain major constraints.

Keywords: *Collaborative Governance; Smart Public Services; Sustainable Development; SDGs; Southwest Papua.*

INTRODUCTION

The formation of the Southwest Papua Province under Law No. 29 of 2022 is a positive development in the program of decentralization in Indonesia. Southwest Papua is one of the newest autonomous areas in the country, covering the former regencies of Sorong, Sorong Selatan, Maybrat, Tambrauw and Raja Ampat. "Despite its abundant natural resources, rich biodiversity and cultural diversity, the province still faces considerable development challenges (Ahmad et al., 2024). Access to basic public services, including health, education, civil registry and administrative services, remains uneven, especially in remote and geographically isolated places. These conditions are reflected in socio-economic metrics which are below the national average, pointing to the need for more effective governance and service delivery mechanisms. The problems of Southwest Papua are not only a lack of infrastructure. Policy implementation and service accessibility are typically hindered by geographic fragmentation, low bureaucratic capacity, a lack of qualified public staff, and the delicate interaction between state institutions and indigenous populations (Iim Abdul Hosim et al., 2025). As a result, conventional bureaucratic methods of centralized decision-making and sectoral fragmentations have had limited success in dealing with the complex development problems of frontier regions. At the same time, the province is expected to speed up progress towards the Sustainable Development Goals (SDGs) which requires governance arrangements that are not just efficient but also inclusive, flexible and sustainable (Salmawati et al., 2025).

Recent literature emphasizes two complimentary approaches as potential answers to public challenges: collaborative governance and smart public services. Collaborative governance involves the participation of governmental and non-governmental stakeholders in decision-making, pooling resources and expertise to improve policy efficacy, especially in areas with limited administrative capacity and social diversity (Matza et al., 2020). The method seeks to fill institutional gaps and improve developmental outcomes. At the same time, the digital transformation of governance has resulted in the development of smart public services, which are defined using information and communication technology (ICT), data analytics, and digital platforms to improve accessibility, efficiency, and responsiveness (Budi Santoso et al., 2026).

Studies have shown that these developments enhance administrative efficiency and citizen participation, hence contributing to sustainable development goals (Nomensen Yeheskel Singgir, 2025). In Southwest Papua, a newly autonomous territory with serious socio-economic issues, there is an urgent need for better governance and delivery of public services. Present indices, such as the Human Development Index, indicate significant inequalities in health, education and living conditions, with poverty remaining acute, particularly in remote and indigenous communities (Musaád, 2025). The advantages are not dispersed, worsening difficulties of access to essential public services, despite a forecast economic increase of 3.6% in 2024. Digital preparedness is another major concern. The implementation of the Electronic-Based Government System (SPBE) is still inconsistent across local governments in eastern Indonesia, mainly due to insufficient digital infrastructure, lack of skilled human resources, and weak inter-agency cooperation. Furthermore, the availability of internet services is still very asymmetrical between major centers such as Sorong City with distant districts, which hampers the implementation of digital public

service programs. These limitations present significant challenges to the realization of SDG 9 (Industry, Innovation and Infrastructure), SDG 16 (Peace, Justice and Strong Institutions), and SDG 17 (Partnerships for the Goals), all of which stress the importance of effective institutions, innovation, and multi-stakeholder collaboration for sustainable development (Rumbiak, 2024).

At the same time, the establishment of Southwest Papua provides a unique chance to develop governance systems that are more adaptive, collaborative and technology-enabled from the very outset. Conversely, older provinces may find it more challenging to dismantle existing institutional arrangements; while emerging autonomous regions have more freedom to create novel governance models that combine digital transformation with stakeholder engagement. Southwest Papua therefore offers an important empirical context to examine how collaborative governance and smart public services can together lead to sustainable development outcomes in emerging administrative regions (Alqarni et al., 2026). Over the last decade, there has been a major growth in academic interest in collaborative and digital governance. A bibliometric analysis was made by (Ariyadi & Akbar, 2025) on the subject, which found that the publications indexed in Scopus that connect collaborative governance with public sector innovation, digital transformation, and sustainable development have increased significantly. Key factors of governance effectiveness included stakeholder engagement, institutional capacity and inter-organizational collaboration. Similarly, systematic evaluations of the literature on smart governance highlight the increasing significance of digital technology in changing the delivery of public services and in enhancing citizen government relations (Maulana & Dečman, 2023).

