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Why is Education Improving? An Economic and Poverty Investigation of Average Length of Schooling in the Context of SDG 4 (Quality Education) in East Java 2015-2024

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ABSTRACT

Objective: *The low quality of education in Indonesia ranks 12th out of 12 countries in Asia according to a survey by PERC, and East Java Province is still below the mandatory 9-year education standard based on data from BPS of 8.69 years in 2024. Therefore, this study aims to analyze the effect of Gross Regional Domestic Product (GRDP) and poverty levels on the average length of schooling in East Java Province during the period 2015–2024.* ***Method:*** *The method used in this study is multiple linear regression or Ordinary Least Square (OLS) analysis through SPSS to see the relationship between the two economic variables and the community's educational attainment. The data used is secondary data from the Central Statistics Agency, which covers regional educational development and economic conditions.* ***Results:*** *The results show that GRDP and poverty levels simultaneously have a significant effect on average length of schooling, with an explanatory contribution of 76%. However, partially, both variables have a negative effect, indicating that economic growth is not yet evenly distributed and poverty remains an obstacle to improving education. This study is expected to provide input for local governments in formulating policies to improve the quality of education.* ***Novelty:*** *The novelty of this study lies in the analysis of the partial and simultaneous effects of two major economic factors on education indicators at the regional level, which has not been empirically studied much previously. Therefore, this study supports SDG 4 (Quality Education) by ensuring inclusive and equitable quality education and promoting lifelong learning opportunities.*

INTRODUCTION

Education is an important factor in shaping the quality of human resources, which are the main drivers of a country's economic development. Through quality education, individuals can improve their abilities, skills, and productivity, which directly impact economic growth and community welfare. Therefore, a country's economic growth cannot be separated from the quality of its population's education and economic progress in each region. Based on data from worldtop20.org, Indonesia's education quality in 2023 ranks 67th out of a total of 209 countries in the world Tabi'in (2024). This result is also in line with a survey by Political and Economic Risk Consultant (PERC), which ranked Indonesia 12th out of 12 countries in Asia in terms of education quality (Sujarwo, 2015). The low quality of education in Indonesia cannot be separated from various factors, such as the limited number of educators, suboptimal teaching methods, and uneven school facilities. According to Adamecz (2023), education can develop human capital because long-term education can provide benefits. Therefore, this study supports SDG 4 (Quality Education) by ensuring inclusive and equitable education quality and increasing lifelong learning opportunities

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One important indicator used to assess educational development in a region is the Average Length of Schooling (ALS). ALS shows the average length of formal education completed by residents aged 15 years and above (Putria et al., 2023). This indicator provides a concrete picture of the quality of education in the community. Based on data from the Central Statistics Agency (BPS), the ALE in East Java Province increased from 7.71 years in 2015 to 8.69 years in 2024. However, it is still below the 9-year compulsory education standard. This shows that some of the population has not completed their basic education, so human capital development is not yet optimal.

In addition to educational aspects, regional economic factors also play an important role in determining the quality of human resources. Acheampong et al., (2024) explains that with increased economic growth, households and governments will be able to invest in education, even to bridge the gender gap. Education and the economy have a mutually influential relationship because good education will encourage labor productivity, while economic growth provides financial support for improving the quality of education. According to Surya et al., (2025), the higher the level of education of the community, the better the quality of human life, which in turn can drive economic growth and the welfare of a country. However, based on data from the Central Statistics Agency (BPS), the Gross Regional Domestic Product (GRDP) of East Java actually decreased from 14.52% in 2015 to 14.39% in 2024. In fact, with an increase in the GRDP, a region can have more optimal funding capacity to help build adequate and quality education. This is not in line with the research Rahmi et al., (2025) which explains that based on data from BPS in 2024, the island of Java has the largest contribution to GRDP in Indonesia. Meanwhile, the poverty rate in East Java is still recorded at 9.56% in 2024. The high poverty rate can limit investment in education because household income is absorbed by basic needs, resulting in suboptimal access to and quality of education. Therefore, children are at risk of dropping out of school or choosing to work early, thereby reducing their opportunities to obtain a quality education. According to Qudsi & Ashar, (2025), the average length of schooling has a significant negative impact on poverty. Meanwhile, according to Fayza et al., (2025), improvements in education can serve as a means of reducing poverty. This situation shows that improvements in education are not yet fully in line with economic growth and poverty reduction in the region.

