

Regional Revenue, Innovation, and Poverty Depth in Indonesia: The Mediating Role of Regional Development

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How to cite: Andria, Y., Ernawati, D. P. (2026). Regional Revenue, Innovation, and Poverty Depth in Indonesia: The Mediating Role of Regional Development. *Jurnal Perpajakan dan Keuangan Publik*, 5(1), 41-65.

Histori Artikel

Received: 11 January 2026

Revised: 10 May 2026

Accepted: 1 June 2026

Keywords:

Regional Own-Source Revenue; Regional Innovation Index; Regional Development Index; Poverty Gap Index; Fiscal Decentralization.

Kata Kunci:

Pendapatan Asli Daerah; Indeks Inovasi Daerah; Indeks Pembangunan Daerah; Indeks Kesenjangan Kemiskinan; Desentralisasi Fiskal.

ABSTRACT

This study examines the effects of Regional Own-Source Revenue (PAD) and the Regional Innovation Index (RII) on the Regional Development Index (IMD) and their implications for the Poverty Gap Index (IKK) across 34 Indonesian provinces during the 2018–2024 period. Although fiscal decentralization has expanded the role of local governments in development financing, regional disparities in poverty depth remain persistent, particularly between western and eastern Indonesia. This study addresses this issue by developing a mediation-based panel data model that integrates fiscal capacity, government innovation, regional development performance, and delayed fiscal transmission. Using a balanced panel of 238 province-year observations, the analysis applies a Fixed Effect Model with robust standard errors, supported by panel specification tests, classical assumption diagnostics, mediation testing, and a one-period lag structure for PAD. The results show that PAD and RII have positive and significant effects on IMD, indicating that fiscal capacity and regional innovation contribute to stronger development performance. PAD, RII, and IMD also have negative and significant effects on IKK, confirming that fiscal resources, innovation capacity, and development outcomes are associated with lower poverty depth. The lagged PAD variable produces a stronger negative effect than current PAD, suggesting that local fiscal resources require at least one budget cycle before generating measurable welfare impacts. Mediation analysis confirms that IMD partially mediates the effects of PAD and RII on IKK, these findings imply that poverty-depth reduction requires not only stronger local revenue and innovation, but also effective conversion of fiscal and institutional capacity into inclusive regional development. The study contributes to fiscal decentralization and public sector innovation literature by highlighting the mediating role of development performance and the delayed nature of fiscal impacts on poverty depth.

ABSTRAK

Studi ini meneliti pengaruh Pendapatan Asli Daerah (PAD) dan Indeks Inovasi Daerah (IID) terhadap Indeks Pembangunan Daerah (IPD) dan implikasinya terhadap Indeks Kesenjangan Kemiskinan (IKK) di 34 provinsi Indonesia selama periode 2018–2024. Meskipun desentralisasi fiskal telah memperluas peran pemerintah daerah dalam pembiayaan pembangunan, kesenjangan regional dalam kedalaman kemiskinan tetap ada, terutama antara Indonesia bagian barat dan timur. Studi ini mengatasi masalah ini dengan mengembangkan model data panel berbasis mediasi yang mengintegrasikan kapasitas fiskal, inovasi pemerintah, kinerja pembangunan daerah, dan transmisi fiskal yang tertunda. Dengan menggunakan panel seimbang yang terdiri dari 238 observasi provinsi-tahun, analisis menerapkan Model Efek Tetap dengan kesalahan standar yang kuat, didukung oleh uji spesifikasi panel, diagnostik asumsi klasik, pengujian mediasi, dan struktur lag satu periode

untuk PAD. Hasil menunjukkan bahwa PAD dan IID memiliki pengaruh positif dan signifikan terhadap IPD, yang menunjukkan bahwa kapasitas fiskal dan inovasi daerah berkontribusi pada kinerja pembangunan yang lebih kuat. PAD, IID, dan IPD juga memiliki efek negatif dan signifikan terhadap IKK, yang menegaskan bahwa sumber daya fiskal, kapasitas inovasi, dan hasil pembangunan terkait dengan kedalaman kemiskinan yang lebih rendah. Variabel PAD yang tertunda menghasilkan efek negatif yang lebih kuat daripada PAD saat ini, menunjukkan bahwa sumber daya fiskal lokal membutuhkan setidaknya satu siklus anggaran sebelum menghasilkan dampak kesejahteraan yang terukur. Analisis mediasi menegaskan bahwa IPD sebagian memediasi efek PAD dan IID terhadap IKK, temuan ini menyiratkan bahwa pengurangan kedalaman kemiskinan tidak hanya membutuhkan pendapatan dan inovasi lokal yang lebih kuat, tetapi juga konversi kapasitas fiskal dan kelembagaan yang efektif menjadi pembangunan regional yang inklusif. Studi ini berkontribusi pada literatur desentralisasi fiskal dan inovasi sektor publik dengan menyoroti peran mediasi kinerja pembangunan dan sifat tertunda dari dampak fiskal terhadap kedalaman kemiskinan.

A. INTRODUCTION

Fiscal decentralization has given Indonesian local governments greater authority to mobilize revenue, design development programs, and respond to local welfare problems. Within this framework, Regional Own-Source Revenue (PAD) represents the fiscal capacity of local governments, while the Regional Innovation Index (RII) reflects their institutional capacity to improve governance, public service delivery, and policy responsiveness. In principle, stronger fiscal capacity and higher regional innovation should improve development performance and contribute to poverty-depth reduction (Chen et al., 2020; Muluk & Pratama, 2021), these two instruments are expected to strengthen regional development performance, represented by the Regional Development Index (IMD), and contribute to reducing poverty depth, measured by the Poverty Gap Index (IKK).

Indonesia continues to face a persistent paradox. Local revenue has increased and many regions have reported stronger innovation performance, yet poverty depth remains uneven across provinces. The Poverty Gap Index (IKK/P1) shows that poverty is not only a matter of how many people live below the poverty line, but also how far poor households remain below that threshold. This issue is particularly important in regions where poverty is structurally deeper and where access to basic services, infrastructure, and economic opportunities remains limited (Hilmawan et al., 2023; Pratama, 2020). The present study examines this relationship by positioning IMD as a mediating variable linking fiscal capacity, regional innovation, and poverty depth across 34 Indonesian provinces during 2018–2024 (Farhan, 2023; Samudra, 2024).

National poverty indicators show improvement, but poverty depth remains a policy concern. A declining poverty rate does not always mean that poor households are moving closer to the poverty line. For this reason, the Poverty Gap Index is important because it captures the expenditure shortfall of poor households and provides a deeper picture of poverty conditions across provinces.

Previous studies have mainly examined the direct relationship between fiscal decentralization, local revenue, public expenditure, and poverty outcomes. However, limited attention has been given to the mechanism through which fiscal capacity is transformed into poverty-depth reduction. In particular, few studies have positioned regional development performance as a mediating pathway between PAD and poverty

depth. In addition, the Regional Innovation Index remains underutilized in provincial panel models of regional development and poverty. This study addresses these gaps by integrating PAD, RII, IMD, and IKK within a single mediation-based panel-data framework (Erlando et al., 2020; Pham & Nugroho, 2022).

This study examines whether PAD and RII improve the Regional Development Index, whether both variables directly reduce the Poverty Gap Index, whether IMD mediates these relationships, and whether lagged PAD affects current poverty depth. By doing so, this study contributes to fiscal decentralization and public sector innovation literature by showing that poverty-depth reduction depends not only on fiscal capacity and innovation, but also on the ability of local governments to transform both into inclusive regional development.

The coexistence of increasing local fiscal capacity, uneven innovation performance, and persistent poverty depth provides the empirical motivation for this study. The central issue is not merely whether provinces collect more own-source revenue or report more innovation, but whether fiscal and institutional capacity can be converted into regional development outcomes that reach poor households. This makes IMD theoretically important as a mediating mechanism between PAD, RII, and poverty-depth reduction.