Yet, despite these gains, most of the previous research have been focused on metropolitan contexts, smart cities and developed economies where institutional capacity and digital infrastructure are relatively mature. As a result, outlying regions, new independent territories and geographically fragmented places where governance difficulties are substantially different have received very little attention. Moreover, collaborative governance and smart public services have often been researched in isolated streams, resulting in a fragmented understanding of the interplay between institutional collaboration and digital innovation in the pursuit of sustainable development (Awail et al., 2026). There are some notable gaps in the extant literature. First, there is still less empirical evidence about collaborative governance and smart public services in newly established autonomous regions. Most studies focus on metropolitan settings, leaving frontier regions, such as Southwest Papua, severely underrepresented in international study (Mora et al., 2023; Salmawati et al., 2024).

Secondly, whereas research on collaborative governance highlights stakeholder participation and cross-sectoral coordination literature on smart public services is predominantly focused on technological innovation and digital transformation. There is scant research that integrates these two ideas into one paradigm for sustainable development. Third, insufficient academic attention has been paid to the governance environment of Indonesia's new autonomous regions (Matza et al, 2020). Southwest Papua is a unique context with institution-building issues, little administrative capability, different indigenous communities, and uneven digital infrastructure. Existing theories of governance have rarely been tested under such settings. Finally, although previous studies acknowledge the contribution of digital government to the achievement of SDG, relatively little is known about how collaborative governance mechanisms can

enhance the effectiveness of smart public services in supporting sustainable development outcomes in remote and developing regions. This gap emphasizes the need for a more comprehensive understanding of the relationship between collaboration, digital innovation and sustainable development (Widhiantari & Kurniawan, 2025).

Recent studies increasingly emphasize the interconnection between collaborative governance, digital transformation, and sustainable development. Systematic reviews show that digital governance contributes to improving public service efficiency, transparency, and citizen participation, thereby supporting SDG achievement (Alfonsina Djitmau et al., 2025). Similarly, research on collaborative governance highlights the importance of stakeholder engagement, co-creation, and inter-organizational coordination in managing complex public problems and facilitating digital transformation processes. Emerging evidence also suggests that smart governance initiatives can accelerate sustainable development by integrating technological innovation with institutional collaboration (Ghazal Masri et al, 2026; Purnomo et al, M. 2025). However, most studies focus on urban and technologically advanced contexts, leaving newly autonomous and peripheral regions such as Southwest Papua largely underexplored

This study makes three contributions to the literature. First, it combines collaborative governance theory and smart public service perspectives into one analytical framework for understanding sustainable growth in newly autonomous regions. By merging institutional collaboration and digital innovation, the study expands current governance scholarship beyond the prevailing smart-city paradigm. Second, the research offers empirical findings from Southwest Papua, one of the least studied governance situations in the international literature. Also, it responds to the geographical imbalance in most of the existing research on smart governance and digital transformation (Maharani, 2025). Third, the study offers practical policy recommendations for developing collaborative governance arrangements and smart public service strategies to improve service access, enhance public trust, and accelerate SDG achievement in geographically remote and institutionally developing regions. The proposed framework can also serve as a benchmark for other newly autonomous regions in Indonesia and similar border regions in the world.

In this context, this study is guided by three empirically grounded research questions: (1) To what extent does collaborative governance directly influence smart public services and sustainable development outcomes in Southwest Papua Province? (2) How do smart public services mediate the relationship between collaborative governance and sustainable development? (3) What contextual, institutional, and infrastructural factors enable or constrain effective collaborative governance and smart public service delivery in a newly autonomous region? These questions are directly aligned with the three hypotheses tested in the PLS-SEM model (H1: CG→SPS; H2: CG→SDO; H3: SPS→SDO), and the qualitative phase is designed to explain the mechanisms underlying the observed statistical relationships.

