International Journal of
Economics Development Research, Volume 6(3), 2025
pp. 1142-1155

The Effect of Infrastructure and Economic Growth on Poverty Reduction in Indonesia

Rio Saputra Simanjuntak [1], Achmad Solihin [2]

Abstract:

This study examines the impact of infrastructure development and economic growth on poverty reduction in Indonesia from 2014 to 2023. Utilizing panel data from 34 provinces, the analysis employs static regression 3 models CEM, FEM, and REM to evaluate the significance of education, health, telecommunications, electricity, road infrastructure, and regional GDP growth on poverty rates. The Hausman and Chow tests identified FEM as the optimal model, revealing that education infrastructure (school-to-population ratio), telecommunications (mobile phone ratio), roads (length of paved roads), and GDP growth significantly reduce poverty. Conversely, health facilities and electricity access showed no statistically meaningful effect. These findings underscore the necessity of prioritizing equitable education, digital connectivity, and inclusive economic policies to enhance poverty alleviation efforts. The study recommends targeted infrastructure investments in underserved regions, integration of digital literacy programs, and synergistic policies linking economic growth with social protection systems to ensure sustainable poverty reduction. This research contributes novel insights by integrating a comprehensive analysis of six infrastructure and economic variables across diverse provinces, highlighting stark regional disparities in development outcomes and proposing a synergistic policy framework that links digital infrastructure expansion with literacy programs to address accessibility gaps.

Keywords: *Poverty; Infrastructure; Economic Growth*

Submitted: March 15, 2025, Accepted: April 14, 2025, Published: May 20, 2025

1. Introduction

Todaro & Smith (2020) argues that the most essential investment for developing countries is real long-term investment, including the construction of factories, equipment, and physical and social infrastructure, not just speculative investment. Fagbemi et al. (2022) classify infrastructure into two groups, namely economic and social. Economic infrastructure refers to government spending on facilities such as telecommunications, roads, and electricity that increase productivity and market integration, which indirectly drives economic growth and job creation. While social infrastructure refers to government spending on facilities such as water supply, health, and education contributes directly to improving the quality of human capital, reducing

[1] *Universitas Airlangga, Indonesia. rio.saputra.simanjuntak-2023@feb.unair.ac.id*
[2] *Universitas Airlangga, Indonesia.*

the cost of living, and expanding the poor's access to basic services. The link between these two types of infrastructure is crucial in the context of poverty alleviation, especially in a country with geographical characteristics and regional disparities like Indonesia.

Ruchira Kumar (2012) states that infrastructure development is a key strategy for poverty alleviation by expanding the access of the poor to economic resources. However, its effectiveness depends on the type of infrastructure and alignment with pro-poor policies. Telecommunication access can empower MSMEs through digital marketing, while roads connected to distribution centers can reduce logistics costs. On the other hand, health and education infrastructure can only have a significant impact if accompanied by subsidies or assistance programs to reach vulnerable groups. Giving the poor better access to the economy will increase their income and help them move out of poverty (Sasmal & Sasmal, 2016).

The issue of poverty is a major concern for developing countries in formulating development policies (Todaro & Smith, 2020). Poverty is a condition in which individuals cannot enjoy the choices and opportunities to meet their basic needs, such as proper health, an appropriate standard of living, freedom, self-esteem, and respect from others (Pramono & Marsisno, 2018).

