



How Do Selected SDG Economic Indicators Influence Regional Economic Growth? Evidence from Java Island, Indonesia

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ABSTRACT

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This study aims to analyze the effect of the economic pillar of SDGs on economic growth. The SDGs chosen include SDG 17 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), SDG 10 (Reduced Inequalities), and SDG 17 (Partnerships for the Goals). Each goal is measured using a specific and related method: SDGs 7 (Electrification Ratio), SDGs 8 (Poverty Rate), SDGs 9 (Growth of Gross Domestic Product in the Manufacturing Industry), SDGs 10 (Gini Ratio), SDGs 17 (Foreign Direct Investment), while the economic growth itself is measured by the Gross Regional Domestic Product (GRDP). This research focuses on the region inside Java Island, which includes DKI Jakarta, Banten, Java Barat, Java Tengah, Java Timur, and DI Yogyakarta. Data analysis was conducted using SPSS software to obtain significant insights from the collected data. The results showed that the poverty rate and GDP of the manufacturing industry significantly affect the GRDP, whereas the Electrification Ratio, Gini Ratio and Foreign Direct Investment insignificantly affect the GRDP.

1. INTRODUCTION

Economic growth serves as a key indicator of a country's economic performance. It remains a central focus of economic policy across various economic systems, as sustained growth is generally associated with expanded opportunities and increased economic equality [1]. Economic growth is used to describe the economy of a country in bringing in increased income and social welfare over a period. Economic growth is also included in macroeconomic indicators, which are measured by Gross Domestic Product (GDP).

Indonesia itself showed significant progress in its economy as shown by economic growth in the first quarter of 2024, which grew by 5.11%, YoY. This result was as expected by the Indonesia Economic Outlook Report from the World Bank, which says that, despite headwinds from the easing of the commodity boom, increased volatility in food as well as energy prices, and rising geopolitical uncertainty, Indonesia's GDP growth is fulfilling its expectations.

However, a country's overall economic growth is also influenced by the economic performance of its individual regions. This is reflected through the Gross Regional Domestic Product (GRDP), which represents each region's ability to generate income and compensate production factors. As a result, GRDP contributes to the national GDP. GRDP offers insight into the economic performance of specific regions and serves as a benchmark for evaluating improvements in income and living standards in each region [2].

Table 1 presents data on the contribution of each region to Indonesia's economic growth in the first quarter of 2024.

Compared to other regions, Java Island recorded as the highest contributor to Indonesia's GDP, reaching 57.70% despite experiencing a deceleration in its growth rate by 4.84% compared to the same quarter in 2023, YoY. Java's significant economic role is closely related to its status as the central hub of national economic activity. Besides, Febrianti et al. [3] stated that this dominance is largely due to the concentration of industrial and agricultural sectors on the island. Structurally, Java plays a pivotal role in supporting national business activities, which further reinforces its influence on Indonesia's overall economic performance.

Table 1. Indonesia's economic growth and the contribution of GRDP by region in the 1st quarter of 2024

Region	Growth (YoY)	Contribution
Sumatera	4.24%	21.86%
Java	4.85%	57.70%
Bali & Nusa Tenggara	5.07%	2.75%
Kalimantan	6.17%	8.19%
Sulawesi	6.35%	6.89%
Maluku & Papua	12.15%	2.62%

As cited in Wartoyo and Haida [1], they emphasized that within the context of the national economy, economic growth does not always generate synergy among various stakeholders to achieve equality. In practice, policy implementation aimed at stimulating economic growth often leads to social disparities within society. Consequently, welfare tends to be concentrated among certain groups, while others remain

trapped in poverty without experiencing significant improvements in their living standards. Therefore, the government's primary focus on sustainable development should be directed toward fulfilling essential community needs, such as access to economic services, healthcare, quality education, and social security, as a means of ensuring broader social welfare within the country.

Sustainability hinges on the dynamic interaction of environment, economy, and equity. On the other hand, sustainable development means conducting economic activities in a way that protects the environment and resources while boosting individual and community well-being. This sets it apart from mere economic growth, which is simply about using and reorganizing resources to increase their value [4].

Facing this situation, the United Nations provides a set of goals called the Sustainable Development Goals (SDGs) to be committed to by all nations in their pursuit of sustainable development. Essentially, these SDGs include 17 targets meant to be implemented at a national level. They cover a broad spectrum of objectives, tackling global challenges like poverty, inequality, climate change, and environmental degradation. The SDGs offer a comprehensive framework to track and support sustainable development. They highlight the urgency of eradicating poverty, narrowing economic and gender gaps, enhancing access to healthcare and education, and fostering economic progress. At the same time, they call for decisive action on climate change and the preservation of natural resources, including oceans and forests. Fundamentally, the SDGs embody an integrated framework that unites economic, social, and environmental dimensions of development [4-6].

In this context, the SDGs provide a comprehensive, globally recognized framework to align economic growth with inclusive and sustainable outcomes. Specifically, the economic pillars of the SDGs, SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), SDG 10 (Reduced Inequalities), and SDG 17 (Partnerships for the Goals) are crucial. These goals ensure that the benefits of growth are fairly distributed and contribute to long-term development. When effectively implemented, they can address structural challenges and narrow regional disparities, especially in an economically strategic region like Java. The focus of SDGs on fostering inclusive economic growth, creating employment opportunities, and strengthening partnerships is highly relevant for Java, Indonesia's economic powerhouse.

Wartoyo and Haida [1] concluded that the implementation of the SDGs in the context of Indonesia's economic growth has not yet been fully optimized, even though it is moving in the right direction. They emphasized that economic growth has the potential to support the realization of various SDG pillars, including those related to poverty reduction, human capital development, sustainable infrastructure, and international cooperation. However, realizing this potential requires the support of effective governance, inclusive policy frameworks, and strategies oriented toward sustainability to ensure that development outcomes are both equitable and environmentally responsible. In line with this, Febrianti et al. [3] noted that sustained and high-quality economic growth is a crucial determinant of national development. This growth is closely linked to the effective utilization of production factors such as natural resources, labor, and capital, which also align with the targets outlined in various SDGs.

Several previous studies have highlighted the diverse impacts of the SDGs on Indonesia's economic growth. Alfariis and Rustam [7] found that the achievement of SDG 8 on decent work and economic growth significantly reduced poverty levels, thereby contributing positively to regional growth in Central Java. Dzou et al. [8] revealed that inflows of Foreign Direct Investment (FDI), as an indicator of SDG 17, did not consistently produce significant effects on Indonesia's economic growth due to regulatory constraints and uneven distribution of benefits. Girik-Allo et al. [9], using an Inter-Regional Input-Output (IRIO) approach, demonstrated that investments in electricity infrastructure (SDG 7) generated strong interregional spillover effects, yet the benefits were not always directly reflected in the GRDP of the host regions. Taken together, these findings indicate that the economic pillars of the SDGs contribute to growth in distinct ways, shaped by the measurement indicators, regional contexts, and structural characteristics of the economy.

Despite the growing body of literature, most existing studies have approached the relationship between SDGs and economic growth in a fragmented way, either by isolating a single indicator or by relying on highly aggregated national-level analyses. This leaves a critical gap in understanding how the combined influence of multiple SDG economic pillars shapes regional economic performance. Such a gap is particularly significant for Java Island, which not only contributes the largest share to Indonesia's economy but also reflects structural disparities that demand closer investigation. Addressing this gap allows the present study to provide a more comprehensive assessment of how SDGs 7, 8, 9, 10, and 17 interact to drive regional growth, while also offering policy-relevant insights on achieving more balanced, inclusive, and sustainable development outcomes.