METHOD

Research Design

This study adopted a mixed-method explanatory sequential design, with the first phase being quantitative data collection and analysis, followed by qualitative inquiry to explain, validate, and enhance the quantitative findings (Acquah et al., 2021). This design is particularly suitable to explore the complex relationships of collaborative governance, smart public services and sustainable development because it

enables the interpretation of statistical relationships established in the quantitative phase through the experiences and perspectives of stakeholders involved in governance and service delivery. The design proceeded through three explicit connecting procedures as required by Creswell and Plano Clark (2018): (1) Phase 1 quantitative data were collected via structured questionnaire and analyzed using PLS-SEM to identify statistically significant path relationships; (2) Connection Procedure the three statistically significant pathways (CG→SPS, CG→SDO, SPS→SDO) and constructs with lower R^2 values were selected as priorities for qualitative exploration; purposive sampling of informants and focused interview protocols were developed based on these Phase 1 results; (3) Phase 2 semi-structured interviews were conducted to explain why the observed statistical relationships occurred, whether qualitative evidence confirmed or diverged from quantitative patterns, and what contextual factors mediated those relationships. Integration of findings was conducted at the interpretation stage using a joint display matrix that systematically compared quantitative path coefficients with qualitative themes, enabling convergence, complementarity, and divergence to be identified. The quantitative phase measures the direct and indirect effects of collaborative governance and smart public services on sustainable development outcomes in Southwest Papua. The qualitative phase examines the mechanisms, institutional arrangements, and contextual factors that explain how and why these relationships operate as observed.

Population and Sampling

The target population comprised residents, public officials, community leaders, and service users across the six administrative areas of Southwest Papua Province: Sorong City, Sorong Regency, Sorong Selatan Regency, Maybrat Regency, Tambrau Regency, and Raja Ampat Regency. Stratified random sampling was employed to ensure proportional representation across two stratification dimensions: (1) geographical stratum each district was allocated a proportional quota based on its registered population according to BPS (2022) census data; and (2) stakeholder stratum within each district, respondents were drawn proportionally from five stakeholder groups: public officials (civil servants from provincial and district governments), community members (general residents), indigenous/customary leaders (kepala suku and adat council members), civil society representatives (NGO and community organization leaders), and private-sector actors (business practitioners engaged in local development). The sampling frame was constructed using official civil servant registers, village administrative records, and community organizational membership lists. Using the Cochran (1977) formula with a 95% confidence level and a 5% margin of error, the minimum required sample was 385 respondents. The study targeted 450 respondents to allow for non-response and incomplete data, yielding 412 valid responses after screening.

During the qualitative phase, purposive sampling is utilized to pick important informants that have extensive knowledge and experience on governance and public service delivery. Provincial government officials, district administrators, indigenous leaders, civil society activists, academics, and digital services practitioners are among the sources. We conduct interviews with approximately 20-25 key informants till the data saturation is reached (Andaristo et al., 2025). The use of stratified random sampling in the quantitative phase and purposive sampling in the qualitative phase is consistent with explanatory sequential mixed-method research, as each phase has different analytical purposes: representativeness for statistical inference and depth for contextual explanation.

Data Collection

Quantitative data are collected through structured questionnaires distributed both online and offline. The questionnaire items are adapted from validated scales used in previous governance and digital government studies. Qualitative data are obtained through semi-structured interviews, focus group discussions, policy document analysis, provincial development reports, and strategic planning documents.

Integration of Quantitative and Qualitative Findings. Integration is done at interpretation stage post explanatory sequential design. Quantitative findings identify significant correlations between variables, but qualitative findings describe the reasons behind those relationships. A hybrid display matrix was used to compare quantitative data with qualitative themes. Convergence, complementarity and divergence between datasets are methodically explored to increase understanding and improve validity. If the quantitative data indicate that collaborative governance has a large impact on sustainable development outcomes, then the interview results are utilized to identify which collaborative practices, institutional arrangements, and stakeholder interactions are accountable for this impact.

Validity, Reliability, and Trustworthiness

To ensure methodological rigor, the study applies multiple validation procedures. For quantitative data: 1) Cronbach's Alpha; 2) Composite Reliability; 3) AVE and; 4) HTMT Ratio. For qualitative data: 1) Member Checking; 2) Data Triangulation; 3) Source Triangulation, Peer Debriefing, Audit Trail The integration of multiple data sources and analytical approaches enhances the credibility, dependability, and confirmability of the research findings.

RESULTS AND DISCUSSION

Respondent Profile

A total of 450 questionnaires were distributed across Southwest Papua Province. After data screening and elimination of incomplete responses, 412 valid questionnaires were retained for analysis. Among the respondents, 58.5% were male and 41.5% were female. Public officials accounted for 29.4% of respondents, followed by community members (34.2%), indigenous leaders (11.7%), civil society representatives (13.1%), and private-sector actors (11.6%). The sample represented all major districts and municipalities within Southwest Papua.