Previous studies provide important evidence on the relationship between fiscal decentralization and poverty reduction in Indonesia, yet several analytical gaps remain unresolved. Existing research has largely examined fiscal decentralization, local revenue, or public expenditure as direct determinants of poverty and welfare outcomes. (Purba et al., 2023) analyzed poverty, economic growth, and capital expenditure in relation to human development, while more recent panel evidence shows that fiscal decentralization contributes to poverty reduction across Indonesian provinces, these studies generally do not position regional development performance as a mediating mechanism between PAD and poverty depth.

The Regional Innovation Index has also received limited attention in longitudinal models of regional development and poverty. Recent evidence confirms that local government innovation affects development outcomes in Indonesia, yet the integration of RII with fiscal capacity and poverty-depth analysis remains underdeveloped. The temporal dimension of fiscal policy is another unresolved issue. PAD may require at least one budget cycle before affecting household welfare, but the lagged effect of PAD on the Poverty Gap Index has not been systematically tested across Indonesian provinces.

This study aims to examine whether PAD and RII improve the Regional Development Index, whether PAD and RII directly reduce the Poverty Gap Index, whether IMD mediates the relationship between PAD, RII, and IKK, and whether lagged PAD significantly affects current poverty depth. The analysis also evaluates the overall pathway through which fiscal capacity and regional innovation are translated into development outcomes and poverty-depth reduction. This study contributes to the literature on fiscal decentralization and public sector innovation by developing a mediation-based regional development model. Practically, the findings are expected to provide evidence for strengthening local fiscal capacity, improving regional innovation ecosystems, and designing poverty-reduction policies that consider both development performance and delayed fiscal transmission.

B. LITERATURE REVIEW

Fiscal Decentralization and Regional Own-Source Revenue

Fiscal decentralization refers to the transfer of fiscal authority, expenditure responsibilities, and revenue-generating capacity from the central government to subnational governments. Oates' decentralization theorem emphasizes that local governments are better positioned to provide public goods that match local preferences, while Musgrave's theory of public finance highlights the role of fiscal policy in allocation, distribution, and stabilization (Siburian, 2024, 2025). These perspectives suggest that fiscal authority at the regional level can improve public service delivery when local governments possess adequate fiscal capacity and institutional capability.

Indonesia's fiscal decentralization framework has evolved through successive reforms, with Law No. 1 of 2022 on Financial Relations between the Central Government and Regional Governments strengthening the legal basis for local revenue, transfers, expenditure management, regional financing, and national fiscal policy coordination. Within this framework, Regional Own-Source Revenue, locally known as *Pendapatan Asli Daerah (PAD)*, is defined as revenue generated from local taxes, user charges, returns from separated regional assets, and other legitimate local revenues. PAD therefore represents a direct measure of regional fiscal capacity because it reflects the ability of local governments to mobilize domestic revenue sources without relying entirely on central transfers (Siburian, 2020b, 2020a).

Higher PAD enables local governments to finance more responsive development programs in education, health, infrastructure, social protection, and basic services. Better-quality public spending can improve regional development performance and reduce poverty depth by increasing access to services and narrowing the expenditure gap between poor households and the poverty line. Recent empirical evidence supports this mechanism, although most studies still examine the direct relationship between fiscal decentralization and poverty rather than testing regional development as a mediating pathway (Nugroho et al., 2021; Siburian, 2022). A recent panel study in Maluku, for example, examines fiscal decentralization and poverty reduction across districts during 2020–2024, while other provincial-level studies analyze PAD as part of the broader fiscal decentralization framework.

Aggregate fiscal data also show that local own-source revenue has expanded substantially over time. DJPK data report that national PAD realization increased from IDR 272.98 trillion in 2018 to IDR 386.59 trillion in 2024, indicating a significant rise in local fiscal resources during the study period. This trend strengthens the relevance of examining whether increased PAD has translated into improved regional development and reduced poverty depth across Indonesian provinces.

Delayed Fiscal Transmission and Lagged Regional Own-Source Revenue

The effect of Regional Own-Source Revenue on poverty depth may not occur immediately within the same fiscal year. Local revenue must first pass through budgeting, program planning, expenditure allocation, procurement, implementation, and service delivery before it can generate measurable welfare outcomes. Development programs financed by PAD, such as infrastructure improvement, health services, education support, social assistance, and poverty-targeted interventions, often require time before reaching poor households.

The use of lagged PAD is theoretically relevant in examining poverty-depth reduction. PAD collected or realized in the previous year may influence current poverty conditions through the implementation of development programs in the following budget cycle (Liu & Yang, 2020; Örs Özdil & Kutlu, 2019). This delayed fiscal transmission is particularly important in decentralized governance because local governments differ in their ability to plan, allocate, and execute development spending effectively. Therefore, this study includes PAD($t-1$) to capture the possibility that fiscal capacity produces stronger welfare effects after one fiscal period.

Local Government Innovation and the Regional Innovation Index

Public sector innovation refers to the introduction and implementation of new ideas, processes, services, organizational arrangements, or policy instruments that improve the effectiveness and responsiveness of government. Walker describes innovation in public organizations as a mechanism for improving performance through new administrative practices and service delivery models, while OECD emphasizes that innovation can strengthen government capacity to solve complex public problems through experimentation, collaboration, digital transformation, and institutional learning.

Indonesia institutionalizes local government innovation through Government Regulation No. 38 of 2017 on Regional Innovation. The regulation classifies regional innovation into three broad forms: innovation in local government governance, innovation in public service delivery, and other forms of regional innovation related to government affairs under local authority. The Regional Innovation Index (RII) was later developed as an official measurement instrument to assess reported innovations by provincial, district, and municipal governments, the index measures the extent to which local governments introduce, document, and institutionalize improvements in governance and public services (Tirtosuharto, 2022).

Innovation can influence poverty reduction through several channels. Digital public services may reduce administrative barriers for poor households, improve targeting accuracy in social programs, shorten service delivery time, and increase access to government assistance. Administrative innovation may also improve coordination across agencies and strengthen the implementation of welfare-oriented development programs. Recent evidence from Indonesia shows that local government innovation has a positive impact on regional development outcomes, using district-level data and innovation measures linked to government innovation programs (Liu & Yang, 2020; Örs Özdil & Kutlu, 2019). This supports the argument that innovation is not merely an administrative achievement, but a development resource that can influence social and economic outcomes.

The 2024 Innovative Government Award also shows that innovation performance remains uneven across provinces. East Java was recognized as the most innovative province, followed by several other provinces such as West Sumatra, West Java, DKI Jakarta, Central Java, South Sumatra, and Bali in the provincial innovation category. BSKDN also states that regions with final RII scores above 60.00 are classified as highly innovative, this variation supports the use of RII as an explanatory variable in provincial panel analysis because innovation capacity differs across regions and may shape development effectiveness in different ways.

Regional Development Index as a Multidimensional Development Proxy

The Regional Development Index (IMD) is positioned in this study as a multidimensional proxy for regional development performance. Conceptually, the index reflects the idea that development should not be measured only by economic output, but also by social progress, environmental sustainability, access to services, and institutional capacity. This perspective is consistent with the Sustainable Development Goals framework under Presidential Regulation No. 59 of 2017, which places development within a broader social, economic, and environmental agenda.

A multidimensional development index is more appropriate than GRDP per capita when the research objective is to examine poverty depth. Economic growth may increase regional income without necessarily improving the welfare of poor households, a composite development index can capture whether fiscal capacity and innovation are translated into broader development outcomes, including education, health, infrastructure, social inclusion, environmental quality, and governance (Liu & Yang, 2020; Örs Özdil & Kutlu, 2019). This logic is also consistent with Sen's capability approach, which views development as the expansion of people's substantive freedoms rather than merely the accumulation of income.