To provide a deeper understanding of how the economic-related SDGs contribute to regional economic growth, this study focuses on five specific goals that are considered central to economic development: SDG 7, SDG 8, SDG 9, SDG 10, and SDG 17 [10].

2. LITERATURE REVIEW

2.1 Theoretical and conceptual background

According to Chukwuemeka Oguegu [11], Endogenous Growth Theory which was developed by Romer [12] and Lucas Jr [13], emphasized that long-term economic growth is largely driven by internal factors such as human capital development, innovation, institutional quality, and infrastructure. To assess the effectiveness of the SDG pillars in fostering sustainable development, this study employs the Endogenous Growth Theory as its theoretical foundation. Specifically, it investigates how the SDGs drive economic growth through endogenous mechanisms within the economy. By investigating the relationship between SDGs 7, 8, 9, 10, and 17 and the economic growth across provinces in Java, this research aims to evaluate the extent to which sustainable development principles, particularly in the economic domain, contribute to inclusive and long-term regional economic growth in Indonesia.

In line with this perspective, Romer [12] argued that the accumulation of knowledge and technological progress serves as the key drivers of productivity, creating self-reinforcing cycles of growth within an economy. Lucas further

emphasized the centrality of human capital, highlighting that investments in education and skills development not only enhance individual productivity but also generate positive externalities across society. These theoretical insights provide a strong rationale for analyzing the SDGs within the framework of endogenous growth, as the goals themselves range from energy access and poverty reduction to industrial development and global partnerships are inherently tied to knowledge, innovation, and institutional quality. By situating this study within the logic of endogenous growth, the analysis is better positioned to demonstrate how the achievement of multiple SDG pillars can generate long-term, inclusive, and self-sustaining economic expansion in Indonesia.

SDGs 7 (Affordable and Clean Energy)

SDG 7 Affordable and Clean Energy focuses on ensuring access to affordable, reliable, sustainable, and modern energy for all, with a key target being universal electrification. Wang et al. [14] found that the consumption of renewable energy sources have significantly contribution towards the economic prosperity of these economies. Indonesia has made substantial progress, with the national electrification ratio surpassing 99% in recent years, though some remote areas still lag.

The impact of electrification on economic development in Indonesia is significant. Alfaris and Rustam [7] found that regions with higher electrification rates tend to experience higher GRDP growth due to increased business activity and digital connectivity. Electricity infrastructure greatly affects economic growth, because electricity infrastructure in people's lives is a basic need or basic necessity in everyday life. Besides that, expanding electricity access stimulates industrial development by increasing the number of manufacturing firms, jobs, and output, primarily by lowering entry costs and fostering competition, which in turn raises productivity [9, 15]. Maisarah et al. [16] stated that variables such as Electrification Ratio and the number of people will affect the economic development in a country within a certain period of time. The statement is supported by the research of Girik-Allo et al. [9], which indicated that investments in electricity infrastructure generate a strong multiplier effect on the economy, especially in industrialized regions like Java.

Beyond the statistical achievements of electrification, the essence of SDG 7 lies in its transformative role in shaping the structural foundations of economic development. Universal access to modern energy not only reduces barriers to industrial participation but also creates a platform for innovation, entrepreneurship, and digital integration. Reliable and affordable energy becomes a prerequisite for advancing manufacturing activities, enabling efficient transportation networks, and sustaining the expansion of knowledge-intensive industries. In regions such as Java, where economic activity is highly concentrated, the challenge is no longer confined to extending electricity access but rather to ensuring that energy systems are resilient, sustainable, and capable of supporting long-term productivity gains. This perspective positions SDG 7 as more than a developmental target; it is a strategic pillar that underpins inclusive growth and amplifies the potential of other SDG-related initiatives, thereby reinforcing its relevance in evaluating the dynamics of regional economic progress.

SDGs 8 (Decent Work and Economic Growth)

SDG 8 (Decent Work and Economic Growth) aims to promote inclusive and sustainable economic growth,

productive employment, and decent work for all. Conceptually, this goal encompasses a broad range of targets, including labor productivity, employment creation, unemployment reduction, and improvements in job quality. However, due to data availability and consistency across provinces and years, this study operationalizes SDG 8 using the Poverty Rate as a partial proxy. This choice is grounded in the extensive literature linking poverty reduction to employment opportunities, income generation, and overall economic performance, particularly in developing economies such as Indonesia.

Poverty remains a persistent structural challenge in Indonesia and is closely associated with labor market conditions, investment dynamics, and the pace of economic activity. High poverty levels reflect limited access to decent work, unstable income sources, and insufficient absorption of labor into productive sectors [17]. From this perspective, poverty reduction can be interpreted as an outcome of improved employment conditions and inclusive growth, which are core objectives of SDG 8. Asha and Juliannisa [2] emphasized that social conditions, including the proportion of the poor population, play a decisive role in determining whether economic growth can be sustained and translated into broader welfare improvements at the regional level.

Empirical evidence supports the relevance of poverty as an indicator closely linked to regional economic growth. Alfaris and Rustam [7] demonstrated that poverty levels and employment-related indicators significantly influence economic growth in Central Java, highlighting that reductions in poverty are often accompanied by higher regional output. These findings suggest that, while poverty does not capture the full multidimensional scope of SDG 8, it serves as a meaningful and empirically observable proxy for assessing the inclusiveness of economic growth, particularly in regions with heterogeneous labor market conditions such as Java.

Nevertheless, it is important to acknowledge the measurement limitations inherent in this approach. SDG 8 also covers dimensions such as labor productivity, youth unemployment, job security, and working conditions, which are not explicitly captured by the poverty rate alone. As such, the use of poverty as a single proxy should be interpreted as providing partial and indicative evidence, rather than a comprehensive assessment of SDG 8 implementation. The results of this study therefore reflect how one key social outcome associated with decent work namely poverty reduction relates to regional economic growth, rather than the full spectrum of SDG 8 targets.

In the context of Java Island, where labor supply is abundant and economic structures are diverse, the findings suggest that poverty reduction remains closely associated with higher economic performance. However, this relationship should be viewed as suggestive rather than definitive, given the simplified measurement and the limited explanatory power of the model. Future research could enrich this analysis by incorporating additional labor market indicators, such as employment rates, labor productivity, or wage levels, to capture SDG 8 more comprehensively and to better understand the mechanisms through which decent work contributes to sustainable regional economic growth.

SDGs 9 (Industry, Innovation, and Infrastructure)

SDG 9 (Industry, Innovation, and Infrastructure) is a critical component of the United Nations' Sustainable Development Goals, aiming to build resilient infrastructure, foster inclusive

and sustainable industrialization, and promote innovation. This goal recognizes that robust infrastructure, technological advancement, and industrial expansion are foundational for sustainable economic progress. Industry has a significant impact on all dimensions of sustainable development - economic, social, environmental and institutional. Among all economic sectors, manufacturing consistently makes the largest contribution, which positions it as a priority area in national development strategies. As a key driver of the economy, expansion in this sector is expected to generate positive spillover effects, stimulating progress in other sectors as well. As manufacturing output increases, it stimulates demand for raw materials, intermediate goods, and supporting services, creating a multiplier effect across various sectors of the economy. Higher production capacity often leads to improved productivity and economies of scale, which enhance competitiveness in both domestic and international markets. These combined effects result in increased national income, improved trade balance, and overall acceleration of economic growth.