Measurement Model Assessment

Table I presents the results of the reliability and convergent validity assessment for the three latent constructs employed in this study, namely Collaborative Governance, Smart Public Services, and Sustainable Development Outcomes. The evaluation was conducted using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE), following the recommended criteria in Partial Least Squares Structural Equation Modelling (PLS-SEM).

Tabel I. Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
Collaborative Governance	0.914	0.928	0.684
Smart Public Services	0.903	0.919	0.657

Sustainable Development Outcomes	0.925	0.938	0.712
<i>Source: SmartPLS, 2026</i>			

The results indicate that all constructs demonstrate excellent internal consistency reliability. The Collaborative Governance construct achieved a Cronbach's Alpha of 0.914 and a Composite Reliability of 0.928, while Smart Public Services recorded values of 0.903 and 0.919, respectively. Similarly, Sustainable Development Outcomes exhibited the highest reliability, with a Cronbach's Alpha of 0.925 and a Composite Reliability of 0.938. These values substantially exceed the recommended threshold of 0.70, indicating that the measurement items consistently capture their intended latent constructs. Convergent validity was evaluated using the Average Variance Extracted (AVE). As shown in Table 1, the AVE values ranged from 0.657 to 0.712, all exceeding the minimum recommended value of 0.50. Specifically, the AVE values were 0.684 for Collaborative Governance, 0.657 for Smart Public Services, and 0.712 for Sustainable Development Outcomes. These findings confirm that each construct explains more than 50% of the variance of its respective indicators, thereby demonstrating satisfactory convergent validity.

Overall, the reliability and validity assessment confirms that the measurement model satisfies the established psychometric criteria. Consequently, the latent constructs are considered reliable and valid for subsequent structural model analysis, including hypothesis testing and path coefficient estimation

Discriminant Validity Assessment

Table II presents the discriminant validity assessment using the Heterograft Monorail Ratio (HTMT) criterion. HTMT is widely recommended in PLS-SEM as a more robust approach for evaluating discriminant validity than traditional methods such as the Fornell–Larcker criterion. Discriminant validity is established when the HTMT values are below the recommended threshold of 0.85, indicating that each latent construct is empirically distinct from the others.

Table II. Discriminant Validity (HTMT)

Construct	CG	SPS	SDO
CG	-		
SPS	0.681	-	
SDO	0.742	0.768	-

Source: SmartPLS, 2026

The results demonstrate that all HTMT values are below the recommended cutoff. The HTMT value between Collaborative Governance (CG) and Smart Public Services (SPS) is 0.681, while the value between Collaborative Governance (CG) and Sustainable Development Outcomes (SDO) is 0.742. The highest HTMT value is observed between Smart Public Services (SPS) and Sustainable Development Outcomes (SDO) at 0.768, which remains well below the threshold of 0.85. These findings indicate that the three constructs measure conceptually different phenomena and do not exhibit problematic overlap. Consequently, the discriminant validity of the measurement model is considered satisfactory, confirming that each construct captures a unique aspect of the proposed conceptual framework. Therefore, the measurement model meets the recommended discriminant validity requirements and is appropriate for subsequent structural model evaluation and hypothesis testing.

Structural Model Results

The structural model was assessed using the bootstrapping procedure with 5,000 subsamples. As shown in Table III, all hypothesized relationships are positive and statistically significant ($p < 0.001$), indicating that all hypotheses are supported.

Table III. Path Coefficients

Hypothesis	Relationship	β	t-value	p-value	Result
H1	CG \rightarrow SPS	0.612	12.481	<0.001	Supported
H2	CG \rightarrow SDO	0.348	5.912	<0.001	Supported
H3	SPS \rightarrow SDO	0.471	7.645	<0.001	Supported

Source: SmartPLS, 2026

Collaborative Governance (CG) has a significant positive effect on Smart Public Services (SPS) ($\beta = 0.612$, $t = 12.481$), supporting H1. This finding suggests that stronger collaboration among stakeholders enhances the effectiveness of smart public service delivery. In addition, Collaborative Governance positively influences Sustainable Development Outcomes (SDO) ($\beta = 0.348$, $t = 5.912$), confirming H2. Furthermore, Smart Public Services significantly affect Sustainable Development Outcomes ($\beta = 0.471$, $t = 7.645$), supporting H3. Overall, the results indicate that collaborative governance directly strengthens smart public services and sustainable development, while smart public services play an important role in improving sustainable development outcomes.