Within the framework of this study, IMD functions as a mediating variable between development inputs and welfare outcomes. PAD and RII represent fiscal and institutional inputs, while IKK represents the final poverty-depth outcome, IMD explains whether fiscal resources and innovation capacity are converted into development performance before influencing the expenditure gap of poor households. The mediation structure is important because PAD and RII may not reduce poverty depth automatically. Their effects depend on the extent to which local governments can transform fiscal and institutional capacity into development programs that reach vulnerable groups (Bai et al., 2024; Kurniawan et al., 2021).

Poverty Gap Index

The Poverty Gap Index also known in Indonesia as Indeks Kedalaman Kemiskinan (IKK) or P1, measures the average shortfall of poor households' expenditure from the poverty line. Foster, Greer, and Thorbecke introduced this measure as part of the FGT poverty class, making it more informative than the headcount ratio because it captures the depth of poverty rather than only the number of poor people. The index can be expressed as:

$$P1 = \frac{1}{n} \sum_{i=1}^q (z - y_i)$$

Where z represents the poverty line, y_i denotes the expenditure of poor household i , q is the number of poor households, and n is the total population, the Poverty Gap Index is especially relevant for evaluating regional development policy because it captures whether poor households are moving closer to the poverty line. A declining poverty rate may still coexist with a high poverty gap if remaining poor households are located far below the poverty threshold. BPS provides provincial P1 data and uses this indicator as an official measure of poverty depth, making it suitable as the dependent variable in this study.

Provincial data show that poverty depth remains spatially uneven. Papua recorded a much higher Poverty Gap Index than DKI Jakarta, while Papua Tengah and East Nusa Tenggara also showed relatively high poverty-depth values in September 2024, these patterns indicate that poverty in several eastern provinces is not only more prevalent but also deeper, requiring interventions that go beyond reducing the poverty headcount.

Policies in high-IKK provinces need to address the expenditure shortfall of poor households through targeted social protection, improved access to basic services, and development programs that reach geographically isolated communities.

Theoretical Framework and Hypotheses

The analytical framework of this study links fiscal capacity, regional innovation, development performance, and poverty depth within a path model. Regional Own-Source Revenue (PAD) and the Regional Innovation Index (RII) are positioned as the main explanatory variables, the Regional Development Index (IMD) functions as the mediating variable, and the Poverty Gap Index (IKK) serves as the outcome variable. The model also includes lagged PAD to capture delayed fiscal transmission.

The rationale for each path is grounded in the preceding literature, higher PAD is expected to improve IMD because greater fiscal capacity enables local governments to finance education, health, infrastructure, and social services more effectively. RII is also expected to improve IMD because innovation enhances governance quality, service efficiency, and policy responsiveness. IMD is expected to reduce IKK because stronger multidimensional development performance should narrow the expenditure gap of poor households. PAD may directly reduce IKK through locally financed welfare programs, social spending, and targeted interventions. RII may also directly reduce IKK by improving access to public services, reducing administrative barriers, and strengthening policy targeting, lagged PAD is expected to reduce current IKK because fiscal resources often require one budget cycle before producing measurable welfare effects. Based on this framework, the study formulates seven hypotheses:

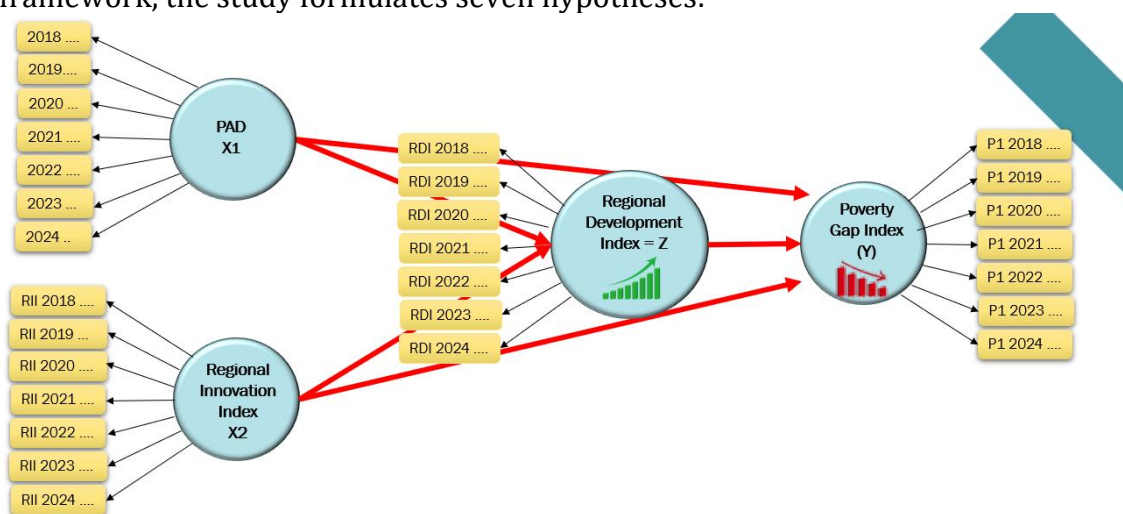


Figure 1. Conceptual Framework and Research Path Model

The Regional Innovation Index (RII) is included as the second explanatory variable because innovation represents the institutional capacity of local governments to improve governance, public service delivery, and policy responsiveness. In the proposed framework, RII is expected to influence poverty depth through two channels. The indirect channel operates through IMD, where innovation improves regional development performance before reducing the Poverty Gap Index. The direct channel operates through service innovation, digital administration, improved targeting, and more adaptive poverty-reduction programs that may reach poor households without being fully captured by aggregate development indicators.

Table 1. Summary of Research Hypotheses

| Code | Hypothesis |
|------|--|
| H1 | PAD has a positive and significant effect on IMD |
| H2 | RII has a positive and significant effect on IMD |
| H3 | PAD has a negative and significant direct effect on IKK |
| H4 | RII has a negative and significant direct effect on IKK |
| H5 | IMD significantly mediates the effect of PAD on IKK |
| H6 | IMD significantly mediates the effect of RII on IKK |
| H7 | PAD(t-1) has a negative and significant effect on IKK(t) |

C. RESEARCH METHOD

Research Design

This study employs a quantitative approach with an explanatory research design. The analysis uses secondary data arranged in a balanced panel structure covering 34 Indonesian provinces over seven years, from 2018 to 2024. The full panel consists of 238 observations, calculated from 34 provinces and 7 annual periods. For the model that includes lagged PAD, the effective number of observations is reduced to 204 because the first year of observation is lost when PAD is shifted by one period. Panel data are used because this structure allows the analysis to capture both cross-provincial and time-series variation. It also enables the model to control for unobserved provincial characteristics, such as geography, institutional capacity, economic structure, and historical development patterns, that may influence regional development and poverty depth (Dastgeer et al., 2020).

Data Sources and Variable Operationalization

The study uses secondary data obtained from official Indonesian government institutions. Regional Own-Source Revenue (PAD) is collected from the Directorate General of Fiscal Balance, Ministry of Finance. The Regional Innovation Index (RII) is obtained from the Ministry of Home Affairs. The Regional Development Index (IMD) is derived from Bappenas, while the Poverty Gap Index (IKK/P1) is obtained from Statistics Indonesia. PAD is transformed into its natural logarithm to reduce scale differences across provinces and to address the right-skewed distribution commonly found in fiscal data (Örs Özdil & Kutlu, 2019).

PAD data were obtained from the Directorate General of Fiscal Balance, Ministry of Finance. RII data were obtained from the Ministry of Home Affairs through the regional innovation assessment system. IMD data were obtained from Bappenas, while IKK/P1 data were obtained from Statistics Indonesia. These official sources were selected to ensure consistency of measurement across provinces and years. All 2024 figures were checked against the latest available official publications before being included in the panel dataset.