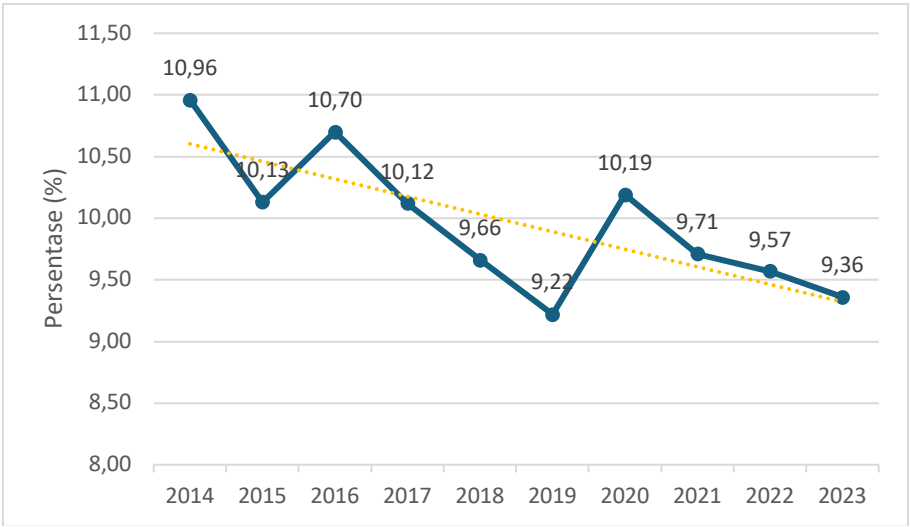

Figure 1. Percentage of poor people in Indonesia

Source: Central Bureau of Statistics (2025)

The issue of poverty in Indonesia is dynamic, as shown in Figure 1.1. In 2014, the percentage of poor people reached 10.96%, then fell to 10.13% in 2015. However, this figure increased again to 10.70% in 2016, allegedly due to the impact of the global economic slowdown triggered by the decline in commodity prices, especially coal and palm oil, and Indonesia's dependence on raw material exports. Recovery began to be seen in 2017-2019 down to 9.41% thanks to the government's fiscal stimulus for infrastructure and social assistance programs. However, the COVID-19 pandemic in 2020-2022 caused poverty to rise to 10.19%, indicating systemic vulnerability. This

fluctuation confirms that poverty is not only influenced by economic growth, but also by the quality and resilience of infrastructure in supporting people's productive activities. Poverty alleviation is a multidimensional problem that requires a comprehensive solution. The Indonesian government recognizes this and has adopted an approach that integrates various sectors, ranging from social, economic, to environmental. In addition to social assistance programs, the government also focuses on infrastructure development.

Poverty alleviation is a multidimensional problem that requires a comprehensive solution. The Indonesian government is aware of this and has adopted an approach that integrates various sectors, ranging from social, economic, to environmental. Apart from social assistance programs, the government also focuses on infrastructure development. During President Joko Widodo's administration, infrastructure became a top priority during his two terms in office. Among these policies, increasing the availability of basic services such as health, education, electricity and especially roads for the poor has been proven based on a report by the Poverty Alleviation Acceleration Team (TNP2K, 2011). There are four strategies in poverty reduction, including improving access to basic services, empowerment, inclusive infrastructure development and improving the social protection system.

2. Theoretical Background

The influence of infrastructure on economic growth is a central topic in many economic studies. One of the pioneers in this field is Sari & Salmah (2004) the one who found that non-military public investment, especially in basic infrastructure such as roads, airports, and street lighting, has made a significant contribution to increasing aggregate productivity in the United States compared to military spending. This finding has sparked a number of similar studies in various countries.

The role of infrastructure development in the context of poverty alleviation has been a topic of interesting debate in the economic literature. There are two conflicting perspectives regarding the causal relationship between these two variables. The first stream believes that investment in infrastructure significantly contributes to reducing poverty levels, while the second stream doubts the existence of a clear causal relationship between the two.

The first school of thought believes that infrastructure development has an effect on reducing poverty both directly and indirectly (Parikh et al., 2015; Kang & Li (2024); Chotia & Rao, 2017) . Parikh et al. (2015) conducted a comparative analysis between slums in India that have been equipped with basic infrastructure and slums that have not. People living in slums that are served by infrastructure, especially access to clean water, have better health conditions and lower medical expenses compared to those living in unserved slums.

The research findings Chotia & Rao (2017) reinforce the view that there is a strong and stable relationship between infrastructure development and poverty reduction in

India. The results of the analysis show that increased investment in infrastructure significantly contributes to a reduction in the poverty rate in the long term. Kang & Li (2024) conducted an in-depth study on the effect of basic infrastructure on poverty alleviation in Indonesia. By defining basic infrastructure as a combination of social and economic infrastructure, this study reveals an indirect relationship between the two variables.