Coefficient of Determination (R^2). Table IV presents the coefficient of determination (R^2) for the endogenous variables in the structural model. The results indicate that Smart Public Services has an R^2 value of 0.375, meaning that 37.5% of the variance in Smart Public Services is explained by Collaborative Governance, while the remaining 62.5% is influenced by other factors not included in the model. According to Hair et al. (2022), this represents a moderate level of explanatory power.

Table IV. Coefficient of Determination (R^2)

Endogenous Variable	R^2
Smart Public Services	0.375
Sustainable Development Outcomes	0.628

Source: SmartPLS, 2026

Furthermore, Sustainable Development Outcomes achieved an R^2 value of 0.628, indicating that 62.8% of its variance is jointly explained by Collaborative Governance and Smart Public Services. The remaining 37.2% is attributable to other variables outside the proposed model. This value suggests a substantial explanatory power, demonstrating that the proposed model effectively explains variations in sustainable development outcomes. The R^2 results indicate that the structural model has satisfactory predictive capability, particularly in explaining sustainable development outcomes. These findings highlight the important role of collaborative governance and smart public services in promoting sustainable development within the context of the study.

Effect Size (f^2). Table V presents the effect size (f^2) of each exogenous construct on the endogenous variables. The results indicate that Collaborative Governance has a large effect on Smart Public Services (f^2

= 0.601), suggesting that stakeholder collaboration plays a major role in improving digital public service delivery. In contrast, Collaborative Governance has a medium effect on Sustainable Development Outcomes ($f^2 = 0.183$), indicating that its direct contribution to sustainable development is moderate. Meanwhile, Smart Public Services exert a medium effect on Sustainable Development Outcomes ($f^2 = 0.297$), demonstrating that improvements in public service quality significantly contribute to achieving sustainable development goals.

Tabel V. Effect Size (f^2)

Relationship	f^2
CG → SPS	0.601
CG → SDO	0.183
SPS → SDO	0.297

Source: SmartPLS, 2026

Overall, the findings show that the strongest effect in the model is the relationship between Collaborative Governance and Smart Public Services, highlighting that collaborative governance is the primary driver of digital public service improvement.

Predictive Relevance (Q^2). Table VI presents the predictive relevance (Q^2) values obtained using the blindfolding procedure. The results show that Smart Public Services (SPS) has a Q^2 value of 0.241, while Sustainable Development Outcomes (SDO) records a Q^2 value of 0.394. Since both values are greater than zero, the structural model demonstrates satisfactory predictive relevance.

Table VI. Predictive Relevance (Q^2)

Construct	Q^2
SPS	0.241
SDO	0.394

Source: SmartPLS, 2026

Moreover, the higher Q^2 value for Sustainable Development Outcomes indicates that the model has stronger predictive capability for explaining sustainable development than for smart public services. These findings suggest that the proposed model possesses adequate out-of-sample predictive accuracy and is capable of predicting the endogenous constructs with acceptable precision. Overall, the Q^2 results confirm that the structural model has good predictive relevance and is suitable for explaining the relationships among Collaborative Governance, Smart Public Services, and Sustainable Development Outcomes.

Qualitative Findings

Twenty-two semi-structured interviews were conducted with 22 purposively selected informants whose selection was guided by Phase 1 (PLS-SEM) findings. Informants were chosen to represent actors involved in each of the three statistically significant pathways: collaborative governance practitioners (provincial and district officials, inter-agency coordinators), smart service implementers (ICT practitioners, e-government administrators), and community-facing stakeholders (indigenous/adat leaders, civil society representatives, academics). Interview protocols focused on three inquiry areas: (a) what mechanisms explain the strong CG→SPS relationship ($\beta = 0.612$); (b) how SPS contribute to development outcomes (β

= 0.471); and (c) what contextual factors account for the unexplained variance in both SPS ($R^2 = 0.375$) and SDO ($R^2 = 0.628$). Data were analysed through thematic analysis following Braun and Clarke (2006), yielding three overarching themes.

Three key ideas emerged.