The relationship between education, economy, and poverty can be explained through Human Capital Theory, which states that education is an important investment to improve one's abilities, skills, and well-being. The higher the level of education, the greater the chances of obtaining decent work and improving family welfare. This is in line with the opinion Gatt et al., (2020) that investment in education will increase human capital and drive economic growth. Meanwhile, Economic Growth Theory Solow, (1956) explains that an increase in regional income or GRDP can strengthen the community's capacity to invest in education. Suci et al., (2023) also emphasize that economic growth, education, and poverty are closely related in the process of human development in a region.

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Several previous studies have highlighted the relationship between economic and educational aspects. For example, the study Salfina et al., (2025) focuses on the influence of GRDP and unemployment on poverty levels, while Bella et al., (2025); Syairoji et al., (2024) examines the relationship between economic growth and RLS on the Human Development Index (HDI). The study Ananda et al., (2024) focuses on educational factors that influence RLS in West Kalimantan through a spatial approach, but does not link it to macroeconomic indicators such as GRDP and poverty. In addition, research Shafiyah & Imaningsih, (2025) in the Province of Yogyakarta analyzed the influence of income inequality, average length of schooling, economic growth, and investment on poverty levels. Of these various studies, few specifically examine the influence of GRDP and poverty levels on educational achievement such as RLS, especially in regions with diverse socioeconomic characteristics such as East Java Province.

Therefore, the research gap in this study is to analyze the effect of Regional Domestic Product (RDP) and poverty rate on Average Length of Schooling (ALS) in East Java Province. The novelty of this study lies in the analysis of the partial or simultaneous influence of two major economic factors on education indicators at the regional level, which has not been empirically studied much previously. Furthermore, data from the Central Statistics Agency (BPS) for the period 2015-2024 shows that GRDP and poverty experienced increases and decreases that were not in line with the average length of schooling, which continued to increase. Therefore, the urgency of this research is an effort to assess whether the economic interventions carried out by local governments have had a real impact on education. It is also important to understand that the decline in poverty rates in the region not only reflects the success of economic development but also has the potential to improve the quality of education.

In practical terms, this study is expected to make two important contributions. First, it will enrich empirical studies on the relationship between the economy, poverty, and education in East Java Province. Second, it will provide input for local governments in formulating policies to improve the quality of education that not only focus on expanding access but also on increasing the duration of schooling for the population, in line with efforts to promote regional economic growth. In line with Nepal et al., (2025), who explain that the government is encouraged to develop education as a means of acquiring knowledge, technology, and job skills, personal qualities, and higher income levels. Thus, the results of this study are expected to contribute to strengthening sustainable human development in East Java.

Average Length of Schooling

Average Length of Schooling (ALS) is an education indicator that describes the average number of years of formal education completed by people aged 15 years and above in a particular region, without counting repeat years (Ananda et al., 2024). ALS is used to assess the quality of human resources, because the higher the average length of schooling, the more people have completed higher levels of education. This is in line with research

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Chang et al., (2023) which states that an increase in ALE reflects an increase in community participation and completion of education.

According to the publication Mean Years of Schooling for Population Aged 15 Years and Over by Urban-Rural Classification BPS, (2025) RLS in Indonesia still shows a gap between urban and rural areas, with urban areas having a higher average length of schooling. Ananda et al., (2024) emphasize that most regions in Indonesia are still below the target of nine years of basic education, which indicates that educational attainment is not yet evenly distributed across regions. This is in line with the opinion of Fahmiyah & Ningrum, (2023), which explains that the expected average length of schooling is around 12-14 years, indicating that most Indonesians have the opportunity to pursue formal education up to high school. However, the average length of schooling is lower than the expected length of schooling, meaning that not everyone completes their education up to high school (12 years), with some only completing elementary and junior high school. Based on the Human Capital Theory perspective, low RLS indicates limited investment in education and has implications for the quality of the workforce produced. Therefore, increasing RLS is an important indicator in assessing the success of human development at the regional level.