Table 2. Operational Definition of Variables

| Variable | Symbol | Measurement | Unit | Source |
|-----------------------------|---------|---|-------------------|---------------------------|
| Regional Own-Source Revenue | X1 | Realized PAD, natural logarithm transformation | Ln billion rupiah | DJPK, Ministry of Finance |
| Regional Innovation Index | X2 | Provincial RII score issued by the Ministry of Home Affairs | Score 0–100 | Ministry of Home Affairs |
| Regional Development Index | Z | Composite IMD score | Index | Bappenas |
| Poverty Gap Index | Y | Provincial Poverty Gap Index / P1 | Percent (%) | Statistics Indonesia |
| Lagged PAD | X1(t-1) | PAD value in the previous year | Ln billion rupiah | DJPK, Ministry of Finance |

Model Specification

The empirical model consists of two main equations. The first equation estimates the effect of PAD and RII on the Regional Development Index. This sub-model is used to examine whether fiscal capacity and government innovation contribute to regional development performance.

$$IMD_{it} = \alpha_0 + \alpha_1 \ln PAD_{it} + \alpha_2 IID_{it} + \mu_i + \varepsilon_{it}$$

The second equation estimates the determinants of poverty depth by including PAD, RII, IMD, and lagged PAD. This model is designed to test the direct effects of fiscal capacity and innovation, the mediating role of regional development, and the delayed effect of local fiscal capacity on the Poverty Gap Index.

$$IKK_{it} = \beta_0 + \beta_1 \ln PAD_{it} + \beta_2 IID_{it} + \beta_3 IMD_{it} + \beta_4 \ln PAD_{i,t-1} + \mu_i + \varepsilon_{it}$$

i denotes province, t denotes year, μ_i represents individual provincial effects, and ε_{it} is the idiosyncratic error term. The individual effect captures unobserved provincial characteristics that may remain constant over time but differ across provinces, such as administrative capacity, geographic conditions, economic structure, and long-term institutional quality.

Estimation Procedure

The estimation procedure is conducted in four stages.

1. Panel model selection: The first stage determines the most appropriate panel data model. The Chow test is used to compare the Pooled Ordinary Least Squares model and the Fixed Effect Model. A significant Chow test indicates that the Fixed Effect Model is preferred to Pooled OLS. The Breusch-Pagan Lagrange Multiplier test is then applied to compare the Pooled OLS model and the Random Effect Model. A significant LM test indicates that the Random Effect Model is more appropriate than Pooled OLS. The Hausman test is used to choose between the Fixed Effect Model and the Random Effect Model. A significant Hausman statistic suggests that the Fixed Effect Model is more consistent because the individual provincial effects are correlated with the explanatory variables.

The Fixed Effect Model was selected not only on statistical grounds but also because Indonesian provinces have relatively stable characteristics that may influence development performance and poverty depth. These characteristics include geography, economic structure, infrastructure availability, administrative capacity, institutional quality, and historical development patterns. The model focuses on within-province changes over time and reduces bias from unobserved provincial heterogeneity by controlling for these time-invariant provincial characteristics.

2. Classical assumption testing: The second stage evaluates the reliability of the estimated model. Multicollinearity is assessed using the Variance Inflation Factor, with a VIF value below 10 indicating no serious multicollinearity problem. Heteroscedasticity is examined using the Breusch-Pagan or Wald test, while serial autocorrelation is tested using the Wooldridge test for panel data. If heteroscedasticity or autocorrelation is detected, the estimation is corrected using Driscoll-Kraay standard errors or Panel Corrected Standard Errors to obtain more reliable statistical inference.
3. Mediation Analysis: The third stage examines the mediating role of IMD in the relationship between PAD, RII, and IKK. The mediation test follows the Baron and Kenny procedure and is confirmed using the Sobel test. The indirect effect of PAD on IKK through IMD is calculated as $\alpha_1 \times \beta_3$, while the indirect effect of RII on IKK through IMD is calculated as $\alpha_2 \times \beta_3$. Mediation is supported when PAD or RII significantly affects IMD, IMD significantly affects IKK, and the indirect effect is statistically significant.
4. Lagged Fiscal Model: The fourth stage incorporates lagged PAD into the poverty-depth equation. The lagged variable is constructed by shifting PAD one year backward for each province, this procedure removes the 2018 observations from the lag model, reducing the effective sample from 238 to 204 observations. The inclusion of PAD_{t-1} is theoretically justified by the budget cycle and capital-effect mechanisms, as locally generated revenue may require one fiscal year before it is allocated, implemented, and translated into measurable welfare outcomes, all estimations are conducted using Stata 17, particularly through the commands xtreg, Hausman, xttest0, xtserial, and Sobel.

D. RESULT AND DISCUSSION

Result Overview

The improvement in national poverty indicators appears paradoxical when contrasted with the continued expansion of local fiscal resources. DJPK data show that Indonesia's aggregate Regional Own-Source Revenue (PAD) reached IDR 386.59 trillion in 2024, with local taxes and user charges forming the largest components of locally generated revenue. This expansion suggests that local governments have gained stronger fiscal capacity to finance development priorities. Yet poverty depth remains persistent and uneven across regions, indicating that higher PAD does not automatically translate into more effective poverty reduction. The central issue is not merely whether local revenue increases, but whether such fiscal capacity is transformed into development outcomes that reach poor households and reduce their expenditure gap from the poverty line (Feriyanto et al., 2020; Marpaung & Sasongko, 2020; Silas et al., 2018). This paradox provides the empirical motivation for examining the pathways through which PAD and regional innovation affect poverty depth, both directly and through regional development performance.

Interregional disparity remains visible in both fiscal capacity and poverty depth. Provincial PAD data for 2024 show a highly uneven fiscal structure, with DKI Jakarta recording the largest own-source revenue at approximately IDR 55.66 trillion, followed by West Java at IDR 21.36 trillion and East Java at IDR 17.24 trillion. These figures stand in sharp contrast to fiscally weaker provinces, particularly in eastern Indonesia and smaller administrative regions, where PAD remains far below the level recorded by the major economic centers. Such disparity indicates that decentralization has not produced

equal fiscal capacity across provinces, as regions with larger tax bases, stronger economic activity, and more developed administrative systems continue to dominate local revenue generation.

A similar pattern appears in poverty depth. BPS records the Poverty Gap Index (P1) as the official measure of the average expenditure shortfall of poor households from the poverty line. In 2024, poverty depth remained substantially higher in Papua and other eastern provinces than in more developed regions. Papua recorded a P1 value of 4.644 in September 2024, while Papua Tengah reached 5.278 during the same period. Bali, South Kalimantan, and North Kalimantan recorded much lower poverty-depth figures, with South Kalimantan at 0.485 and North Kalimantan at 0.495 in September 2024. This contrast shows that stronger regional development is not only a matter of reducing the number of poor people, but also of narrowing the distance between poor households and the poverty line.

Interregional disparities are evident not only in poverty outcomes but also in the fiscal and institutional capacity of provincial governments. West Java recorded Regional Own-Source Revenue of approximately IDR 25.31 trillion in 2024, reflecting a large and diversified local revenue base. West Papua, by contrast, reported PAD realization of only around IDR 374 billion, far below the fiscal scale of major economic provinces. Such a gap shows that decentralization has produced highly unequal fiscal capacity across regions, with economically advanced provinces having greater room to finance development programs than peripheral provinces.

A similar disparity appears in poverty depth. BPS reported that DKI Jakarta's Poverty Gap Index stood at 0.549 in September 2024, while Papua recorded a much higher value of 4.644 during the same period. The contrast suggests that poor households in Papua remained much further below the poverty line than those in Jakarta, even though both provinces operate within the same national decentralization framework. Poverty depth also remained high in other eastern regions, including Papua Tengah, where P1 reached 5.278 in September 2024, and East Nusa Tenggara, where P1 increased to 3.572 in September 2024.