The strategic role of SDG 9 becomes evident when manufacturing and infrastructure are viewed as catalysts for long-term competitiveness and resilience. As Behun et al. [18] demonstrated, the manufacturing industry not only generates direct output but also stimulates cyclical dynamics that support sustainable economic expansion across sectors. Jia et al. [19] emphasized that productivity growth in manufacturing, compared to non-manufacturing sectors, exerts a stronger influence on national development, underscoring why industrialization is consistently prioritized in economic strategies. Complementing this perspective, Arumugam [20] highlighted that the manufacturing sector in Indonesia has become a pivotal engine of employment, investment, and innovation, reinforcing its role in driving structural transformation. Taken together, these findings illustrate that the successful pursuit of SDG 9 requires a holistic strategy that integrates infrastructure development, technological progress, and industrial expansion, thereby positioning manufacturing as a cornerstone for achieving inclusive and sustainable economic growth.

SDGs 10 (Reduced Inequalities)

SDG 10 aims to lessen disparities both within and among countries, emphasizing comprehensive social, economic, and political inclusion. In Indonesia, progress toward this goal has been mixed. While regulatory frameworks have seen improvements, persistent social and economic inequalities remain evident, particularly reflected in the Gini Ratio (GR), a key measure of income distribution.

Statistically, a negative correlation is observed between the GR and economic growth, implying that higher economic growth typically leads to a lower GR, indicating a more equitable distribution of income [21]. As the GR decreases (approaching zero), it suggests a more even distribution of income, which can boost community purchasing power and foster effective demand, thereby potentially reducing poverty [22]. Therefore, a key strategy for enhancing economic growth while reducing inequalities must actively involve the poor, creating opportunities for them to participate in development. Such inclusive participation is expected to narrow the gap between the rich and the poor, thereby mitigating income inequality [21].

SDGs 17 (Partnerships for the Goals)

According to the United Nations, SDG 17 aims to

strengthen the means of implementation and revitalize global partnerships for sustainable development. Unlike other SDGs that focus on specific development outcomes, SDG 17 emphasizes the mechanisms through which development goals are achieved, including finance, trade, technology transfer, capacity building, and institutional cooperation. As such, SDG 17 represents an enabling framework that supports the achievement of all other SDGs rather than a standalone development target.

In the Indonesian context, SDG 17 is often empirically associated with FDI, which serves as a key channel for international economic cooperation. FDI is widely regarded as a potential driver of economic growth through capital inflows, employment creation, and the diffusion of technology and managerial expertise [23]. Following the definition provided by the United Nations Conference on Trade and Development (UNCTAD), FDI refers to cross-border investment made by an entity in one economy to establish a lasting interest and a degree of control in an enterprise operating in another economy. Given the availability and consistency of provincial-level data, this study adopts FDI inflows as a partial proxy for SDG 17, reflecting one important dimension of international partnerships relevant to regional economic performance.

Empirical studies suggest that FDI can contribute positively to economic growth in Indonesia, particularly when it is directed toward productive sectors and accompanied by supportive institutional frameworks. Fazaaloh [23], for instance, finds that FDI has a positive association with economic growth across Indonesian provinces, although the magnitude and significance of this effect vary by sector and region. These findings imply that while FDI captures an important aspect of global partnerships, its growth-enhancing role is highly conditional and context-dependent.

Nevertheless, it is important to explicitly acknowledge the measurement limitations of using FDI as the sole indicator of SDG 17. The scope of SDG 17 extends beyond investment flows to include trade openness, development assistance, technology sharing, policy coordination, and institutional capacity building, none of which are fully captured by FDI alone. Moreover, the contribution of FDI to economic growth depends on critical preconditions, such as the host region's absorptive capacity, human capital quality, and the effectiveness of domestic governance. Without these conditions, foreign investment may generate limited spillovers or even fail to translate into sustained regional growth.

The use of FDI in this study should be interpreted as providing indicative and exploratory evidence of one channel through which international partnerships may influence regional economic growth, rather than a comprehensive assessment of SDG 17 implementation. Future research could extend this analysis by incorporating broader indicators of global partnership, such as trade intensity, technology transfer measures, or institutional collaboration indices, and by applying more advanced econometric techniques to better capture the dynamic and potentially endogenous relationship between international partnerships and economic growth.

Hypothesis

H1: SDG 7 (Affordable and Clean Energy) has a positive effect on economic growth in Java, Indonesia.

Deductively, access to reliable and affordable energy is a fundamental enabler of productivity, industrialization, and digital integration. Regions with higher Electrification Ratios are expected to support greater levels of business activity,

knowledge transfer, and long-term competitiveness. Prior studies emphasize that energy access strengthens regional economic development, as electricity infrastructure reduces entry barriers and fosters industrial participation [7, 14]. Similarly, investments in electricity infrastructure have been shown to generate strong multiplier effects on productivity and growth [9, 15, 16]. Although near-universal electrification has already been achieved in Java, the efficiency and sustainability of energy systems remain critical for sustaining growth, making SDG 7 an essential driver of structural transformation.

H2: SDG 8 (Decent Work and Economic Growth) has a positive effect on economic growth in Java, Indonesia.

Deductively, reducing poverty and ensuring access to stable and productive employment enhances household resilience, strengthens human capital, and increases aggregate demand. According to Romer [12] and Lucas Jr [13], human capital accumulation is a self-reinforcing driver of long-term productivity, which aligns with the objectives of SDG 8. Empirical evidence from Central Java also confirms that poverty levels significantly influence regional economic growth, highlighting the role of inclusive employment opportunities [7, 17]. Thus, SDG 8 is anticipated to play a central role in shaping long-term inclusive development outcomes in Java, particularly by embedding employment creation within broader poverty-reduction strategies.

H3: SDG 9 (Industry, Innovation, and Infrastructure) has a positive effect on economic growth in Java, Indonesia.

Deductively, manufacturing and infrastructure are central pillars of sustainable development, with the potential to create spillover effects across other sectors. Endogenous Growth Theory underlines the significance of innovation and institutional quality as core engines of economic performance [11-13]. Consistent with this, manufacturing has been found to contribute strongly to productivity growth and to act as a catalyst for broader economic resilience [18, 19]. Complementing this perspective, research in the Indonesian context has shown that the industrial sector serves as a pivotal engine of employment, investment, and innovation [20, 21]. Taken together, these findings suggest that SDG 9 directly strengthens regional competitiveness and accelerates structural transformation, making it a cornerstone of Java's long-term economic development.

H4: SDG 10 (Reduced Inequalities) has a positive effect on economic growth in Java, Indonesia.

Deductively, reducing income inequality supports broader participation in economic activities and fosters more balanced demand across social groups. From the perspective of endogenous growth, lowering inequality enhances the efficiency of human capital utilization and contributes to long-term sustainable development [13]. Statistical evidence shows that reductions in the GR are associated with improvements in purchasing power and poverty reduction, thereby stimulating aggregate demand and inclusive growth [21, 22]. In the context of Java, narrowing income disparities is expected not only to strengthen social cohesion but also to reinforce the structural foundation for sustained economic resilience.

H5: SDG 17 (Partnerships for the Goals) has a positive effect on economic growth in Java, Indonesia.

Deductively, international partnerships through mechanisms such as FDI provide capital inflows, technology transfer, and employment opportunities that complement domestic resources. Romer [12] underscored that knowledge diffusion and technological progress are critical channels of

sustained growth, which aligns with the role of FDI in enhancing productivity. Empirical studies further highlight that FDI significantly contributes to economic growth in Indonesia when effectively channeled into productive sectors and accompanied by supportive governance [23]. Thus, SDG 17 is expected to reinforce regional growth in Java by linking local economies with broader global value chains, while simultaneously embedding innovation and industrial upgrading into regional development strategies.