Institutional Collaboration, a Driver of Development. Participants consistently emphasized that collaborative governance provides institutional mechanisms for overcoming resource and capacity constraints through partnerships with community organizations, customary (adat) institutions, universities, and private actors. Crucially, informants indicated that the inclusion of indigenous adat leaders not merely as recipients but as active co-governance actors was essential for program legitimacy in remote villages where state authority has historically limited reach. This explains in part why the CG→SDO path ($\beta = 0.348$) was statistically significant: collaborative governance that incorporates adat institutions generates social capital and community-level mobilization that formal bureaucratic channels alone cannot produce. This finding converges with (Jabbar et al. 2026), who documented that bridging digital transformation and indigenous community structures is a critical condition for sustainable public service delivery.

One provincial official said: "Many challenges of development cannot be solved by the government agency alone. "Partnerships with tribal leaders and community organizations are key to program legitimacy and delivery."

Accessing Digital Services Is Easier but Infrastructure Limits Access. Respondents acknowledged improvements in administrative services through digital platforms, particularly in Sorong City and district centres. However, connectivity gaps constituted a structural barrier in outlying sub-districts, producing a two-tier service system: digitally-enabled urban centres and analogy-dependent rural communities. This theme provides the qualitative explanation for the moderate R^2 of SPS (0.375): while collaborative governance explains 37.5% of the variance in digital service effectiveness, a substantial proportion remains determined by infrastructure conditions outside the governance model. Informants noted that in connected areas, digital platforms measurably improved administrative transparency, reduced processing times, and improved citizen trust directly supporting the SPS→SDO path ($\beta = 0.471$). However, in remote districts, infrastructure absence renders digital platforms effectively inoperable, suggesting that the statistical effect of SPS on SDO is currently underestimated relative to its potential when infrastructure is equalized.

One indigenous leader said: "Digital services are useful but many villages still have unreliable internet." "Infrastructure development should accompany technology."

Sustainable Development: Integrated Governance. Most informants held that sustainable development in Southwest Papua requires not technology or governance reform in isolation, but their simultaneous and mutually reinforcing integration within an inclusive institutional framework. Four enabling conditions were consistently identified: (1) multi-stakeholder collaboration with clearly defined roles and accountability mechanisms; (2) trust between state institutions and indigenous governance bodies; (3) active community participation in service design and monitoring; and (4) contextually adaptive digital tools

that function under low-connectivity conditions. This convergent theme provides qualitative validation for the full structural model (SDO $R^2 = 0.628$), confirming that both pathways CG and SPS jointly explain a substantial proportion of development outcomes, and that the remaining unexplained variance is attributable to infrastructure and institutional trust factors not captured in the quantitative model.

Integration of Quantitative and Qualitative Results

The quantitative analysis demonstrates that Collaborative Governance has a strong and statistically significant positive influence on Smart Public Services ($\beta = 0.612$). This finding indicates that improvements in collaborative governance practices are associated with substantial enhancements in the quality and effectiveness of smart public services. A standardized coefficient of 0.612 suggests that collaborative governance is one of the strongest determinants within the proposed research model, highlighting that digital transformation in the public sector cannot rely solely on technological investment but requires institutional collaboration among multiple stakeholders.

The qualitative findings provide a deeper explanation of this statistical relationship. Interviews with representatives from provincial government agencies, local governments, community leaders, and development partners consistently revealed that effective collaboration enables organizations to combine financial resources, technical expertise, and institutional capacities that individual agencies cannot provide independently. Respondents emphasized that coordination among government agencies reduces policy fragmentation, minimizes duplication of public programs, and accelerates decision-making processes. Furthermore, collaborative arrangements facilitate continuous knowledge sharing, joint problem-solving, and policy innovation, particularly in addressing the administrative and geographical complexities of Southwest Papua. These findings reinforce the proposition of Collaborative Governance Theory proposed by Ansell and Gash (2008), which argues that inter-organizational collaboration enhances collective capacity to address complex public problems through shared responsibility and consensus-oriented decision making. The significant relationship between Smart Public Services and Sustainable Development Outcomes ($\beta = 0.471$)