An alternative perspective denies the existence of a strong causal relationship between infrastructure development and poverty reduction. This school of thought argues that although there is a correlation between the two variables, infrastructure development is not necessarily the main cause of the decline in the poverty rate (Sarah Bracking, 2012; Lenz et al., 2017). Sarah Bracking (2012) criticizes the approach to infrastructure development in Africa as not being in line with the goal of poverty reduction. This study shows that a focus on massive physical infrastructure development is not necessarily effective in reducing poverty. Research Lenz et al. (2017) on the impact of the EARP Program in Rwanda shows significant differences in the benefits obtained by various community groups.

Sahi et al., (2020) research highlights the intricate link between economic growth, poverty reduction, and infrastructure. They argue impact of infrastructure on poverty is not direct, but rather mediated through two critical stages: first, infrastructure development promotes economic growth by increasing productivity, expanding market access, and creating logistical efficiency, then inclusive and equitable economic growth reduces poverty through job creation, increased household income, and expanded access to basic services. Thus, this theory emphasizes that the effectiveness of infrastructure in reducing poverty is highly dependent on the ability of economic growth to reach vulnerable groups equitably.

Based on this, a recent study by Fagbemi et al. (2022) in 2022, which focuses specifically on Nigeria from 1996 to 2019, directly examines the relationship between infrastructure investment and poverty. Their findings confirm that increased infrastructure spending significantly contributes to poverty reduction in the Nigerian context.

3. Methodology

Operational Variable

This study aims to determine how infrastructure affects the poverty rate in Indonesia. A quantitative approach was applied by analyzing secondary panel data, which includes time series and cross-sectional data from 34 provinces during the 2014-2023 period. Stata 17 software was used for data analysis. The analysis model is as follows:

$$Pov_{it} = \alpha + \beta_1 Educ_{it} + \beta_2 Heal_{it} + \beta_3 Telc_{it} + \beta_4 Elec_{it} + \beta_5 Road_{it} + \beta_6 LPDRB_{it} + \varepsilon_{it} \quad (1)$$

Description:

Pov	: Poverty
Educ	: Education infrastructure
Heal	: Health infrastructure

Telc	: Telecommunications infrastructure
Elec	: Electricity infrastructure
Road	: Road infrastructure
LPDRB	: Growth rate of regional gross domestic product
α	: constant
e	: error term
i	: cross section (34 provinces in Indonesia)
t	: time series (2014–2023)

Poverty is measured by the percentage of the population living in poverty, which describes the proportion of people living below the poverty line. Educational infrastructure is represented by the ratio of the number of schools per 1,000 inhabitants, reflecting the availability of educational facilities in an area. Meanwhile, health infrastructure is calculated based on the number of hospitals and community health centers in operation. In the technology sector, telecommunications infrastructure is analyzed through the percentage of mobile phone users, showing the penetration level of communication technology. The electricity infrastructure is measured using the electrification ratio, which records the coverage of electricity access, while the road infrastructure is assessed by the length of roads in a steady condition (in kilometers). All of these variables contribute to economic growth, which is measured by the growth rate of Gross Regional Domestic Product (GRDP) in percentage. The data is sourced from macro indicators that illustrate the link between multidimensional infrastructure development, poverty alleviation, and regional economic dynamics.

This study adapts the panel data regression model developed in research Purnomo (2021). The dependent variable used is the poverty rate. Meanwhile, the independent variable used is infrastructure, which consists of education, health, telecommunications, electricity, and roads. The control variable used is the rate of regional gross domestic product (GDP). The data source is from the Central Statistics Agency for 2014-2023.

The selection of the research period 2014-2023 is based on its relevance to the dynamics of infrastructure policy and poverty alleviation in Indonesia, as well as the availability of comprehensive secondary data. This period covers two presidential periods (2014-2019 and 2019-2024) under President Joko Widodo, who placed infrastructure development as a top priority in his Nawacita agenda. In 2014, the government launched strategic programs such as MP3EI (Masterplan for the Acceleration and Expansion of Indonesia's Economic Development) geared towards reducing the infrastructure gap between regions. This policy was reinforced by the establishment of specialized institutions such as the Public Service Agency (BLU) to accelerate infrastructure projects.