Gross Regional Domestic Product (GRDP)

Gross Regional Domestic Product (GRDP) is the total added value of all economic activities in a region within a certain period of time, usually one year. GRDP per capita is used as a measure of economic welfare and people's purchasing power for social needs, including education (Maichal et al., 2024). Meanwhile, according to Anshori et al., (2025), GRDP is the total gross value added generated by all business units or the total value of final goods and services produced by all economic activities in the region.

Based on Economic Growth Theory Solow, (1956), an increase in GRDP indicates an increase in production capacity and community income, which can increase investment capacity in the field of education. Economic growth affects education through several mechanisms: (1) the household income effect, whereby households with higher incomes are able to bear higher education costs; (2) regional fiscal capacity, whereby an increase in GRDP expands the government's fiscal space to finance the education sector; and (3) human capital accumulation, whereby better education increases labor productivity, which in turn strengthens economic growth.

Poverty Rate

Poverty is a socioeconomic condition that describes an individual's inability to meet basic needs such as food, clothing, shelter, health, and education. According to Muthia & Barikha, (2022), poverty is not only viewed from a monetary perspective but also from the limited access to resources and public services that hinder basic human abilities to live healthy and educated lives. According to Hidayat & Hidayah, (2025) natural poverty

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is a condition of poverty that has been severe from the outset. This condition occurs due to a lack of human resources, natural resources, and poor development resources.

Joe Hasell, (2024) using the Multidimensional Poverty Index (MPI) framework explains that poverty encompasses deprivation in various dimensions, including health, education, and living standards. In the context of education, poor families often face financial constraints that prevent their children from continuing their schooling or force them to work to help support the family economy.

The Effect of Gross Regional Domestic Product (GRDP) on Average Length of Schooling

Theoretically, the relationship between economic growth and education is explained through the Economic Growth Theory Solow, (1956), which states that an increase in regional income or GRDP will strengthen the economic capacity of the community to invest in education. When per capita GRDP increases, household purchasing power also rises, giving them greater financial ability to fund their children's educational needs, from school fees and transportation to other learning requirements. An increase in GRDP also enables local governments to increase their education sector budgets, improve school infrastructure, and expand access to education. In reality, however, according to data from the Central Statistics Agency BPS, (2025), there has been a decline from 14.52% in 2015 to 14.39% in 2024.

Empirically, research findings AryaPutra & Sukartini,(2025) reveal that an increase in GRDP has a significant positive impact on education indicators, including average length of schooling, in various provinces in Indonesia. Hanushek & Woessmann, (2021) explain that long-term economic growth is greatly influenced by the quality of education, and countries that fail to improve the quality of education risk losing their economic potential in the future. Similar research was presented by Canetti & Araujo, (2022), who stated that economic policies that encourage GRDP growth simultaneously contribute to improving the quality of human resources through increased length of schooling and participation in education. Theoretically and empirically, it can be concluded that the higher the GRDP of a region, the higher the average length of schooling of its population.

The Effect of Poverty Levels on Average Length of Schooling

Poverty is one of the main obstacles to achieving quality education. Based on Basic Needs Theory, poverty does not only mean a lack of income, but also limited capabilities to access basic services such as education, health, and nutrition. Poor households often face financial constraints that force their children to work to help support the family, potentially shortening their schooling. Data from the East Java Provincial Statistics Agency (2025) shows that the poverty rate in September 2024 was 9.56%, down from 10.20% in 2019. This condition shows that some people in East Java still face economic constraints that can affect access to and continuity of education.

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Empirical research supports this theory. Saputra & Samsudin, (2025) found that poverty has a significant negative impact on economic development and education in Bengkulu Province, where the higher the poverty rate, the lower the school participation and average length of schooling of the population. Thus, theoretically and empirically, the poverty rate has a negative relationship with the average length of schooling.

The Simultaneous Effect of GRDP and Poverty Rate on Average Length of Schooling

Conceptually, GRDP and poverty rates are two interrelated economic indicators that together influence education. According to Sanz et al., (2017), income poverty is associated with low levels of education or poor job quality, or a lack of social transfers, or inadequate economic policy design for income redistribution. An increase in GDP per capita is usually accompanied by a decrease in poverty rates, as economic growth creates jobs and improves people's welfare. The combination of these two factors reflects macro and microeconomic conditions that collectively determine the community's ability to finance education and keep children in school. Based on Human Capital Theory and Social Development Theory Todaro & Smith, (2015), education and the economy have a two-way relationship: economic growth increases access to education, while increased education strengthens the quality of the workforce and economic productivity.