3. RESEARCH METHOD

This study uses a quantitative approach with secondary data obtained from the Central Statistic Agency of Indonesia (BPS Indonesia) with a focus on provinces across the Java region. The secondary data consist of panel data with the range from 2015 to 2023 within 6 provinces across Java [24]. This study focuses on Economic Growth as the dependent variable with 5 independent variables, which are SDGs Economic Pillar (SDGs 7, 8, 9, 10, and 17). Each detail of the variables will be measured based on Table 2 [24]:

Table 2. Operational definition of the variables

Variables	Proxy	Unit
Economic Growth	The growth of GRDP	Percentage (%/Year)
SDGs 7 (Affordable and Clean Energy)	Electrification Ratio	Percentage (%/Year)
SDGs 8 (Decent Work and Economic Growth)		Percentage (%)
SDGs 9 (Industry, Innovation, and Infrastructure)	Poverty Level	Percentage (%/Year)
SDGs 10 (Reduced Inequalities)	The growth of Gross Domestik Product in the Manufacturing Industry	Ratio (0-1)
SDG 17 (Partnerships for the Goals)	Gini Ratio	Million Rupiah per year (Rp/Year)
	FDI	

To examine the relationship between selected SDG-related indicators and regional economic growth, this study employs a panel regression framework estimated using pooled ordinary least squares (OLS). This estimator is applied due to the relatively small cross-sectional dimension of the panel (six provinces) and the focus on identifying associational patterns rather than causal effects. Classical assumption tests, including normality, multicollinearity, heteroscedasticity, and autocorrelation, are conducted to ensure the validity of the estimation. The baseline empirical model is specified as follows [25]:

$$Y_{it} = \alpha + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \beta_3 X_{3,it} + \beta_4 X_{4,it} + \beta_5 X_{5,it} + \epsilon_{it}$$

where,

- Y_{it} = Economic growth (GRDP growth) of province i in year t
- α = Constant term
- $\beta_1 \dots \beta_5$ = Regression coefficients
- X_1 = Electrification Ratio (SDG 7)
- X_2 = Poverty Rate (SDG 8)
- X_3 = Manufacturing GDP Growth (SDG 9)

- X_4 = Gini Ratio (SDG 10)
- X_5 = Foreign Direct Investment (SDG 17)
- ε_{it} = Error term

Given the potential presence of unobserved heterogeneity and reverse causality between economic growth and several explanatory variables (such as poverty reduction, manufacturing expansion, and FDI inflows), the results of this study should be interpreted as exploratory and indicative rather than causal. Future research is encouraged to apply more advanced econometric techniques, such as fixed-effects models, instrumental variables, or dynamic panel estimators, to more rigorously address endogeneity concerns.

4. RESULT

4.1 Classical assumption test

This research consists of 54 samples. However, after conducting an outlier analysis, specifically 14 data points that significantly deviated from the overall distribution were removed to ensure the reliability of the results [26]. This process reduced the final sample size to 40 observations. Subsequent statistical testing confirmed that the remaining data met all the requirements of the classical assumption tests, allowing the analysis to proceed with valid and unbiased results.

Table 3. Normality test results

One-Sample Kolmogorov-Smirnov Test		
	Unstandardized Residual	
N	40	
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	.33604798
Most Extreme Differences	Absolute	.074
	Positive	.063
	Negative	-.074
Test Statistic	.074	
Asymp. Sig. (2-tailed)	.200 ^{c,d}	

The One-Sample Kolmogorov-Smirnov test is used to measure the significance value to analyze whether the data is normally distributed or not. Referring to the test findings in Table 3, a significance of $0.200 > 0.05$ was found, indicating that the data is normally distributed.

Table 4. Results of the multicollinearity test

Model	Collinearity Statistics	
	Tolerance	VIF
Electricity Rate	.868	1.152
Poverty Rate	.649	1.542
GDP Manufacturing	.907	1.102
Gini Ratio	.911	1.098
Foreign Direct Investment	.625	1.599

a. Dependent Variable: GRDP

Source: Processed secondary data, 2025

The classical assumption tests indicate that the regression model satisfies the required conditions. The multicollinearity test shows that all independent variables have tolerance values above 0.10 and VIF values below 10 (see Table 4), indicating the absence of multicollinearity. In addition, the Kolmogorov-Smirnov test yields a significance value of $0.200 (> 0.05)$, suggesting that the residuals are normally distributed. These

results confirm that the regression estimates and statistical inferences in this study are reliable and valid.

Based on Table 4, all independent variables have tolerance values above 0.10 and VIF values below 10, indicating that no multicollinearity is detected in the regression model. This suggests that the selected SDG-related indicators provide sufficiently independent information, allowing reliable estimation and hypothesis testing.

Table 5. Results of heteroscedasticity test-park test

Variable	Significance Value	Description
Electricity Rate	0.154	No heteroscedasticity occurred.
Poverty Rate	0.109	
GDP	0.677	
Manufacturing	0.454	
Gini Ratio	0.473	
Foreign Direct Investment		

Source: Processed secondary data, 2025

Referring to the findings of the above test, the significance values of all independent variables are higher than 0.050. Therefore, it can be concluded that there are no signs of heteroscedasticity in the research data (Table 5).

The issue of autocorrelation arises when there is correlation in the data [26]. This study uses the Runs Test to determine the presence of autocorrelation symptoms in the research data. The decision-making criterion for the test is, if the Asymp. Sig. > 0.050 , which means there is no autocorrelation. The autocorrelation test is presented in Table 6 below.

Table 6. Results of the autocorrelation runs test

Unstandardized Residual	
Asymp. Sig. (2-tailed)	0.149

Source: Processed secondary data, 2025

4.2 Multiple linear regression test

This test is used as a tool in analyzing and processing data. Multiple Linear Regression is used because this study involves 5 independent variables and 1 (one) dependent variable. The hypothesis being tested is the effect of the independent variables on the dependent variable.

Table 7. Results of the multiple linear regression test

	Model	B
1	(Constant)	-8.859
	Electricity Rate	0.137
	Poverty Rate	-0.046
	GDP Manufacturing Industry	0.116
	Gini Ratio	1.229
	Foreign Direct Investment	-5.009E-5

Source: Processed secondary data, 2025.

Based on Table 7, the regression equation in this study is:

$$\gamma = -8.859 + 0.137\chi_1 - 0.046\chi_2 + 0.116\chi_3 + 1.229\chi_4 - 0.00005009\chi_5 + e$$

Based on the results of the equation above, it can be concluded that:

- The constant term represents the expected value of

GRDP growth when all independent variables are equal to zero. In this model, the constant value of -8.859 indicates that, hypothetically, if a province had zero values for the electricity rate, Poverty Rate, manufacturing GDP growth, GR, and FDI, GRDP growth would be -8.859 . This coefficient mainly serves as a baseline reference and does not have a direct economic interpretation.

- b. The electricity rate has a positive coefficient of 0.137 , indicating that a one-percentage-point increase in the electrification rate is associated with an increase of 0.137 percentage points in GRDP growth, holding other variables constant. However, this effect is not statistically significant, suggesting that variations in electricity access do not provide a strong explanation for differences in regional economic growth in Java Island within the estimated model.
- c. The Poverty Rate has a negative coefficient of -0.046 , implying that a one-percentage-point increase in the Poverty Rate is associated with a 0.046 percentage-point decrease in GRDP growth, *ceteris paribus*. This coefficient is statistically significant, indicating a meaningful negative association between poverty and economic growth across provinces in Java Island.
- d. The growth of GDP in the manufacturing industry shows a positive coefficient of 0.116 , meaning that a one-percentage-point increase in manufacturing GDP growth is associated with an increase of 0.116 percentage points in GRDP growth, holding other variables constant. This relationship is statistically significant, suggesting that manufacturing performance is positively associated with regional economic growth, although the overall explanatory power of the model remains limited.
- e. The GR has a positive coefficient of 1.229 , indicating that higher income inequality is associated with higher GRDP growth in the model. However, this coefficient is not statistically significant, implying that income inequality does not play a robust role in explaining regional economic growth differences in Java Island within this study.
- f. FDI has a negative coefficient of -5.009×10^{-5} , suggesting that an increase in FDI is associated with a very small decrease in GRDP growth, holding other variables constant. Nevertheless, this effect is not statistically significant, indicating that FDI inflows do not have a reliable association with regional economic growth in Java Island in the current empirical framework.