Descriptive Statistics

Descriptive analysis is used as a first step in research to understand the characteristics of each variable. In this study, descriptive analysis begins by reviewing poverty data

as the dependent variable, followed by assessing the variable using the mean and median values.

Generalized Least Square (GLS) Model

In this study, static panel data analysis using the General Least Square (GLS) method was used to estimate the effect of the variables studied. The GLS method was chosen because of its ability to provide efficient estimates, especially when the ordinary least squares (OLS) assumption is not met. The estimation process was carried out using three approach models: Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The selection of the best model among these three models is done through the Hausman test and the Chow test. The Hausman test is used to compare FEM and REM, where FEM is selected if the Hausman test statistic value exceeds the critical value. Meanwhile, the Chow test is used to compare FEM and CEM, where FEM is selected if the null hypothesis is rejected. By using these two tests, researchers can ensure that the selected model best fits the data characteristics and provides valid and reliable results.

F-Statistic Test

The F-test evaluates whether all independent variables in the regression model simultaneously significantly affect the dependent variable. The null hypothesis (H0) states that there is no effect, while the alternative hypothesis (H1) states that the independent variables have a simultaneous effect. If the F-test p-value is less than the significance level H0 is rejected, indicating a significant model. Conversely, if the p-value is greater H0 is not rejected, indicating an insignificant model.

T-Statistic Test

The T-test is used to assess the significance of the influence of each independent variable separately on the dependent variable in the regression model. The null hypothesis (H0) states that there is no effect, while the alternative hypothesis (H1) states that there is an effect. The t-score is compared to the t-table value. If t-score exceeds t-table, H0 is rejected, indicating a significant independent variable. Conversely, if t-calculated is less than t-table, H0 is not rejected, the independent variable is insignificant. The t-test is important for identifying which independent variables have the most influence in the model.

4. Empirical Findings/Result

Descriptive Statistics

The following is a table summarizing descriptive statistical data on how infrastructure relates to poverty in Indonesia between 2014 and 2023:

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
P0	340	10.80094	5.621341	3.42	28.4
Educ	340	0.9129724	0.2860033	0.4969	2.0511
Heal	340	375.3676	332.4022	55	1514
Telc	340	61.23268	9.873332	27.35	82.47

Variable	Obs	Mean	Std. dev.	Min	Max
Elec	340	92.79141	10.012024	43.46	100
Road	340	10424.01	7179.21	1992	35375
Lpdrb	340	3.176971	3.935196	-20.13	21.18

Source: Data Processed (2025)

Data analysis of the 340 observed regions shows wide variations in poverty and infrastructure indicators. The percentage of poor people (P0) has an average of 10.8% with a standard deviation of 5.62, indicating significant disparities between regions, from a low of 3.42% to a high of 28.4%.

In the education infrastructure sector, the ratio of schools per 1,000 population is relatively stable, averaging 0.91 with a deviation of 0.29, although some regions still have ratios below 0.5. In the health sector, inequality is striking with an average of 375 health facilities and a deviation of 332, with the poorest region having only 55 units, while other regions reach 1,514 units. Telecommunications infrastructure shows an average of 61.23% cell phone users, but there are still regions with percentages as low as 27.35%, suggesting a digital access gap.

Electricity electrification is a relatively stable indicator with an average of 92.79%, although some regions lag behind with a ratio of 43.46%. Road infrastructure displays disparities in road length varying from 1,992 to 35,375 units with a deviation of 7,179, reflecting uneven development priorities. The GRDP rate has an average of 3.18% indicating positive economic growth in aggregate, but there are regions with negative growth of up to -20.13%, confirming the unbalanced economic performance between regions.