Research Feng et al., (2024); Putria et al., (2023) proves that simultaneously, the variables of GRDP and poverty have a significant effect on the average length of schooling. In this study, GRDP has a significant positive effect, while poverty has a negative but insignificant effect, indicating that regional economic conditions are more dominant in determining the educational achievements of the community. Similar findings were also reported Muryani & A N., (2024), showing that GRDP has a significant positive effect on social indicators, including education, while poverty shows a stronger negative effect in regions with high income inequality.

Therefore, it can be concluded that GRDP and poverty levels have a complementary effect on average length of schooling. GRDP encourages an increase in financial capacity and purchasing power for education, while poverty becomes a structural barrier that prevents some people from accessing long-term education. The relationship between the two reflects the importance of inclusive economic growth so that educational development can be enjoyed by all levels of society, including low-income groups in East Java Province.

RESEARCH METHOD

This This study uses a quantitative approach and multiple linear regression with the Ordinary Least Square (OLS) method to analyze the effect of Gross Regional Domestic Product (GRDP) and poverty rates on average length of schooling (ALS) in East Java Province during the period 2015–2024. As explained by Al Humssi et al., (2025), the OLS method can be used to understand the response of per capita domestic government expenditure to changes in GDP. This approach was chosen because it can objectively

describe the relationship between economic and social variables and show the effect of economic changes on community educational attainment over a certain period of time.

The data used in this study is secondary data obtained from official publications of the Central Statistics Agency (BPS) of East Java Province and the National BPS. The data used is in the form of annual data (time series) for ten years, from 2015 to 2024. The variables used consist of average length of schooling (RLS) as the dependent variable, as well as GRDP and poverty rate as independent variable. Data processed directly from BPS data without undergoing data transformation, including logarithmic transformation. The processed data shows a relatively stable pattern and all classical OLS assumptions have been fulfilled.

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Table 1. Variable

Variable	Period	Source	Description
Average Length of Schooling (ALS)	2015-2024	Central Statistics Agency (BPS) EAST JAVA	Average length of education for residents aged 15 years and older
Gross Regional Domestic Product (GRDP)			Prosperity and regional economic growth
Poverty Rate			People with expenditures below the poverty line

Analysis Model

The relationship between variables was analyzed using a multiple linear regression model with the following equation:

$$ALS = \alpha + \beta 1GRDP + \beta 2PR + \varepsilon$$

Description:
ALS = Average Length of Schooling,
GRDP = Gross Regional Domestic Product,
PR = Poverty Rate,
α = constanta,
β_1 dan β_2 = regression coefficient,
ε = error component

Data analysis was performed using SPSS software through several stages. First, descriptive analysis was conducted to describe the development of GRDP, poverty rates, and average length of schooling during the research period. Next, classical assumption tests were conducted, including tests for normality, multicollinearity, heteroscedasticity, linearity, and autocorrelation to ensure that the regression model met the BLUE (Best

Linear Unbiased Estimator) requirements. After the model was declared feasible, hypothesis testing was conducted, consisting of an F test to see the simultaneous effect of independent variables, a t test to determine the partial effect of each variable, and a coefficient of determination (R^2 and Adjusted R^2) to measure the contribution of GRDP and poverty rate in explaining the variation in average length of schooling.

RESULTS AND DISCUSSION

Results

Before conducting multiple regression analysis, this study first performed a series of classical assumption tests to ensure that the regression model used met statistical requirements and produced valid and unbiased estimates. These tests include normality, multicollinearity, heteroscedasticity, linearity, and autocorrelation tests. It is important to perform classical assumption tests so that the data analyzed is in accordance with the ideal characteristics of linear regression, so that the resulting model is reliable and the interpretation of the results is more accurate.