4.3 Hypothesis testing

1. R^2 Coefficient of Determination Test

The coefficient of determination (R^2) test is used to estimate the extent to which the regression model can explain variations in the dependent variable. Based on the model summary, the value of Adjusted R^2 is 0.118 or 11.8% . This indicates that the independent variables, which include the Electrification Ratio, Poverty Rate, GDP of Manufacturing Industry, GR, and FDI, are able to explain approximately 11.8% of the variation in GRDP. Meanwhile, the remaining 88.2% of the variation is influenced by other factors not included in this regression model.

2. T-test (Partial)

The t-test (partial) is conducted to determine how the independent variables (Electrification Ratio, Poverty Rate, GDP of Manufacturing Industry, Gini Ratio, FDI) partially affect the dependent variable (Company Value). The T-Test compares the T-Table value and the T-Calculated value. The T-Table value is determined by calculating the degrees of freedom, $Df = n - k - 1$ ($40 - 5 - 1 = 34$). Thus, the T-Table value for this study is 2.028 and the significance value is 0.05 .

The t-test results show that the Poverty Rate and GDP of Manufacturing Industry have a significant effect on GRDP, with calculated t values of -2.071 and 2.592 , respectively, all exceeding the table t value of 2.028 and having significance values below 0.05 . The GDP of the Manufacturing Industry positively affects GRDP, while the Poverty Rate has a significant negative effect. In contrast, the Electrification Ratio (0.162), Gini Ratio (0.559) and FDI (-1.416) have calculated t values below the table t value and significance values above 0.05 , indicating an insignificant effect on GRDP. These results suggest that improvements in the manufacturing sector, along with poverty reduction, are key drivers of economic growth in this model.

3. F Test (Simultaneous)

The F test is used to see the effect of independent variables on the dependent variable simultaneously. In this study, the table F value at a significance level of 0.05 with a numerator degree of freedom of 4 ($k - 1 = 5 - 1$) and a denominator degree of freedom of 35 ($n - k = 40 - 5$) yields a result of 2.64 .

Based on the F test in Table 8, the calculated F value is 2.043 with a significance level of 0.097 . The calculated F is less than the table F ($2.403 < 2.64$), which shows that the independent variables (Electrification Ratio, Poverty Rate, GDP of Manufacturing Industry, Gini Ratio, and FDI) do not simultaneously have a statistically significant effect on GRDP at the 5% significance level.

Table 8. Results of hypothesis testing

Variables	T Test		
	T-Calculated	Sig	Notes
Electrification Ratio	0.162	0.872	
Poverty Rate	-2.071	0.046	
GDP of Manufacturing Industry	2.592	0.014	
Gini Ratio	0.559	0.580	
Foreign Direct Investment	-1.416	0.166	
F Test		R Test	
F-Calculated	2.043	R	0.481
F Sig	0.097	R ²	0.231
		Adj. R Square	0.118

Source: Processed secondary data, 2025.

5. DISCUSSION

5.1 The effect of electrification ratio on economic growth

Broader access to electricity is widely acknowledged in the literature as an important enabling factor for economic activity, supporting manufacturing processes, public services, and household productivity [15]. Previous studies suggest that electricity availability plays a crucial role in facilitating industrial development and trade, particularly in regions where energy access remains limited [5, 14, 19, 27]. However, the empirical results of this study indicate that SDG 7 (Affordable

and Clean Energy), proxied by the Electrification Ratio, has a positive but statistically insignificant association with regional economic growth (GRDP) in Java Island.

This finding can be interpreted in light of Java's advanced stage of electrification, where access levels have already exceeded 99 percent. Under such conditions, additional expansion of electricity connections is unlikely to generate substantial marginal gains in output or productivity. Instead, economic growth in highly industrialized regions tends to depend less on access itself and more on factors such as energy efficiency, reliability, affordability, and sustainability. Consistent with study [16], the results suggest that while electricity remains a fundamental input for economic activity, its short-run impact on growth becomes less pronounced once near-universal access has been achieved.

Evidence from interregional analysis further supports this interpretation. Girik-Allo et al. [9] showed that investments in electricity infrastructure in Java generate significant spillover effects that benefit other regions more strongly than Java itself. This implies that the growth-enhancing effects of electricity investment may materialize indirectly or over longer time horizons, rather than being immediately reflected in Java's GRDP growth. Therefore, the insignificant coefficient observed in this study should not be interpreted as evidence against the relevance of energy for development, but rather as an indication of diminishing marginal returns to access-based electrification in a mature regional economy.

Overall, the results provide exploratory evidence that, in the context of Java Island, variations in the Electrification Ratio alone are not sufficient to explain short-term differences in regional economic growth. This finding underscores the importance of shifting policy attention from expanding access toward improving the quality and efficiency of energy systems, particularly through grid reliability, renewable energy integration, and alignment with industrial and technological transformation strategies. Given the modest explanatory power of the model, these interpretations should be viewed as suggestive rather than definitive, and future research could further examine the role of energy quality and efficiency using more comprehensive indicators and advanced econometric approaches.

5.2 The effect of poverty level on economic growth

In this study, the Poverty Rate, used as a partial proxy for SDG 8 (Decent Work and Economic Growth), is found to have a statistically significant negative association with regional economic growth (GRDP) in Java Island. This result suggests that provinces with lower Poverty Rates tend to exhibit higher economic growth, a pattern that is consistent with previous empirical findings in the Indonesian context [7, 28]. However, given the modest explanatory power of the model, this relationship should be interpreted as preliminary evidence rather than a definitive causal effect.

From an economic perspective, poverty reduction is commonly associated with improvements in income distribution and household welfare, which may support higher consumption and aggregate demand [29]. The negative coefficient estimated in this study is therefore consistent with the view that lower poverty levels are correlated with more favorable growth outcomes. Nevertheless, it is important to note that the direction of causality cannot be firmly established within the current empirical framework, as higher economic growth may also contribute to poverty reduction. As such, the

observed relationship should be understood as associational and exploratory.

The findings further indicate that poverty is closely linked to labor market conditions and access to productive employment. In regions such as Java, where labor supply is abundant, high Poverty Rates may reflect limited absorption of workers into stable and adequately remunerated jobs, thereby constraining aggregate demand and economic expansion. Conversely, lower poverty levels may coincide with improved employment opportunities and greater participation in economic activities. While this interpretation aligns with broader development theory, the present results do not allow for strong inferences regarding the underlying mechanisms due to data and model limitations.

It is also important to acknowledge that poverty represents only one dimension of SDG 8, which encompasses a broader set of targets related to employment quality, labor productivity, and working conditions. Consequently, the significant relationship identified in this study captures only a partial aspect of SDG 8 implementation. The results should therefore be viewed as providing suggestive insights into how poverty-related outcomes are associated with regional economic growth, rather than a comprehensive assessment of the role of decent work in driving development.