Indonesia's wide poverty gap, from 3.42% to 28.4%, reflects a complex interaction between geographical, economic, policy, and social factors. Geographically, remote regions such as Papua and Nusa Tenggara face isolation due to the lack of basic infrastructure such as roads, electricity, and telecommunications that hinder access to markets and essential services. The electrification ratio in Papua is only 43.46%, well below the national average of 92.79%, while the absence of quality roads in rural Kalimantan limits the distribution of agricultural produce. On the economic side, dependence on primary sectors such as mining and subsistence agriculture makes regions like Sumatra and Kalimantan vulnerable to fluctuations in global commodity prices, as seen in the rise in poverty when coal and palm oil prices plummeted in 2016. Meanwhile, decentralization policies that are not matched by regional fiscal capacity exacerbate inequality: poorer regions such as Maluku have difficulty financing infrastructure projects, while Java gets a larger budget allocation for strategic projects such as the Trans Java Toll Road that do not necessarily address local needs. Social factors also contribute, such as the low ratio of schools below 0.5 per 1,000 population and health facilities of only 55 units in disadvantaged areas vs. 1,514 units in Java, which limit social mobility and increase the cost of living.

External crises, such as the COVID-19 pandemic, further widened the gap-regions with weak digital infrastructure such as Nusa Tenggara saw a 2.5% increase in poverty, while regions such as Bali recovered faster adapting through e-commerce. To address this, a holistic approach is needed that combines region-specific needs based infrastructure development for internet networks in Papua, fiscal policy reforms for budget equity, and HR empowerment programs that are synergistic with infrastructure. Without inclusive policy integration, this gap will continue to mirror the systemic failure to link physical development with improvements in the welfare of vulnerable communities.

Measure Model Testing

To ensure the measurement model's validity, rigorous testing is essential. This process involves evaluating various models using static panel data regression to identify the optimal fit. The resulting statistical outputs are summarized in the table below:

Table 2. Model Measurement

Variabel	Common	Fixed	Random
Constanta	0.000	0.000	0.000
Educ	0.021	0.019	0.505
Heal	0.117	0.112	0.134
Telc	0.000	0.000	0.000
Elec	0.420	0.414	0.000
Road	0.077	0.073	0.601
Lpdrb	0.000	0.000	0.799
R-Squared	0.4665	0.5092	0.5075
Prob (F-Statistic)	0.0000	0.0000	0.0000
Number of Observation	340	340	340
Number of Groups	10	10	10
Shapiro Wilk Test	0.31799		
Chow Test	0.0000		
Hausman Test	0.0000		
LM Test	0.0000		
VIF Test	2.66		

Source: Data Processed (2025)

Poverty alleviation efforts in Indonesia are influenced by factors such as education infrastructure, health, telecommunications, electricity, roads and GRDP rate. In the context of panel data regression analysis, this study tests three models, namely the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). The results of the Chow and Hausman tests show that the Fixed Effect Model (FEM) is the most suitable model for analysis, with a probability value of 0.0000 which is well below the significance threshold of 0.05. In addition, the FEM coefficient of determination value is higher than other models, which is 0.5092,

indicating that FEM has a better ability to explain the variation of dependent variables. The probability value of the F-Statistic also shows the significance of the simultaneous effect of the independent variable on the dependent variable. Shapiro Wilk data distribution of 0.31799 is greater than 0.05 indicating normal distribution and VIF value of 2.66 is below the threshold of 10 indicating no multicollinearity.

Hypothesis Test

This study then proceeds to the hypothesis testing stage, which specifically aims to analyze the direct effect of the independent variable on the dependent variable.

Variabel	Probability	Conclusions
H1 Educ on Pov	0.019	Support
H2 Heal on Pov	0.112	Not Support
H3 Telc on Pov	0.000	Support
H4 Elec on Pov	0.414	Not Support
H5 Road on Pov	0.073	Not Support
H6 Lpdrb on Pov	0.000	Support

Notes : Significance at P<0.05

Source: Data Processed (2025)

F-test

The F Hypothesis Test is a combined or simultaneous test used to assess the overall effect of education infrastructure, health, telecommunications, electricity, roads and GRDP rate on the percentage of poor people. Using the fixed effect model (FEM), the F-test produced findings that the independent variables collectively have a significant effect on the dependent variable. Evidence of this significance is the probability value of the F-statistic of 0.0000, which is lower than the significance threshold of 0.05. Thus it can be concluded that the infrastructure variables of education, health, telecommunications, electricity, roads and GRDP rate have a significant effect on the percentage of poor people.