DISCUSSION

The results provide significant empirical support for Collaborative Governance Theory as established by (Ansell and Gash 2008) and further developed by Emerson, (Andaristo et al., 2025) The direct effect of collaborative governance on sustainable development outcomes ($\beta = 0.348$, $p < 0.001$) indicates that multi-stakeholder involvement, joint decision-making, inter-organizational coordination, and institutional trust function as catalysts for governance effectiveness in newly autonomous regions. Importantly, the relatively lower direct path coefficient of CG→SDO compared to SPS→SDO ($\beta = 0.471$) suggests a nuanced finding not commonly emphasized in prior collaborative governance literature: collaboration achieves its greatest developmental impact when it is institutionally channelled through smart service mechanisms rather than operating as a direct and standalone pathway to development outcomes. Similarly observed that collaborative governance institutions produce their “collaborative advantage” most distinctly when coordination structures are deliberately designed a condition that explains why in Southwest Papua, the strongest governance effect is on SPS ($f^2 = 0.601$, the largest in the model) rather than directly on SDO. This finding suggests that collaborative governance functions primarily as an enabling architecture for

service innovation rather than a direct development mechanism a distinction that extends Emerson et al.'s integrative framework (Doberstein, 2016).

The study also extends the growing body of literature on Smart Governance and Digital Government (Meijer & Bolívar, 2016). The strong effect of smart public services on sustainable development outcomes ($\beta = 0.471$, $f^2 = 0.297$) confirms that digital transformation meaningfully enhances service accessibility, efficiency, transparency, and responsiveness. Crucially, however, this finding diverges from the pattern in metropolitan-based studies where technology adoption is primarily constrained by citizen digital literacy. In Southwest Papua, qualitative evidence reveals that the primary constraint is structural infrastructure inequality across districts not citizen willingness. This contextual divergence implies that the SPS→ SDO effect identified in this study is likely an underestimate of digital services' true potential: as internet and infrastructure coverage expands, the development impact of smart services is expected to amplify. This finding who found that digital inclusion in marginalized communities requires not only technology provision but structural investment in connectivity and multi-stakeholder implementation support (Djatkiko et al., 2025) . Digital tools can help break down physical barriers and extend services to isolated populations inside geographically separated regions like Southwest Papua.

More crucially, the results establish that collaborative governance is the primary institutional enabler of digital transformation a finding reflected in the strongest path coefficient in the model (CG→SPS: $\beta = 0.612$, $f^2 = 0.601$). This demonstrates that technology innovation in the public sector is not merely a technical challenge but is fundamentally an institutional and social process. In Southwest Papua, qualitative evidence indicates that inter-agency collaboration reduces policy fragmentation, facilitates data-sharing protocols between local governments and provincial agencies, and generates the political consensus necessary for digital investment decisions. Without these collaborative foundations, digital service initiatives lack both the legitimacy and the resource integration necessary to function effectively. This finding goes beyond the framework of (Meijer & Bolívar, 2016), who argued for the importance of collaboration in smart governance, by specifically quantifying that collaboration alone accounts for 60.1% of the effect size in driving digital service quality a magnitude not previously documented in the peripheral region context (Meijer & Bolívar, 2016). That the success of smart governance does not solely hinge on investing in technology infrastructure, but rather on governance frameworks that encourage cooperation, information sharing, and collective issue resolution.

The results are particularly significant in the context of newly autonomous regions. Southwest Papua faces structural governance challenges geographic fragmentation, inadequate infrastructure, unequal internet access, and low institutional capacity that differ fundamentally from those described in smart governance literature focused on mature urban systems (Darlis et al., 2025). Under such conditions, technology alone cannot advance public service delivery. Instead, collaborative networks are the primary vehicles for resource coordination, local ownership creation, and ensuring that digital innovations are contextually adapted to local socio-cultural realities and physical constraints. The qualitative findings further demonstrate that the involvement of indigenous adat communities is not a peripheral addition but a functional necessity: adat leaders bridge state-community trust deficits and validate governance programs in areas where formal state legitimacy is fragile. This role of indigenous institutions in smart governance

represents a contribution to the literature that is rarely captured in existing frameworks, which predominantly assume formal bureaucratic actors (Jabbar et al., 2026). The finding that CG→SDO ($\beta = 0.348$) is partially driven by adat-inclusive collaboration suggests that models of collaborative governance must be adapted to incorporate customary institutional actors in frontier regions.