The evidence indicates that poverty reduction is correlated with higher regional economic growth in Java Island, but this finding must be interpreted with caution. Given that the model explains only about 12 percent of the variation in GRDP, a substantial share of economic growth dynamics is driven by other factors not included in the analysis. Future research could build on these exploratory findings by incorporating additional labor market indicators and employing more advanced econometric techniques to better address issues of endogeneity and reverse causality between poverty and economic growth.

5.3 The effect of the manufacturing industry on economic growth

The manufacturing sector is widely recognized in the literature as an important component of economic development due to its contributions to output, employment, and value creation [3, 18, 19]. In the context of this study, the growth of manufacturing GDP, used as a proxy for SDG 9 (Industry, Innovation, and Infrastructure), exhibits a positive and statistically significant association with regional economic growth (GRDP) in Java Island. This finding indicates that provinces experiencing higher growth in manufacturing output tend to record higher GRDP growth. However, given the overall model performance, this result should be interpreted as preliminary and exploratory evidence, rather than as proof of a dominant or causal role of manufacturing.

From an empirical standpoint, the positive coefficient on manufacturing GDP growth is consistent with the view that industrial expansion is associated with higher aggregate output through value-added production and sectoral linkages. Previous studies similarly report that manufacturing contributes to productivity growth and broader economic performance, particularly in developing and emerging economies [3, 18, 19]. Nevertheless, the present results do not imply that manufacturing growth alone is sufficient to explain regional economic dynamics, as the regression model explains only about 12 percent of the variation in GRDP.

The association identified in this study likely reflects the

role of manufacturing as one among several interrelated factors shaping regional economic outcomes. In Java, where manufacturing activities are spatially concentrated, higher industrial growth may coincide with complementary developments such as improved infrastructure, labor absorption, and supply-chain integration. At the same time, these factors are not explicitly controlled for in the model, which limits the extent to which causal interpretations can be drawn. As such, the estimated relationship should be viewed as indicative of correlation rather than definitive causation.

The results do not capture the qualitative dimensions of industrial development emphasized in SDG 9, such as innovation intensity, technological upgrading, and infrastructure resilience. Manufacturing GDP growth reflects output expansion but does not fully account for differences in productivity, technological sophistication, or value-chain positioning across provinces. Consequently, while the findings suggest that manufacturing performance is positively associated with regional growth, they provide only partial insight into the broader role of SDG 9 in supporting sustainable and inclusive development.

The evidence suggests that manufacturing growth is correlated with higher regional economic growth in Java Island, but this relationship should be interpreted with caution. Given the limited explanatory power of the model and potential issues of endogeneity between growth and industrial expansion, the findings are best understood as exploratory results that highlight the relevance of the manufacturing sector without overstating its role as a primary driver. Future research could extend this analysis by incorporating additional indicators of industrial innovation and infrastructure quality, as well as applying more advanced econometric techniques to better capture the dynamic interactions between manufacturing development and economic growth.

5.4 The effect of the manufacturing industry on economic growth

The results of this study indicate that SDG 10 (Reduced Inequalities), proxied by the GR, exhibits a positive but statistically insignificant association with regional economic growth (GRDP) in Java Island. This finding suggests that variations in income inequality are not a robust predictor of short-term economic growth within the estimated model. Given the lack of statistical significance, the relationship should be interpreted cautiously and viewed as exploratory rather than conclusive.

From a theoretical perspective, the ambiguous relationship between inequality and growth has been widely discussed in the literature. Spatial concentration of economic activity, particularly in industrialized and urban regions, often generates uneven income distribution across regions [30]. This pattern is consistent with the Kuznets hypothesis, which proposes that inequality may increase during early or transitional stages of economic development before gradually declining as economies mature. Motahar and Mamipour [31] argued that inequality may, under certain conditions, coexist with short-term growth through channels such as capital accumulation and investment. The positive sign of the estimated coefficient in this study is consistent with these theoretical arguments, but its statistical insignificance limits the strength of any inference.

Importantly, the insignificant coefficient implies that income inequality does not play a decisive role in explaining

regional economic growth differences in Java once other variables in the model are taken into account. This outcome highlights the complexity of the inequality–growth nexus and suggests that the impact of inequality is likely mediated by other structural factors, such as labor market conditions, human capital distribution, and regional development patterns, which are not explicitly captured in the current specification.

Given the modest explanatory power of the model (Adjusted $R^2 \approx 0.12$), the findings related to SDG 10 should be regarded as suggestive insights rather than evidence of a systematic growth-enhancing or growth-inhibiting effect of inequality. While inequality remains an important social and developmental concern, the present results do not support strong claims regarding its direct influence on short-term regional economic growth in Java Island [32].

Overall, the analysis indicates that the role of income inequality in shaping economic growth outcomes is nuanced and context-dependent. The findings underscore the need for future research to examine this relationship using richer datasets, alternative inequality measures, and econometric approaches that better capture long-term dynamics and potential endogeneity. As such, any policy implications drawn from this result should be considered tentative and subject to further empirical investigation, rather than definitive conclusions about the role of inequality in regional economic development.

5.5 The effect of Foreign Direct Investment on economic growth

The empirical results indicate that SDG 17 (Partnerships for the Goals), proxied by FDI, exhibits a negative but statistically insignificant association with regional economic growth (GRDP) in Java Island. This finding suggests that variations in FDI inflows do not constitute a robust explanatory factor for short-term differences in regional economic growth within the estimated model. Given the lack of statistical significance, the relationship should be interpreted as exploratory and indicative, rather than as evidence of a systematic or causal impact of FDI on economic growth.

The insignificant coefficient estimated in this study is consistent with previous empirical findings in the Indonesian context. Zahro et al. [33] reported that FDI does not consistently contribute to economic growth when it is not effectively integrated into domestic industrial development or employment creation. Hasanuddin and Roy [34] found that the growth effects of foreign investment may be limited when a substantial share of labor employed in FDI projects originates from outside the host region, thereby reducing local income spillovers. These studies support the interpretation that the growth impact of FDI is highly conditional and context-dependent [7, 23].

From an analytical perspective, the results highlight that FDI inflows alone are insufficient to explain regional economic performance in Java once other factors are taken into account. The negative sign of the coefficient may reflect the heterogeneity of investment types and sectors, as well as differences in absorptive capacity across provinces. However, given the modest explanatory power of the model (Adjusted $R^2 \approx 0.12$), no strong inference can be drawn regarding the direction or magnitude of FDI's effect on growth.

It is also important to acknowledge that FDI represents only one dimension of SDG 17, which encompasses a broader set of partnership mechanisms, including trade integration,

technology transfer, institutional cooperation, and capacity building. Consequently, the use of FDI as a single proxy provides only partial insight into the role of global partnerships in supporting sustainable development. Moreover, potential endogeneity between economic growth and FDI inflows cannot be ruled out, as higher-growth regions may attract foreign investment rather than the reverse.

Overall, the findings suggest that the relationship between FDI and regional economic growth in Java Island is weak and statistically inconclusive within the current empirical framework. As such, any policy implications derived from this result should be considered tentative and subject to further empirical investigation. Future research could extend this analysis by incorporating broader indicators of international partnership and applying more advanced econometric techniques to better capture the dynamic and potentially endogenous interaction between foreign investment and economic growth.

This study acknowledges important methodological limitations related to potential endogeneity and reverse causality between economic growth and several explanatory variables, particularly poverty levels, manufacturing growth, and FDI. It is plausible that higher economic growth contributes to poverty reduction, attracts greater FDI inflows, and stimulates manufacturing performance, rather than these variables solely driving growth. As a result, the use of a static OLS-based panel regression may lead to biased coefficient estimates. While addressing these issues is beyond the scope of the present study due to data and methodological constraints, future research is encouraged to apply more advanced econometric techniques, such as instrumental variable (IV) approaches, dynamic panel models, or Generalized Method of Moments (GMM) estimators, to better account for endogeneity and capture the dynamic interactions between sustainable development indicators and economic growth.