T-test

The partial hypothesis test, which is a statistical method, is used to measure the impact of each independent variable on the dependent variable. In this study, the t-test was applied to analyze the effect of education, health, telecommunications, electricity, road, and regional economic growth (GRDP) infrastructure on the poverty rate of the population. Based on the estimation results of the Fixed Effect Model with a significance level of 5%, it is found that education infrastructure, telecommunication infrastructure and GRDP rate have a significant effect on the percentage of poverty in Indonesia. In contrast, health infrastructure, electricity and roads do not show a significant effect. An in-depth explanation of the t-test findings will be presented in the following description.

5. Discussion

Education Infrastructure Affects the Percentage of Poor Population
Educational infrastructure based on the indicator of the ratio of the number of schools to the total population has a significant negative effect on the percentage of poor people (P0), meaning that every 1 percent increase in the ratio of the number of schools to the total population will reduce the percentage of poor people by -2.35%, assuming other variables are constant. This result is in accordance with theory and several previous studies, as has been explained that Todaro & Smith (2020) human capital is a key pillar in a sustainable development strategy. The results of this study support the research Kang & Li (2024), Pramono & Marsisno (2018) and Queiroz et al. (2020) that quality and affordable education infrastructure will increase high employment opportunities.

Health Infrastructure Does Not Affect the Percentage of Poor Population
The health infrastructure variable based on the number of health facilities indicator shows a different pattern of influence on the three dimensions of poverty. In the percentage of poor people (P0), the coefficient of health at 0.0024584 shows a positive relationship, although it is very small and not statistically significant. This shows that an increase in health facilities is not able to reduce the percentage of poor people. This phenomenon may be due to inequality in access or quality of health services and the development of physical infrastructure has not been accompanied by an increase in affordability or public awareness to utilize it optimally. This finding contrasts with research Thakur & Faizan (2024) and Puteri et al., (204) that states that adequate access to health can reduce poverty through increased labor productivity. The use of quantity indicators of health facilities (number of hospitals and puskesmas) may fail to capture quality aspects, such as availability of medical personnel, completeness of equipment, or affordability of services. For example, in Papua, despite an increase in the number of puskesmas, access for the poor remains hampered by transportation costs or cultural stigma.

Telecommunication Infrastructure Affects the Percentage of Poor People
The telecommunication infrastructure variable based on the percentage of cellular phone users shows a significant negative effect on all three dimensions of poverty. For the percentage of poor people (P0), the coefficient of -0.3478123 indicates that every 1% increase in access to telecommunication infrastructure can reduce the percentage of poor people by 0.35% (ceteris paribus). Significance at $\alpha = 1\%$ strengthens the evidence that digitalization plays a crucial role in reducing structural poverty, especially through expanding access to information. This finding is in line with research Chotia & Rao (2017) in India and the *digital divide* theory UNDP (2021), which emphasizes that equal access to information technology can accelerate the socioeconomic mobility of vulnerable groups. The study also supports that improvements in telecommunications infrastructure correlate with poverty reduction in developing countries.

Electricity Infrastructure Has No Effect on the Percentage of Poor People
The electricity infrastructure variable measured by the electrification ratio shows a negative effect on the three dimensions of poverty but is not statistically significant. On the percentage of poor people (P0), the electricity coefficient at -0.0216381 indicates that every 1% increase in the electrification ratio only decreases the percentage of poor people by 0.02%, assuming other variables are constant. However, the insignificance of this result indicates that electrification has not been a key factor in reducing poverty. This is contrary to the opinion of Kang & Li (2024), Pramono & Marsisno (2018), and Chotia & Rao (2017) which states that increasing access to electricity can reduce poverty. This is thought to be caused by inequality in the quality of electricity access such as limited power KWH electricity, especially for the poor, then the inability of the poor to utilize electricity for productive activities, or the cost of electricity that is not affordable for vulnerable groups. Studies Dagnachew et al. (2019) in Sub-Saharan Africa reinforce this finding, electrification only has a significant impact if accompanied by skills training programs and access to productive capital. The benefits of infrastructure such as roads or electricity are often long-term. For example, road construction in West Papua in 2018 may only stimulate MSME growth in 2023 through improved market access. However, the study data (2014-2023) may be too short to capture this effect.