Normality Test

Table 2. Normality Test

Kolmogorov–Smirnov	Coefficients	P-Value	Information
Variable	0.196	0.05	Significant

The Kolmogorov–Smirnov significance value is 0.196 > 0.05, so the residuals are normally distributed. This means that the regression model meets the assumption of normality and the analysis results can be interpreted validly. Thus, the classical assumption of normality is met and the regression model used is suitable for further analysis.

Multicollinearity Test

Table 3. Multicollinearity Test

Variabel	Tolerance	VIF	Information
GRDP	0.722	1.385	No Multicollinearity
Poverty	0.722	1.385	

The Tolerance value = 0.722 and VIF = 1.385 indicating that there is no multicollinearity. The two independent variables do not strongly influence each other, so they are safe to use in the regression model.

Heteroscedasticity Test

Table 4. Heteroscedasticity Test

Variabel	Coefficient	P-Value	Information
GRDP	0.891	0.05	Significant
Poverty	0.425	0.05	

The significance values for GRDP (0.891) and poverty (0.425) are greater than 0.05, indicating that the model does not experience heteroscedasticity. The residual variance is stable across the entire data range.

Linearity Test

Table 5. Linearity Test

	Coefficient	P-Value	Information
Linearity	0.089	0.05	Significant
Deviation from Linearity	0.341	0.05	

The linearity value (0.089) and deviation from linearity (0.341) are above 0.05. Thus, the relationship between the independent and dependent variables is linear, making multiple linear regression appropriate for use.

Autocorrelation Test

Table 6. Autocorrelation Test

Model	Coefficients	Information
Durbin-Watson	0.089	No Autocorrelation

The Durbin–Watson value of 1.898 is within the range of 1.5–2.5, indicating no autocorrelation. The residuals between years are independent, so the model is suitable for use with time series data. According to Liu & Ge, (2025), before performing regression modeling, it is advisable to analyze spatial autocorrelation to identify existing spatial dependencies.

After all classical assumption tests were met and the model was declared feasible, the analysis then continued with multiple regression tests to see the effect of each variable on the average length of schooling.

Table 7. Model Summary.

Model	R Square	Adjusted R Square
1	0.813	0.760

The R^2 value = 0.813 and the Adjusted R^2 = 0.760. The data processing results show an Adjusted R Square value of 0.760. This means that the variables of per capita GRDP and poverty are able to explain 76% of the variation in the Average Length of Schooling (RTL) variable, while the remaining 24% is influenced by other variables not included in the regression model.

Table 8. Coefficients Simultan.

Variable	Coefficient	P-Value	Information
GRDP & Poverty	0.003	0.05	Significant

The significance value of the F test = 0.003 < 0.05. The significance value is 0.003, which is smaller than the significance of 0.05. This shows that together (simultaneously) the variables of per capita GRDP and poverty rate have a significant effect on the average length of schooling in East Java.

Table 9. Coefficient Parsial

Variabel	Coefficient	P-Value	Information
GRDP	0.039	0.05	Significant
Poverty	0.025	0.05	

Per capita GRDP has a significance value of 0.039 < 0.05, meaning that it has a significant partial effect on the average length of schooling. The direction of the effect is negative, indicating that when per capita GRDP increases, the average length of schooling tends to decrease.

(This could be due to several factors, such as the increase in GRDP not directly benefiting the entire community or the existence of income inequality). The poverty rate has a significance value of 0.025 < 0.05, meaning that it also has a significant partial effect on the average length of schooling. The direction of the effect is also negative, meaning that the higher the poverty rate, the lower the average length of schooling.

Regression Equation

$$\mathbf{Y = 28.501 - 1.227PDRB - 0.230TK + \varepsilon}$$

The regression analysis results show that per capita GRDP and poverty rate have a negative relationship with average length of schooling. The per capita GRDP regression coefficient of –1.227 indicates that every increase in per capita GRDP of 1 million rupiah actually reduces the average length of schooling by 1.227 years.

Discussion

This study uses secondary data sourced from the Central Statistics Agency (BPS) of East Java Province for the period 2015 to 2024. The variables analyzed include average length of schooling as the dependent variable, as well as GRDP per capita and poverty rate as independent variables. The selection of these variables is based on the economic view of education, which states that economic conditions and community welfare are closely related to educational participation and achievement. This relationship has also been empirically proven in various recent studies showing that macroeconomic factors and poverty play a significant role in determining regional educational achievement (UNDP, 2023; World Bank, 2022).