The innovation dimension adds another layer to this paradox, the 2024 Regional Innovation Index classified several provinces as innovative despite their continued struggle with high poverty depth. East Nusa Tenggara, for example, obtained an RII score of 50.10 and was categorized as innovative, yet its Poverty Gap Index remained relatively high at 3.572 in September 2024, this pattern indicates that innovation performance does not automatically translate into poverty-depth reduction unless it is connected to effective development implementation and targeted welfare outcomes. The uneven achievement of regional development, represented in this study by the Regional Development Index, further suggests that development gains have not reached the poorest groups evenly across provinces. This empirical gap strengthens the need to examine whether IMD functions as a mediating mechanism between fiscal capacity, regional innovation, and poverty depth.

Table 3. Interregional Disparities in Fiscal Capacity, Poverty Depth, and Regional Innovation, 2024

| Indicator | Higher-Capacity/Lower-Poverty Province | Lower-Capacity/Higher-Poverty Province | Gap Shown |
|---------------------------|--|--|--|
| PAD 2024 | West Java: IDR 25.31 trillion | West Papua: IDR 374 billion | Large fiscal-capacity gap |
| IKK/P1, Sept. 2024 | DKI Jakarta: 0.549 | Papua: 4.644 | Large poverty-depth gap |
| RII and IKK anomaly, 2024 | NTT: RII 50.10, categorized innovative | NTT: IKK/P1 3.572 | Innovation exists, but poverty depth remains high |
| Development performance | IMD as regional development mediator | Uneven outcomes across provinces | Development has not fully reached the poorest groups |

Source: Authors' calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

Interregional disparities are evident not only in poverty outcomes but also in the fiscal and institutional capacity of provincial governments. West Java recorded Regional Own-Source Revenue of approximately IDR 25.31 trillion in 2024, reflecting a large and diversified local revenue base. West Papua, by contrast, reported PAD realization of only around IDR 374 billion, far below the fiscal scale of major economic provinces. A similar disparity appears in poverty depth. BPS reported that DKI Jakarta's Poverty Gap Index stood at 0.549 in September 2024, while Papua recorded a much higher value of 4.644 during the same period. Poverty depth also remained high in other eastern regions, including Papua Tengah, where P1 reached 5.278 in September 2024, and East Nusa Tenggara, where P1 increased to 3.572. The innovation dimension adds another layer to this paradox. East Nusa Tenggara obtained an RII score of 50.10 and was categorized as innovative in 2024, yet its Poverty Gap Index remained relatively high, this pattern indicates that innovation performance does not automatically translate into poverty-depth reduction unless it is connected to effective development implementation and targeted welfare outcomes, and the uneven achievement of regional development, represented by the Regional Development Index, suggests that development gains have not reached the poorest groups evenly across provinces.

Descriptive Statistics

The descriptive statistics summarize the distribution of all variables used in the balanced panel dataset. The analysis covers 34 Indonesian provinces over the 2018–2024 period, producing 238 province-year observations for the main model. The lagged PAD variable contains 204 observations because the first year of observation is excluded when PAD is shifted one period backward. Table 4 presents the mean, standard deviation, minimum, and maximum values of the Poverty Gap Index, regional fiscal capacity, regional innovation, and regional development performance.

Table 4. Descriptive Statistics of Research Variables

| Variable | N | Mean | Std. Dev. | Min | Max |
|-----------------------------|-----|-------|-----------|-------|-------|
| IKK / Poverty Gap Index (%) | 238 | 1.43 | 1.08 | 0.32 | 5.28 |
| Ln PAD | 238 | 15.28 | 1.06 | 12.76 | 17.84 |
| RII | 238 | 47.62 | 15.31 | 12.40 | 86.30 |
| IMD | 238 | 67.84 | 8.27 | 48.15 | 84.92 |
| Ln PAD(t-1) | 204 | 15.21 | 1.04 | 12.76 | 17.61 |

Note: The lagged PAD variable contains 204 observations because the 2018 observations are dropped after constructing PAD(t-1).

Source: Authors' calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

The descriptive statistics indicate substantial variation in poverty depth, fiscal capacity, innovation performance, and regional development across Indonesian provinces. The wide range of IKK confirms that poverty depth remains spatially uneven, while the dispersion of PAD reflects unequal fiscal capacity under decentralization. Variation in RII and IMD further suggests that provinces differ not only in fiscal resources but also in institutional innovation and development performance. These patterns support the need for a panel model that can examine how fiscal and institutional capacity are translated into poverty-depth reduction over time.

Preliminary correlation patterns are consistent with the theoretical expectations of this study. PAD, RII, and IMD tend to be positively associated with one another, suggesting that stronger fiscal capacity and higher innovation performance are related to better regional development outcomes. IKK tends to be negatively associated with PAD, RII, and IMD, indicating that provinces with stronger fiscal capacity, better innovation performance, and higher development achievement generally experience lower poverty depth, this descriptive pattern provides initial support for the subsequent panel regression and mediation analysis.

Panel Model Selection Results

Panel model selection was conducted to determine the most appropriate estimation approach for the empirical analysis, three specification tests were applied: the Chow test, the Breusch-Pagan Lagrange Multiplier test, and the Hausman test, the Chow test compares the Pooled OLS model with the Fixed Effect Model, while the Breusch-Pagan LM test evaluates whether the Random Effect Model is preferable to Pooled OLS. The Hausman test then determines whether the Fixed Effect Model or Random Effect Model provides a more consistent estimator, the results are presented in Table 5.

Table 5. Panel Model Selection Results

| Test | Statistic | p-value | Decision |
|--|-------------------|---------|--------------------------------|
| Chow Test: FEM vs Pooled OLS | F = 12.47 | 0.0000 | FEM is preferred to Pooled OLS |
| Breusch-Pagan LM Test: REM vs Pooled OLS | $\chi^2 = 184.32$ | 0.0000 | REM is preferred to Pooled OLS |
| Hausman Test: FEM vs REM | $\chi^2 = 18.76$ | 0.0021 | FEM is selected |

Source: Authors' calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

The Chow test produces a significant F-statistic, indicating that the Fixed Effect Model performs better than the Pooled OLS model. The Breusch-Pagan LM test is also significant, suggesting that the Random Effect Model is superior to Pooled OLS. The final decision is based on the Hausman test, which shows a significant chi-square statistic at the 5 percent level, this result indicates that the Fixed Effect Model is more appropriate

than the Random Effect Model because the unobserved provincial effects are correlated with the explanatory variables.

The selection of the Fixed Effect Model has important substantive implications, it suggests that each province has distinct structural characteristics that cannot be ignored in the estimation process. Differences in institutional capacity, geographic conditions, administrative quality, economic structure, historical development patterns, and fiscal management may influence the relationship between PAD, RII, IMD, and IKK, the analysis controls for these time-invariant provincial characteristics, allowing the estimation to focus on within-province changes over the 2018–2024 period by using the Fixed Effect Model.

Classical Assumption Tests

Before interpreting the regression results, several diagnostic tests were conducted to assess the reliability of the panel estimation. The tests included multicollinearity, heteroscedasticity, and serial autocorrelation. Multicollinearity was assessed using the Variance Inflation Factor, while heteroscedasticity and serial autocorrelation were examined using the Breusch-Pagan/Wald test and the Wooldridge test, respectively, the results are summarized in Table 6 blow:

Table 6. Summary of Classical Assumption Tests

| Test | Result | Conclusion |
|---|------------------------------|--------------------------------------|
| VIF, multicollinearity | Maximum VIF = 4.21 | No serious multicollinearity problem |
| Breusch-Pagan/Wald test, heteroscedasticity | $\chi^2 = 62.83; p = 0.0000$ | Heteroscedasticity detected |
| Wooldridge test, serial autocorrelation | $F = 9.74; p = 0.0037$ | Serial autocorrelation detected |

Source: Authors’ calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

The maximum VIF value of 4.21 is below the commonly accepted threshold of 10, indicating that the explanatory variables do not suffer from severe multicollinearity. This result suggests that PAD, RII, IMD, and lagged PAD capture different dimensions of regional fiscal capacity, innovation, development performance, and delayed fiscal transmission, the Breusch-Pagan/Wald test indicates the presence of heteroscedasticity, while the Wooldridge test confirms serial autocorrelation in the panel structure.