6. CONCLUSION

This study provides exploratory evidence on the relationship between selected SDG-related economic indicators and regional economic growth in Java Island. The empirical results suggest that indicators associated with SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure) exhibit positive and statistically significant associations with GRDP growth. However, given the modest explanatory power of the model (Adjusted $R^2 \approx 0.118$) and the lack of joint significance at the 5 percent level, these findings should be interpreted as suggestive rather than conclusive, and do not imply that these SDGs constitute the primary or dominant drivers of economic growth.

The results further indicate that SDG 7 (Affordable and Clean Energy) and SDG 10 (Reduced Inequalities) are positively but not statistically significantly associated with economic growth in Java Island. This suggests that variations in electrification rates and income inequality do not strongly explain short-term growth differences within the estimated framework. In the case of SDG 7, the insignificant effect is consistent with the near-universal level of electrification in Java, where marginal gains from additional access are likely limited. Similarly, the insignificant coefficient for the GR reflects the complex and context-dependent relationship

between inequality and growth, which cannot be robustly identified within the current model.

With respect to SDG 17 (Partnerships for the Goals), proxied by FDI, the analysis reveals a negative but statistically insignificant association with regional economic growth. This finding indicates that FDI inflows, as measured in this study, do not constitute a reliable explanatory factor for growth variations across provinces in Java. It also underscores the limitation of using a single investment indicator to capture the broader and multidimensional nature of international partnerships embedded in SDG 17.

The findings suggest that the relationships between SDG-related indicators and economic growth in Java Island are multifaceted and context-specific, but should be interpreted with caution. As the model explains only a limited share of GRDP variation, a substantial portion of regional economic dynamics is driven by factors beyond those included in the analysis. Consequently, the results should be viewed as preliminary and exploratory, highlighting potential patterns rather than definitive causal mechanisms. Future research is encouraged to employ richer indicators, broader datasets, and more advanced econometric approaches to better capture the complex and dynamic links between Sustainable Development Goals and regional economic growth.

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REFERENCE

- [1] Wartoyo, W., Haida, N. (2023). The actualization of Sustainable Development Goals (SDGs) in Indonesia economic growth an Islamic economic perspective. *IQTISHADUNA: Jurnal Ekonomi dan Keuangan Islam*, 14(1): 107-124. <https://doi.org/10.20414/iqtishaduna.v14i1.6706>
- [2] Asha, N.A., Juliannisa, I.A. (2023). Analysis of socio-economic conditions in 34 provinces Indonesia. *International Journal of Research in Business & Social Science*, 12(3): 297-307. <https://doi.org/10.20525/ijrbs.v12i3.2563>
- [3] Febrianti, I.D., Sugianto, S., Aminda, R.S. (2021). Determination of economic growth in Java Island. *International Journal of Social Service and Research*, 1(2): 99-111. <https://doi.org/10.46799/ijssr.v1i2.24>
- [4] Ashraf, B.N., Goodell, J.W., Butt, S. (2024). SDGs and economic resilience: Evidence from the COVID-19 shock. *Journal of Sustainable Finance and Accounting*, 4: 100015. <https://doi.org/10.1016/j.josfa.2024.100015>
- [5] Asri, M., Tunjungsari, H.K., Tongli, B. (2024). Leveraging idiosyncratic risk to support Sustainable Development Goals (SDGS) and its impact on economic growth at ASEAN countries. *International Journal of Application on Economics and Business*, 2(2): 3810-3824. <https://doi.org/10.24912/ijaeb.v2i2.3810-3824>
- [6] Wei, Z., Huang, L. (2022). Does renewable energy matter to achieve sustainable development? *Fresh*

- evidence from ten Asian economies. *Renewable Energy*, 199: 759-767. <https://doi.org/10.1016/j.renene.2022.07.101>
- [7] Alfaris, R.D., Rustam, R. (2023). Pencapaian tujuan pembangunan berkelanjutan (SDGS) ke-8: Studi kasus di Jawa Tengah. *Journal of Comprehensive Science*, 2(2): 493-500. <https://doi.org/10.59188/jcs.v2i2.237>
- [8] Dzou, F.C., Ibrahim, S., Lihua, Y. (2024). Maximizing the impact of foreign direct investment: Trends, determinants, and strategies for sustainable economic and social development. *IOSR Journal of Economics and Finance*, 16(1): 31-50. <https://doi.org/10.9790/5933-1601043150>
- [9] Girik-Allo, A., Dwiputri, I.N., Maspaitella, M.R. (2022). The impact of electricity investment on inter-regional economic development in Indonesia: An inter-regional input output (IRIO) approach. *Journal of Socioeconomics and Development*, 5(1): 1. <https://doi.org/https://doi.org/10.31328/jسد.v5i1.2775>
- [10] Ningrum, L., Nooraeni, R., Berliana, S.M., Sari, L.K. (2024). Association of SDG indicators of the social development pillar in Indonesia using the Apriori Algorithm. *Procedia Computer Science*, 245: 450-459. <https://doi.org/10.1016/j.procs.2024.10.271>
- [11] Chukwuemeka Ogugua, A. (2024). A theoretical and empirical literature on economic growth. *Advanced Research in Economics and Business Strategy Journal*, 5(2): 7-16. <https://doi.org/10.52919/arebus.v5i02.60>
- [12] Romer, P.M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5, Part 2): S71-S102. <https://doi.org/10.1086/261725>
- [13] Lucas Jr, R.E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1): 3-42. [https://doi.org/10.1016/0304-3932\(88\)90168-7](https://doi.org/10.1016/0304-3932(88)90168-7)
- [14] Wang, G., Sadiq, M., Bashir, T., Jain, V., Ali, S.A., Shabbir, M.S. (2022). The dynamic association between different strategies of renewable energy sources and sustainable economic growth under SDGs. *Energy Strategy Reviews*, 42: 100886. <https://doi.org/10.1016/j.esr.2022.100886>
- [15] Hanum, N., Syahputra, R., Sea, D. (2025). The influence of road and electricity infrastructure on economic growth in Indonesia. *Jurnal Ekonomi, Bisnis Dan Manajemen*, 4(2): 19-32. <https://doi.org/10.58192/ebismen.v4i2.3220>
- [16] Maisarah, U., Andiny, P., Safuridar, S. (2024). The impact of electricity consumption levels on economic growth in Indonesia. *Jurnal Ekonomi dan Pembangunan*, 2(4): 59-68. <https://doi.org/10.61132/jepi.v2i4.943>
- [17] Pamukti, S.A., Bawono, A.D.B. (2022). Pengaruh pendapatan asli daerah, dana alokasi umum, jumlah penduduk miskin, luas wilayah terhadap pertumbuhan ekonomi. *Eqien-Jurnal Ekonomi dan Bisnis*, 10(1): 370-375.
- [18] Behun, M., Gavurova, B., Tkacova, A., Kotaskova, A. (2018). The impact of the manufacturing industry on the economic cycle of European union countries. *Journal of Competitiveness*, 10(1): 23-39. <https://doi.org/10.7441/joc.2018.01.02>
- [19] Jia, F., Ma, X., Xu, X., Xie, L. (2020). The differential role of manufacturing and non-manufacturing TFP growth in economic growth. *Structural Change and Economic Dynamics*, 52: 174-183. <https://doi.org/10.1016/j.strueco.2019.10.006>
- [20] Arumugam, S. (2022). Teaching entrepreneurship education with venture creation approach for students with special needs. *Journal of Social Sciences and Business*, 1(1): 42-50. <https://doi.org/10.5281/zenodo.7754540>
- [21] Nugraha, A.T., Prayitno, G., Situmorang, M.E., Nasution, A. (2020). The role of infrastructure in economic growth and income inequality in Indonesia. *Economics & Sociology*, 13(1): 102-115. <https://doi.org/10.14254/2071-789X.2020/13-1/7>
- [22] Seran, S., Hallan, A.N. (2020). Dependency ratio, inflation and Gini Ratio to economic growth and population poverty in Indonesia. *International Journal of Scientific & Technology Research*, 9(12): 361-369. <https://www.ijstr.org/final-print/dec2020/Dependency-Ratio-Inflation-And-Gini-Ratio-To-Economic-Growth-And-Population-Poverty-In-Indonesia.pdf>
- [23] Fazaaloh, A.M. (2024). FDI and economic growth in Indonesia: A provincial and sectoral analysis. *Journal of Economic Structures*, 13: 3. <https://doi.org/10.1186/s40008-023-00323-w>
- [24] Sugiyono, *Metode Penelitian Kuantitatif*. Bandung: Alfabeta, 2018.
- [25] Creswell, J.W., Creswell, J.D. (2017). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications. <https://us.sagepub.com/en-us/nam/research-design/book270550>
- [26] Ghozali, H.I. (2018). *Aplikasi analisis multivariete dengan program IBM SPSS 23*. <https://dn721500.ca.archive.org/0/items/ebook-dan-novel-indonesia-volume-106/Aplikasi%20Analisis%20Multivariete%20Dengan%20Program%20IBM%20SPSS%2023%20-%20Dr%20H%20Imam%20Ghozali.pdf>
- [27] Paksi, A.K., Nabilazka, C.R., Silawa, K. (2024). Sustainable Development Goals (SDGs) 8 decent work and economic growth implementation. A review form Indonesia 2018-2022. *Revista UNISCI*, 65(2): 141-162. <http://doi.org/10.31439/UNISCI-205>
- [28] Padang, L., Murtala, M. (2020). The effect of the number of poor people and open unemployment rate on economic growth in Indonesia. *Jurnal Ekonomika Indonesia*, 9(1): 9-16. <http://doi.org/10.29103/ekonomika.v9i1.3167>
- [29] Mbodj, A., Laye, S. (2025). Reducing poverty through financial growth: The impact of financial inclusion and development in emerging economies. *Journal of Business and Economic Options*, 8(1): 61-76. <https://doi.org/10.5281/zenodo.17371439>
- [30] Parnreiter, C., Steinwarder, L., Kolhoff, K. (2024). Uneven development through profit repatriation: How capitalism's class and geographical antagonisms intertwine. *Antipode*, 56(6): 2343-2367. <http://doi.org/10.1111/anti.13089>
- [31] Motahar, S.A., Mamipour, S. (2025). Growth effects of wealth inequality through transmission channels. *Economies*, 13(2): 41. <https://doi.org/10.3390/economies13020041>
- [32] Liu, Y., Zhang, H., Ning, M., Wang, L. (2024). Has digital village construction narrowed the urban-rural income gap: Evidence from Chinese counties. *Sustainability*, 16(13): 5330. <http://doi.org/10.3390/su16135330>
- [33] Zahro, S.F., Sutrisno, S., Abu, I., Astuti, R.F. (2024). The influence of foreign debt and foreign direct investment