Descriptively, the average length of schooling for East Java residents shows an upward trend from 7.71 years in 2015 to 8.69 years in 2024, indicating improvements in access to and quality of education (BPS, 2025). During the same period, the gross regional domestic product (GRDP) per capita tended to be stable at around 14.2–14.7 million rupiah, while

the poverty rate decreased from 12.28% to 9.56% (Rahmi et al., 2025). This is in line with the findings of BPS (2023) and Prasetyo & Kurniawan (2021), which state that poverty reduction contributes positively to the improvement of education indicators, although the impact is not always direct and evenly distributed across regions.

After all classical assumptions were met and the model was deemed feasible, regression analysis showed that the R Square value was 0.76. This means that per capita GRDP and poverty rates were able to explain 76% of the variation in average length of schooling, while the rest was influenced by other factors such as school quality, educational facilities, family support, and local government policies. This is in line with the findings of Suryahadi et al. (2020) dan World Bank (2022), which found that economic and poverty variables are the main determinants of educational achievement at the regional level, especially in developing countries. These findings confirm that economic factors play an important role in educational development.

The F-test results show a significance value of 0.003 < 0.05, indicating that both variables simultaneously have a significant effect on the average length of schooling. This reinforces the findings of Nurkholis & Hadi (2022), which show that the combination of economic growth and poverty rates significantly affects education indicators, including the average length of schooling, in various provinces in Indonesia. Thus, when per capita GRDP and poverty rate are considered together, they are able to explain changes in the educational attainment of the community in East Java.

Partially, GRDP per capita has a significance value of 0.039 < 0.05, but the direction of influence is negative. This indicates that an increase in GRDP per capita is actually followed by a decrease in average length of schooling. This result is not in line with Economic Growth Theory, which argues that an increase in regional income should improve access to education. This discrepancy may be due to unequal income distribution or an increase in income that actually encourages some people to work rather than continue their education (Salfina et al., 2025).

Furthermore, the poverty level variable has a significance value of 0.025 < 0.05 with a negative coefficient of –0.230. This means that a 1% increase in the poverty level will reduce the average length of schooling by 0.230 years. The direction of this relationship is in line with dengan Shafiyah & Imaningsih (2025), who explain that poverty limits households' ability to finance education, thereby increasing the risk of dropping out of school and reducing educational attainment. These results are also consistent with the findings of Suryahadi et al. (2020) and UNDP (2023), which state that poverty remains a major structural obstacle to educational continuity, particularly through limited educational costs and household economic pressures. Although various educational assistance programs have been expanded in recent years, these studies also confirm that the impact of poverty on education has not been fully overcome.

Overall, this study shows that economic conditions and community welfare levels have a significant effect on educational development. These two economic variables have been proven to play an important role in determining the average length of schooling for the population of East Java during the period 2015–2024 .

CONCLUSION

Fundamental Finding: that these two economic variables have been proven to have an impact on educational attainment. Simultaneously, GRDP and poverty levels affect RLS, while partially, both show a negative impact. This study explains that economic growth in East Java has not been fully enjoyed equally by the entire community, so it does not directly encourage an increase in the duration of education. In addition, the poverty rate remains a major obstacle that limits the community's opportunities to pursue higher education. **Implication:** provides an overview that educational achievement does not only depend on improving facilities or access to schools, but is also influenced by economic conditions and community welfare. Therefore, efforts to improve the quality of education need to be accompanied by strategies to reduce poverty and ensure a more equitable distribution of income. This study is also expected to make two important contributions. First, it enriches empirical studies on the relationship between economics and education in East Java Province. Second, it provides input for local governments in formulating policies to improve the quality of education that not only focus on expanding access but also on increasing the duration of schooling for the population, in line with efforts to promote regional economic growth. **Limitation:** including limited data within a specific time frame and relatively few variables, which may affect the estimation results. These limitations require careful interpretation, especially regarding the validity of the model and the generalization of the research results. **Future Research:** to consider other variables such as education spending, human development index, or demographic factors, as well as expanding the scope of data, using more complex analytical methods, or combining qualitative approaches to enrich the findings obtained.

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