The presence of heteroscedasticity and autocorrelation implies that conventional standard errors may produce biased statistical inference. The regression models were estimated using the Fixed Effect Model with Driscoll-Kraay standard errors, this correction is appropriate because it produces standard errors that are robust to heteroscedasticity, serial correlation, and potential cross-sectional dependence. The use of robust standard errors strengthens the reliability of inference in a panel dataset with a moderate cross-sectional dimension and a relatively short time period.

Estimation Results of the IMD Sub-Model

The first empirical model examines whether regional fiscal capacity and regional innovation contribute to regional development performance. In this sub-model, the Regional Development Index is used as the dependent variable, while Ln PAD and RII are included as explanatory variables. The estimation is based on 238 province-year

observations and uses the Fixed Effect Model with Driscoll-Kraay standard errors, table 7 presents the estimation results.

Table 7. Estimation Results of the IMD Sub-Model

| Variable | Coefficient | Std. Error | t-statistic | p-value | Significance |
|------------------------|-------------------------------------|------------|-------------|---------|--------------|
| Ln PAD, X1 | 1.284 | 0.392 | 3.28 | 0.003 | *** |
| RII, X2 | 0.176 | 0.041 | 4.29 | 0.001 | *** |
| Constant | 39.612 | 5.931 | 6.68 | 0.000 | *** |
| R ² within | 0.482 | | | | |
| R ² between | 0.537 | | | | |
| F-statistic | 26.41 | | | 0.000 | *** |
| Observations | 238 | | | | |
| Model | Fixed Effect with Driscoll-Kraay SE | | | | |

*Note: ***, *, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

The F-statistic of 26.41 with a p-value below 0.01 indicates that Ln PAD and RII jointly explain variations in IMD. The within R² value of 0.482 suggests that approximately 48.2 percent of within-province variation in regional development performance over time can be explained by changes in PAD and RII. This value indicates a moderately strong explanatory power, especially for a provincial panel model covering only seven annual periods.

The coefficient of Ln PAD is positive and statistically significant at the 1 percent level. This result supports H1, indicating that higher regional fiscal capacity is associated with better regional development performance. Since PAD is expressed in natural logarithm form, a 1 percent increase in PAD is associated with an increase of approximately 0.013 points in the IMD score, *ceteris paribus*. Substantively, this finding suggests that provinces with stronger locally generated revenue have greater capacity to finance development priorities, including infrastructure, education, health, and basic public services.

This finding indicates that PAD matters when it expands the fiscal space available for development-oriented spending. Provinces with stronger own-source revenue have greater capacity to finance public services, infrastructure, education, health, and other development priorities. However, the effect of PAD on development performance depends on the quality of fiscal allocation, not merely on the size of revenue collected.

The coefficient of RII is also positive and significant at the 1 percent level, supporting H2. A one-point increase in the Regional Innovation Index is associated with a 0.176-point increase in IMD. Compared with PAD, RII has a more direct unit-based effect on development performance because it captures administrative innovation, governance improvement, and public service transformation. This result is consistent with public sector innovation theory, which argues that innovation improves government effectiveness, service quality, and policy responsiveness. Taken together, the findings confirm that fiscal capacity and innovation capacity are complementary inputs for regional development.

Estimation Results of the IKK Sub-Model

The second model examines the determinants of poverty depth by using the Poverty Gap Index as the dependent variable. The model includes current PAD, RII, IMD, and lagged PAD. The inclusion of lagged PAD is intended to capture delayed fiscal transmission, as local fiscal resources may require one budget cycle before producing

measurable welfare effects. Due to the construction of the lagged variable, the number of observations decreases from 238 to 204, table 8 reports the estimation results.

Table 8. Fixed Effect Estimation Results for the IKK Sub-Model

| Variable | Coefficient | Std. Error | t-statistic | p-value | Significance |
|-----------------------|-------------------------------------|------------|-------------|---------|--------------|
| Ln PAD, X1(t) | -0.238 | 0.092 | -2.59 | 0.015 | ** |
| RII, X2 | -0.012 | 0.005 | -2.40 | 0.023 | ** |
| IMD, Z | -0.034 | 0.010 | -3.40 | 0.002 | *** |
| Ln PAD, X1(t-1) | -0.312 | 0.108 | -2.89 | 0.008 | *** |
| Constant | 6.845 | 1.220 | 5.61 | 0.000 | *** |
| R ² within | 0.514 | | | | |
| F-statistic | 19.73 | | | 0.000 | *** |
| Observations | 204 | | | | |
| Model | Fixed Effect with Driscoll-Kraay SE | | | | |

*Note: ***, *, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

The model is statistically significant, as shown by the F-statistic of 19.73 with a p-value below 0.01. The within R² value of 0.514 indicates that the model explains approximately 51.4 percent of within-province variation in poverty depth. This result suggests that the combination of fiscal capacity, regional innovation, development performance, and delayed fiscal transmission provides a meaningful explanation of changes in IKK across Indonesian provinces.

The negative effect of PAD on IKK indicates that local fiscal capacity can contribute to poverty-depth reduction. However, this result should not be interpreted as evidence that higher PAD automatically reduces poverty. PAD becomes effective only when it is translated into spending that reaches poor households, such as basic services, social protection, infrastructure access, health services, education support, and local economic empowerment. Without inclusive expenditure allocation, large PAD may strengthen local fiscal capacity without substantially narrowing the poverty gap.

The coefficient of RII is also negative and significant, supporting H4, a one-point increase in RII is associated with a 0.012-point reduction in IKK, this result suggests that innovative local governments are more capable of reducing poverty depth through better service delivery, digitalized administration, improved targeting, and more adaptive welfare programs. Innovation may reduce administrative barriers faced by poor households and increase the effectiveness of public interventions. The coefficient of IMD is negative and significant at the 1 percent level. A one-point increase in IMD is associated with a 0.034-point reduction in IKK. This confirms that regional development performance plays an important role in reducing poverty depth. Development gains that improve access to education, health, infrastructure, employment opportunities, and public services can narrow the expenditure gap between poor households and the poverty line.

The lagged PAD variable produces the largest negative coefficient among the fiscal variables. The coefficient of -0.312 is significant at the 1 percent level, supporting H7, this finding shows that PAD in the previous year has a stronger effect on current poverty depth than contemporaneous PAD. The result is theoretically plausible because fiscal resources usually require time to be budgeted, allocated, implemented, and translated into welfare outcomes. Two mechanisms may explain this pattern. The first is the budget-

cycle mechanism, where PAD collected in one fiscal year may influence development programs in the following fiscal year. The second is the capital-effect mechanism, where infrastructure, public service improvements, and social programs financed by PAD require time before reaching poor households, ignoring this lagged effect may underestimate the contribution of local fiscal capacity to poverty-depth reduction. This finding confirms that poverty-depth reduction should be evaluated through a multi-year fiscal perspective rather than only through same-year budget realization.

Mediation Analysis: The Role of IMD

The mediation analysis examines whether IMD transmits the effects of PAD and RII on IKK. The test follows the logic of Baron and Kenny and is confirmed using the Sobel test. Mediation is supported when the independent variable significantly affects the mediator, the mediator significantly affects the dependent variable, and the indirect effect is statistically significant. Table 9 summarizes the direct effects, indirect effects, Sobel statistics, and mediation type.