Road Infrastructure Has No Effect on the Percentage of Poor Population
The road infrastructure variable measured by the length of road in good condition indicator shows a negative but very limited effect on reducing the poverty rate. On the percentage of poor people (P0), the road coefficient of -0.0001215 has a very small significance at $\alpha = 10\%$, indicating that every 1% increase in the length of steady roads only reduces the percentage of poor people by 0.00012% *ceteris paribus.* This small impact shows that road infrastructure has not been the dominant factor in reducing poverty. The ineffective effect of roads is due to the uneven distribution of quality roads, where development is more concentrated in urban or industrial areas, while there is also an imbalance between provinces. In addition, the lack of integration with supporting infrastructure such as markets or logistics makes the economic benefits of roads suboptimal. Studies Banerjee et al. (2020) in China reinforce these findings, where rural roads only have a significant impact when combined with MSME development programs and access to microfinance.

GDP Growth Affects the Percentage of Poor People
The GRDP rate variable shows a significant negative effect on all three dimensions of poverty, with a very high statistical significance level of $\alpha = 1\%$. This result confirms the theory that inclusive economic growth can be the motor of multidimensional poverty reduction. The coefficient of the GDP rate of -0.2136646 indicates that every 1% increase in the regional economic growth rate (GDP) contributes to reducing the percentage of poverty rate by 0.21%, *ceteris paribus*. This relatively large impact confirms that quality economic growth can create jobs, increase income, and expand access to basic services for the poor. This finding is in line with the pro-poor UNDP (2021) growth theory that emphasizes the importance of economic growth accompanied by equal opportunities. The study Dollar et al. (2016) also shows that

countries with GRDP growth above 5% per year tend to experience faster poverty reduction.

6. Conclusions

The results showed that simultaneously infrastructure consisting of education, health, telecommunications, electricity, roads and GRDP rate had a significant effect on poverty in Indonesia for the period 2014-2023. Simultaneously, the estimation results explain that if the six exogenous variables work together in the economy, it will encourage poverty alleviation. Improving infrastructure and followed by maintaining the quality of GRDP growth rate will provide optimal results in influencing poverty. Infrastructure development needs to be focused on sectors that are proven to significantly reduce poverty such as education and telecommunications. The government should expand access to quality schools in underdeveloped areas, especially Papua and Nusa Tenggara by building educational facilities equipped with digital technology. On the telecommunications side, the expansion of internet networks and BTS in remote areas must be accompanied by digital literacy programs to ensure that the poor can utilize them in economic activities. Meanwhile, electricity and road infrastructure need to be improved, such as ensuring stable electricity tariffs for MSMEs and improving rural roads connected to local economic centers.

The insignificance of health, electricity and road infrastructure in this study does not necessarily confirm policy failure, but rather reflects the complexity of measuring impact and the need for a more holistic approach. Effective solutions require a combination of infrastructure quality improvement, community-based mentoring programs, and policies that are responsive to the local context. Without this, physical infrastructure will only be an "empty building" that fails to address the root causes of poverty.

Government policies should be more inclusive, such as social assistance programs and pre-employment cards that need to be synergized with health infrastructure development, for example by providing free access to health centers for social assistance recipients. In addition, fiscal policy should encourage private investment in the telecommunications and education sectors through tax incentives or ease of licensing. The government also needs to revise the infrastructure budget allocation by prioritizing underdeveloped regions and ensuring transparency in project implementation to avoid budget leakage.

References:

Banerjee, A., Duflo, E., & Qian, N. (2020). On the road: Access to transportation infrastructure and economic growth in China. *Journal of Development Economics, 145*, 102442. https://doi.org/10.1016/j.jdeveco.2020.102442

Bracking, S. (2012). Secrecy jurisdictions and economic development in Africa: The role of sovereign spaces of exception in producing private wealth and public

poverty. *Economy and Society, 41*(4), 615–637. https://doi.org/10.1080/03085147.2012.718626

Chotia, V., & Rao, N. V. M. (2017). An empirical investigation of the link between infrastructure development and poverty reduction: The case of India. *International Journal of Social Economics, 44*(12), 1906–1918. https://doi.org/10.1108/IJSE-06-2016-0154