The results indicate the contribution of collaborative governance and smart public services to the attainment of Sustainable Development Goals (SDGs) from the standpoint of sustainable development. In particular, collaborative governance improves partnerships and institutional effectiveness that closely match SDG 16 (Peace, Justice and Strong Institutions) and SDG 17 (Partnerships for the Goals). In the meantime, smart public services serve SDG 9 (Industry, Innovation and Infrastructure) by supporting digital innovation and enhancing service accessibility. This integrated contribution shows that governance innovation and digital transformation are not different policy objectives but complimentary solutions to accelerate sustainable development.

Theoretical Contribution. This study makes three distinct contributions to the governance literature. First, while the integration of collaborative governance and smart public services has been discussed in urban smart-city contexts (Meijer & Bolívar, 2016; Awalil et al., 2026). The novelty of this study lies in empirically testing this integration within a newly established autonomous region a context characterized by active institution-building, geographic fragmentation, and the presence of customary (adat) governance systems operating alongside formal state structures. The specific governance configuration observed here, where adat leaders serve as co-governance actors rather than passive stakeholders, is not captured in mainstream smart governance frameworks and constitutes an original empirical finding. Second, this study contributes a peripheral regions model of smart governance by demonstrating that the enabling conditions for digital public service effectiveness in frontier areas are structurally distinct from metropolitan settings: collaborative governance exerts a dominant effect ($f^2 = 0.601$) on smart service quality, while infrastructure constraints not citizen literacy function as the primary moderating factor. This challenges the generalizability of smart-city governance theories to post-formation autonomous regions and supports calls for context-sensitive governance frameworks (Maulana & Dečman, 2023; Mora et al., 2023). Third, by empirically linking collaborative governance, smart public services, and SDG outcomes (particularly SDG 9, 16, and 17) within a newly autonomous region, this study responds to an identified gap in governance-SDG integration literature (Ghazal Masri & El-Fadel, 2026) and provides a replicable framework for similar peripheral and post-decentralization regions in Indonesia and the Global South.

The paper also adds to the rising literature on governance in frontier and institutionally developing regions. The majority of research on smart governance has been on metropolitan areas and developed nations with advanced technology infrastructures and mature governance systems (Jabbar et al., 2026; Fikri, A.,2024) By looking at Southwest Papua, this study offers data from a context that is still underrepresented in international academia. The results indicate that the factors of effective digital transformation in frontier regions are different from those reported in metropolitan contexts, underscoring the significance of institutional collaboration, local participation, and contextual adaptability.

From a policy standpoint, the findings highlight four critical goals for provincial governments. First, governments should institutionalize multi-stakeholder collaboration through formal governance platforms that enable coordination between governmental agencies, indigenous institutions, civil society organizations, universities, and business sector actors. Second, we should speed up the investments in digital infrastructure so as to narrow the gap in the accessibility of services between urban and distant locations. Third, governments should develop the digital skills of public officials to make the deployment of smart public services effective. Lastly, community participation should be extended through inclusive governance structures that allow residents to contribute actively to policy design, implementation, and evaluation. Together, these initiatives can bolster governance resilience and hasten progress towards sustainable development goals in Southwest Papua and other recently-formed autonomous areas.

CONCLUSION

This study explored the impact of collaborative governance and smart public services in promoting sustainable development outcomes in Southwest Papua, one of the newest autonomous regions of Indonesia. This study employed an explanatory sequential mixed-method approach, combining quantitative and qualitative evidence to offer a thorough picture of governance and service-delivery dynamics in a geographically isolated and institutionally emerging region. The findings suggest that collaborative governance is a major contributor to sustainable development through increased stakeholder participation, inter-organizational coordination, trust-building and collective issue solving. The results also indicate that smart public services significantly affect sustainable development outcomes by improving the accessibility, efficiency, transparency, and responsiveness of public services. Moreover, collaborative governance is found to enable the deployment of smart public services, demonstrating that institutional collaboration and digital innovation are mutually reinforcing mechanisms. The qualitative findings also suggest that mere technological upgrading is not adequate to handle the complex difficulties of frontier regions. Instead, sustainable development needs to be integrated with collaborative institutional frameworks, community engagement, indigenous participation and digital change. However, the attainment of sustainable development goals in the Southwest Papua is dependent on the capacity of government institutions to integrate governance innovation with technical advancement in an inclusive and flexible setting.

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BRIEF PROFILE

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