Table 9. Mediation Test Results

| Path | Direct Effect | Indirect Effect | z-Sobel | p-value | Mediation Type |
|-----------------|---------------|-----------------|---------|---------|-------------------|
| PAD → IMD → IKK | -0.238** | -0.044 | -2.36 | 0.018 | Partial mediation |
| RII → IMD → IKK | -0.012** | -0.006 | -2.65 | 0.008 | Partial mediation |

Note: The indirect effects are calculated as $\alpha_1 \times \beta_3$ for PAD → IMD → IKK and $\alpha_2 \times \beta_3$ for RII → IMD → IKK.

Source: Authors' calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

IMD functions as a bridge between fiscal and institutional capacity and poverty-depth reduction in this model. PAD and RII do not automatically reduce IKK. Their effects become more meaningful when local governments are able to transform fiscal resources and innovation capacity into inclusive regional development outcomes. This means that development performance is not only an intermediate statistical variable, but also the practical channel through which local fiscal and innovation capacity reach poor households.

The mediation result confirms H5, indicating that IMD significantly mediates the relationship between PAD and IKK. The indirect effect of PAD through IMD is -0.044, obtained from the multiplication of the PAD coefficient in the IMD model and the IMD coefficient in the IKK model. The Sobel test is statistically significant, with a z-value of -2.36 and a p-value of 0.018. Since the direct effect of PAD on IKK remains significant after IMD is included, the mediation is classified as partial rather than full. This finding means that PAD reduces poverty depth through two pathways. The first pathway operates through regional development performance, where stronger fiscal capacity improves IMD and subsequently reduces IKK. The second pathway operates directly through local fiscal programs that may affect poor households without necessarily being fully captured by aggregate development performance.

The mediation result also supports H6. The indirect effect of RII through IMD is -0.006, with a significant Sobel statistic of -2.65 and a p-value of 0.008. The result suggests that innovation reduces poverty depth partly by improving regional development performance, the direct effect of RII on IKK remains significant, indicating that innovation may also influence poor households through service digitalization, administrative simplification, better targeting, and more responsive local programs. The proportion of the indirect effect is approximately 15.6 percent of the total PAD effect and 33.3 percent

of the total RII effect, suggesting that IMD plays a more substantial mediating role in the innovation-poverty pathway than in the fiscal-poverty pathway.

Spatial Pattern of Lagging Provinces

Beyond the average panel effects, the individual fixed effects provide useful information about provinces whose poverty depth remains persistently higher than predicted by the model. A positive and relatively large individual fixed effect indicates that a province has structural characteristics that raise IKK even after controlling for PAD, RII, IMD, and lagged PAD. Table 10 presents selected provinces with the highest positive fixed effects in the IKK model:

Table 10. Selected Provinces with High Positive Individual Fixed Effects in the IKK Model

| Rank | Province | Estimated Individual Effect | Interpretation |
|------|--------------------|-----------------------------|--|
| 1 | Papua | 1.42 | Poverty depth remains far above model prediction |
| 2 | West Papua | 1.08 | Persistent structural poverty-depth pressure |
| 3 | East Nusa Tenggara | 0.86 | High vulnerability despite fiscal and innovation controls |
| 4 | Maluku | 0.64 | Geographic and service-access constraints remain important |
| 5 | Gorontalo | 0.51 | Poverty depth remains relatively persistent |

Source: Authors’ calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

The ranking indicates that several eastern Indonesian provinces continue to face poverty-depth pressures that cannot be fully explained by the fiscal, innovation, and development variables included in the model. Papua, West Papua, East Nusa Tenggara, Maluku, and Gorontalo show positive individual effects, suggesting that poverty depth in these regions is influenced by deeper structural conditions.

The persistence of poverty depth in Papua, West Papua, East Nusa Tenggara, Maluku, and Gorontalo should be understood as a structural and contextual issue rather than merely a fiscal or administrative problem. In several of these provinces, geographic isolation, archipelagic or mountainous terrain, limited road connectivity, high distribution costs, and uneven access to health, education, and basic services make poverty reduction more difficult. Local governments may also face administrative constraints in translating fiscal resources and innovation programs into services that effectively reach remote and vulnerable communities. These findings indicate that lagging provinces require more than general fiscal decentralization policies. They need context-specific interventions, affirmative fiscal support, infrastructure acceleration, improved service delivery in remote areas, and poverty programs adapted to local geographic and institutional conditions.

Synthesis of Hypothesis Testing

The results of the regression and mediation analysis provide consistent support for the theoretical framework. PAD and RII improve regional development performance, while PAD, RII, IMD, and lagged PAD reduce poverty depth. The mediation analysis further confirms that IMD partially transmits the effects of fiscal capacity and innovation on poverty depth. Table 11 summarizes the results of all hypotheses.

Table 11. Summary of Hypothesis Testing

| Hypothesis | Result | Decision |
|------------------------------|--------------------------------|----------|
| H1: PAD → IMD | Positive and significant | Accepted |
| H2: RII → IMD | Positive and significant | Accepted |
| H3: PAD → IKK, direct effect | Negative and significant | Accepted |
| H4: RII → IKK, direct effect | Negative and significant | Accepted |
| H5: IMD mediates PAD → IKK | Partial mediation, significant | Accepted |
| H6: IMD mediates RII → IKK | Partial mediation, significant | Accepted |
| H7: PAD(t-1) → IKK(t) | Negative and significant | Accepted |

Source: Authors' calculation based on official datasets from DJPK-Ministry of Finance, Ministry of Home Affairs, Bappenas, and Statistics Indonesia.

The findings support the proposed theoretical framework. PAD and RII improve regional development performance, while PAD, RII, IMD, and lagged PAD contribute to lower poverty depth. The mediation results show that fiscal capacity and regional innovation reduce poverty depth partly through regional development performance. These findings confirm that poverty-depth reduction in decentralized Indonesia depends on the interaction between fiscal capacity, innovation capacity, development quality, and the time needed for fiscal resources to generate welfare outcomes.

The findings of this study show that regional fiscal capacity and local government innovation are significant determinants of regional development performance and poverty-depth reduction. PAD and RII positively affect IMD, while PAD, RII, IMD, and lagged PAD negatively affect IKK. This pattern indicates that poverty-depth reduction is not produced by fiscal resources alone, but through the interaction between fiscal capacity, institutional innovation, development performance, and the time required for public expenditure to generate measurable welfare outcomes. The results support the fiscal decentralization argument that local governments can improve welfare when they have adequate fiscal space and the institutional capacity to translate resources into effective development programs (Liu & Yang, 2020; Örs Özdil & Kutlu, 2019).

The positive effect of PAD on IMD confirms that stronger own-source revenue improves regional development performance. This finding is consistent with studies showing that fiscal capacity allows local governments to finance infrastructure, education, health, and other basic services that shape development outcomes (Dastgeer et al., 2020; Mehmetoglu, 2018). It also supports the broader literature on fiscal decentralization in Indonesia, which finds that local fiscal capacity can improve public service delivery and welfare when regional governments allocate resources effectively (Bai et al., 2024; Rudolph et al., 2019). Unlike studies that examine PAD only as a direct predictor of poverty, this study shows that PAD also operates through a development-performance channel. The result suggests that fiscal capacity matters not merely because regions collect more revenue, but because higher PAD enables governments to build the social and physical infrastructure required for multidimensional development.

The negative direct effect of PAD on IKK indicates that local fiscal capacity can reduce poverty depth even after controlling for regional development performance, this result aligns with empirical findings that local revenue and fiscal decentralization contribute to poverty reduction through locally financed programs, public spending, and improved access to basic services (Bell et al., 2019; Nugransih et al., 2024), this finding is not entirely consistent with studies that report weak or insignificant effects of PAD on poverty outcomes, particularly when local expenditure quality is low or when PAD is concentrated in administratively stronger regions (Kurniawan et al., 2021; Putri & Mahmudi, 2019). The difference may arise because poverty depth differs from the

poverty headcount ratio. IKK captures the expenditure gap of poor households, so it is more sensitive to targeted interventions that improve the welfare of the poorest population, even when the overall number of poor residents does not immediately decline.