Dagnachew, A. G., Poblete-Cazenave, M., Pachauri, S., Hof, A. F., van Ruijven, B., & van Vuuren, D. P. (2019). Integrating energy access, efficiency and renewable energy policies in sub-Saharan Africa: A model-based analysis. *Environmental Research Letters, 15*(12), 124058. https://doi.org/10.1088/1748-9326/abcbb9

Dollar, D., Kleineberg, T., & Kraay, A. (2016). Growth still is good for the poor. *European Economic Review, 81*, 68–85. https://doi.org/10.1016/j.euroecorev.2015.05.008

Fagbemi, F., Osinubi, T. T., & Adeosun, O. A. (2022). Enhancing sustainable infrastructure development: A boon to poverty reduction in Nigeria. *World Development Sustainability, 1*, 100006. https://doi.org/10.1016/j.wds.2022.100006

Kang, Y., & Li, Y. (2024). The impact of China's economic growth on poverty alleviation: From absolute to relative poverty. *arXiv*. https://arxiv.org/abs/2412.20176

Kumar, R. (2012). Poverty literature review summary: Infrastructure, economic growth and poverty reduction. *International Finance, World Bank*, 1–7.

Lenz, L., Munyehirwe, A., Peters, J., & Sievert, M. (2017). Does large-scale infrastructure investment alleviate poverty? Impacts of Rwanda's electricity access roll-out program. *World Development, 89*, 88–110. https://doi.org/10.1016/j.worlddev.2016.08.003

Parikh, P., Fu, K., Parikh, H., McRobie, A., & George, G. (2015). Infrastructure provision, gender, and poverty in Indian slums. *World Development, 66*, 468–486. https://doi.org/10.1016/j.worlddev.2014.09.014

Pramono, G., & Marsisno, W. (2018). Availability of infrastructure for poverty reduction in Indonesia: Spatial panel data analysis. *Economics and Finance in Indonesia, 64*(2), 157–180. https://doi.org/10.47291/efi.v64i2.587

Puteri, C. A. M., Nihayah, D. M., & Widyawati, R. F. (2024). Infrastructure development and its influence on income disparities: Case study in Indonesia. In *Proceedings of the 4th International Conference on Social Sciences and Law (ICSSL 2024)* (pp. 808–827). Atlantis Press. https://doi.org/10.2991/978-2-38476-303-0_75

Purnomo, S. D. (2021). Analysis of labor absorption in Central Java Province. *Ekonomis: Journal of Economics and Business, 5*(1), 240–252. https://doi.org/10.33087/ekonomis.v5i1.311

Queiroz, M. V. A. B., Sampaio, R. M. B., & Sampaio, L. M. B. (2020). Dynamic efficiency of primary education in Brazil: Socioeconomic and infrastructure influence on school performance. *Socio-Economic Planning Sciences, 70*, 100738. https://doi.org/10.1016/j.seps.2019.100738

Sahi, D. F., Arham, M. A., & Santoso, I. R. (2020). The impact of government infrastructure spending on economic growth and poverty in Gorontalo

Province. *Jambura Equilibrium Journal, 2*(1). https://doi.org/10.37479/jej.v2i1.4494

Sasmal, R., & Sasmal, J. (2016). Public expenditure, economic growth and poverty alleviation. *International Journal of Social Economics, 43*(6), 604–618. https://doi.org/10.1108/IJSE-08-2014-0161

Sari, D. A., & Salmah, E. (2024). Analysis of the influence of infrastructure development, poverty, and education on economic growth in Mataram City 2014–2023. *Formosa Journal of Multidisciplinary Research, 3*(10), 3843–3860. https://doi.org/10.55927/fjmr.v3i10.11821

Thakur, R., & Faizan, M. A. (2024). Magnitude of health expenditure induced removable poverty in India: Some reflections of Ayushman Bharat. *Heliyon, 10*(1), e23464. https://doi.org/10.1016/j.heliyon.2023.e23464

Todaro, M. P., & Smith, S. C. (2020). *Economic development* (13th ed.). Pearson.

United Nations Development Programme. (2021). UNDP and energy access for the poor: Energizing the Millennium Development Goals. https://www.undp.org