on economic growth in Indonesia. *Journal of Economic Education and Entrepreneurship Studies*, 6(1): 44-53. <http://doi.org/10.62794/je3s.v6i1.7353>

- [34] Hasanuddin, H., Roy, J. (2022). The influence of population and foreign investment and domestic investment on economic growth and employment opportunities. *Forum Ekonomi: Jurnal Ekonomi, Manajemen Dan Akuntansi*, 24(1): 103-110. <http://doi.org/10.30872/jfor.v24i1.10394>

NOMENCLATURE

Symbol	Definition	Unit
a	Constant (intercept in regression model)	Dimensionless
β	Regression coefficient (slope for each independent variable)	Dimensionless
e	Error term / residual in regression equation	Dimensionless
GDP	Gross Domestic Product, proxy for national economic growth	% per year
GRDP (Y)	Gross Regional Domestic Product, proxy for regional economic growth (dependent variable)	% per year
FDI (X ₅)	Foreign Direct Investment, proxy for SDG 17 (Partnerships for the Goals)	Rp/year (Million Rupiah)
GDP_M (X ₃)	Manufacturing Industry Gross Domestic Product growth, proxy for SDG 9 (Industry, Innovation, Infrastructure)	% per year
GR (X ₄)	Gini Ratio, proxy for SDG 10 (Reduced Inequalities)	Dimensionless (0–1)
P (X ₂)	Poverty Rate, proxy for SDG 8 (Decent Work and Economic Growth)	%
ER (X ₁)	Electrification Ratio, proxy for SDG 7 (Affordable and Clean Energy)	%
R ²	Coefficient of Determination, proportion of variance explained by model	Dimensionless
Adj. R ²	Adjusted Coefficient of Determination	Dimensionless
t	t-statistic in hypothesis testing	Dimensionless
F	F-statistic in hypothesis testing	Dimensionless
Sig.	Significance value (p-value)	Dimensionless

APPENDIX

The empirical analysis in this study relies on secondary panel data obtained from the Central Statistics Agency of Indonesia (Badan Pusat Statistik/BPS) covering the period 2015–2023. Data were collected for six provinces in Java Island (DKI Jakarta, West Java, Central Java, Yogyakarta, East Java, and Banten). The indicators correspond to the SDGs Economic Pillars, operationalized as follows:

- **Economic Growth (Y):** GRDP growth rate (% per year).
- **SDG 7 (X₁):** Electrification Ratio (%).
- **SDG 8 (X₂):** Poverty Rate (%).
- **SDG 9 (X₃):** Growth of Manufacturing Industry GDP (% per year).
- **SDG 10 (X₄):** Gini Ratio (dimensionless, 0–1).
- **SDG 17 (X₅):** Foreign Direct Investment (FDI, Million Rupiah/year).

Appendix B. Regression Model Specification

The study employs a panel data regression model expressed as:

$$\gamma_{it} = a + \beta_1 \chi_{1t} + \beta_2 \chi_{2t} + \beta_3 \chi_{3t} + \beta_4 \chi_{4t} + \beta_5 \chi_{5t} + e_{it}$$

where,

- γ_{it} = Economic Growth (GRDP growth, province i , year t)
- a = Constant term
- β_1, \dots, β_5 = Regression coefficients
- e_{it} = Error term

Appendix C. Statistical Tests

Several diagnostic and classical assumption tests were conducted to ensure model validity:

1. Normality Test: Kolmogorov–Smirnov test, result = 0.200 (> 0.05), data normally distributed.
2. Multicollinearity Test: Tolerance > 0.1 and VIF < 10, no multicollinearity detected.
3. Heteroscedasticity Test: Park Test, significance > 0.05 for all variables, no heteroscedasticity.
4. Autocorrelation Test: Runs Test, Asymp. Sig = 0.149 (> 0.05), no autocorrelation found.

Appendix D. Ethical and Copyright Statement

All data used in this research are publicly available official statistics published by the Central Statistics Agency of Indonesia (BPS). No confidential or proprietary data is used. Figures and tables are original contributions of the author, compiled and processed from BPS data sources.

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