The stronger effect of lagged PAD provides a key contribution to the literature, the coefficient of PAD($t-1$) is larger than the coefficient of current PAD, suggesting that local fiscal resources require time before affecting poverty depth, this finding supports the logic of delayed fiscal transmission, where revenue collected in one fiscal year passes through planning, budgeting, procurement, implementation, and service-delivery processes before producing welfare effects. Previous studies on fiscal decentralization often focus on contemporaneous fiscal variables, which may underestimate the actual impact of local fiscal capacity (Mardiana et al., 2023; Suryahadi et al., 2020). The present finding indicates that the effect of PAD should be evaluated through a longer policy horizon, local revenue may not immediately reduce poverty depth in the same fiscal year, but it can become more effective after being converted into development programs and social interventions in the following year.

The positive effect of RII on IMD confirms the relevance of public sector innovation in regional development. This result is consistent with (Dastgeer et al., 2020) argument that innovation improves government performance through new administrative processes, service models, and organizational practices. It also aligns with OECD (2019), which emphasizes that public sector innovation strengthens the ability of governments to respond to complex social problems. The finding supports studies showing that local government innovation contributes to development outcomes and improves the quality of public services (Mishra & Ray, 2022; Sumarto et al., 2018). RII can strengthen IMD because innovative governments are more likely to adopt digital services, simplify procedures, integrate data systems, and design programs that are more responsive to local needs.

The negative direct effect of RII on IKK suggests that innovation can reduce poverty depth beyond its effect on regional development performance, this result implies that innovation may affect poor households through more practical and immediate mechanisms, such as digitalized social assistance, integrated poverty databases, mobile public services, and improved targeting of welfare programs. The finding is consistent with studies showing that digital government and service innovation improve access to public services and strengthen administrative responsiveness (Hartono et al., 2020), this result should be interpreted carefully. Some studies argue that public sector innovation does not automatically improve welfare when innovation is symbolic, fragmented, or weakly connected to policy implementation (Alkire, Kanagaratnam, et al., 2021; Alkire, Nogales, et al., 2021), this caution is relevant for Indonesia because some regions may receive high innovation scores while still facing high poverty depth. Innovation reduces poverty only when it is institutionalized, sustained, and directed toward vulnerable groups.

The significant negative effect of IMD on IKK confirms that regional development performance plays an important role in poverty-depth reduction, this finding is consistent with (Qiu & Chreim, 2022) capability approach, which views development as the expansion of substantive freedoms rather than merely the increase of income. Higher IMD reflects broader improvements in education, health, infrastructure, economic opportunities, and governance, all of which can help poor households move closer to the poverty line. The result also aligns with studies showing that human development and

multidimensional development indicators are strongly associated with lower poverty and better welfare outcomes (Ramadani et al., 2020; Sazzad et al., 2021). Compared with studies that use economic growth or GRDP per capita as development indicators, this study offers a broader interpretation by placing IMD as a multidimensional mediator.

The mediation results provide an important theoretical contribution, IMD partially mediates the effect of PAD on IKK and the effect of RII on IKK. This means that PAD and RII reduce poverty depth through two simultaneous mechanisms, the first mechanism is indirect: fiscal capacity and innovation improve regional development performance, which then reduces poverty depth. The second mechanism is direct: PAD and RII can affect poor households through targeted fiscal programs and service innovations that may not be fully captured by aggregate development indicators, this partial mediation pattern is more realistic than full mediation because public policies rarely operate through a single channel, the result is consistent with studies that emphasize the multidimensional and multi-pathway nature of poverty reduction (Nam, 2019; Sarkar, 2021).

The spatial pattern of lagging provinces further strengthens the interpretation of the findings. Provinces such as Papua, West Papua, East Nusa Tenggara, Maluku, and Gorontalo remain structurally vulnerable even after controlling for PAD, RII, IMD, and lagged PAD. This suggests that poverty depth in these regions is shaped by deeper structural constraints, including geographic isolation, high service-delivery costs, infrastructure deficits, limited market access, and weaker administrative capacity, this finding is consistent with studies showing that poverty in eastern Indonesia is more persistent because of spatial inequality, limited connectivity, and unequal access to public services (Sudrajat & Andhika, 2021; Suhendra, 2018). It also supports research arguing that fiscal decentralization may produce unequal welfare outcomes when local governments differ substantially in fiscal capacity and institutional quality (Kattel & Mazzucato, 2018; Torfing, 2019).

Several findings also differ from parts of the previous literature, some studies suggest that fiscal decentralization can increase regional inequality when richer regions are better able to mobilize own-source revenue and poorer regions remain dependent on central transfers (Buchheim et al., 2020; Cinar et al., 2024). The present study does not reject that argument, it shows that PAD can reduce poverty depth on average, while the spatial analysis reveals that structurally disadvantaged provinces still require special intervention, although RII has a significant negative effect on IKK, the existence of innovative provinces with relatively high poverty depth suggests that innovation scores should not be interpreted as automatic evidence of welfare improvement. The effectiveness of innovation depends on whether it is connected to poverty programs, local development priorities, and the needs of poor households.

The overall findings suggest that poverty-depth reduction in decentralized Indonesia requires a combination of fiscal capacity, institutional innovation, and inclusive development performance. PAD provides the fiscal space, RII reflects the institutional ability to innovate, and IMD captures the extent to which these inputs are transformed into broader development outcomes, the significant lagged PAD effect highlights the importance of time in fiscal policy evaluation. Poverty-depth reduction should not be assessed only through annual budget realization, but through a multi-year development horizon. The main contribution of this study lies in integrating fiscal, innovation, development, poverty-depth, and lagged-transmission dimensions into a single panel

framework, offering a more nuanced explanation of why poverty remains deep in some provinces despite increasing local revenue and innovation performance.

E. CONCLUSION

This study examined how regional fiscal capacity and government innovation influence poverty depth in Indonesia by positioning regional development performance as a mediating mechanism. Using panel data from 34 provinces during the 2018–2024 period, the findings show that Regional Own-Source Revenue and the Regional Innovation Index contribute to stronger regional development performance. The results also indicate that PAD, RII, IMD, and lagged PAD are associated with lower poverty depth. The main message of this study is that poverty-depth reduction requires more than increasing local revenue or improving innovation scores. Fiscal capacity and regional innovation must be converted into inclusive development outcomes that improve access to basic services, infrastructure, education, health, social protection, and local economic opportunities. The mediating role of IMD confirms that regional development performance serves as a key pathway through which PAD and RII contribute to reducing the Poverty Gap Index.

The significant effect of lagged PAD further suggests that fiscal policy requires time to generate measurable welfare outcomes. Local revenue may not immediately reduce poverty depth in the same fiscal year because it must pass through planning, budgeting, implementation, and service-delivery processes. This finding highlights the importance of evaluating local fiscal policy through a multi-year development perspective rather than relying only on annual budget realization. From a policy perspective, local governments need to strengthen fiscal capacity, improve the quality of regional innovation, and ensure that both are directed toward inclusive development. Provinces with persistent poverty depth, particularly in structurally disadvantaged regions, require more context-specific interventions, including affirmative fiscal support, infrastructure improvement, targeted social protection, and better access to public services. This study is limited by its provincial-level scope and by the availability of consistent regional development and innovation data. Future research may extend the analysis to district and municipal levels, incorporate spatial panel models, test longer fiscal lags, and include additional macroeconomic controls such as unemployment, inflation, GRDP growth, and sectoral employment structure.

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