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Contribution of Educational and Economic Factors to HDI Scores of Districts/Cities in East Java: A Multiple Linear Regression Study

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Abstract: The Human Development Index (HDI) is a strategic indicator that reflects the quality of life, achievements of society, particularly in the domains of education and economy. This study aims to analyze the contribution of educational and economic factors to the variation in HDI scores across districts and municipalities in East Java Province. A quantitative approach was employed using multiple linear regression analysis. The independent variables include the number of senior high schools, the student–teacher ratio in senior high schools, the Net Enrollment Rate (NER) at the senior high school level, the poverty rate, and per capita expenditure. The dependent variable is the Human Development Index (HDI). Data were obtained from the 2023 publication of Statistics Indonesia (BPS), covering 38 districts/municipalities in East Java Province. The results indicate that the educational and economic factors significantly contributing to HDI are the NER, poverty rate, and per capita expenditure, while the number of senior high schools and student–teacher ratio show no significant contribution. The regression model strongly explains the proportion of HDI variance with a high R-square value, making it a reliable basis for formulating regional development policies. This study underscores that interventions aimed at improving educational attainment and strengthening the local economy are key strategies for accelerating human development in East Java. Although the multiple linear regression model used in this study shows strong explanatory power in identifying the educational and economic determinants of HDI across districts and cities in East Java, this model assumes independence between observation units and still cannot explain other indicators that influence HDI in detail. Therefore, future research on HDI indicators could utilise a multilevel or linear mixed modelling framework to achieve a more robust analytical level that could assist policymakers in formulating policies.

Keywords: Human Development Index, Education, Economy, Multiple Linear Regression, East Java.

INTRODUCTION

The Human Development Index (HDI) has long served as the primary barometer for assessing a nation's development success, transcending mere measures of economic growth. As emphasised by Putri and Budiman (2025), education plays a crucial role as a dual pillar in HDI formation: it functions as a direct component through the knowledge dimension, while simultaneously acting as a catalyst for increasing productivity and society's economic welfare. In the Indonesian context, efforts to boost HDI are often translated through massive fiscal policy interventions. Nasution et al. (2025) highlight that the efficiency of public spending in the education sector is an absolute prerequisite for creating quality human capital accumulation. However, the greatest challenge lies in ensuring that the allocation of these resources truly culminates in an equitable improvement in the quality of life, rather than merely being exhausted in expenditure posts that lack impact.

Although the education budget continues to increase, the reality on the ground demonstrates a disconnection between policy inputs and educational outcome achievements. Sanisah (2023), in her study, identified a phenomenon of low relevance between education financing programs and the grand design of human quality improvement, where interventions are often trapped in administrative and physical aspects without touching the essence of learning. In East Java, disparities in HDI achievements between regions remain a persistent issue, even though thousands of new school units have been built and teacher ratios continue to improve. This phenomenon indicates that the availability of physical infrastructure (schools) and teaching staff, which have been the main focus of regional spending, may have reached a point of diminishing returns or are no longer the sole determinants capable of significantly boosting HDI amidst complex demographic challenges.

The failure of a purely infrastructure-based approach demands a reorientation of focus toward other, more fundamental determinants. Nisa' and Argyanti (2025), through their latest regression modelling, proved that economic variables (such as poverty rates) and real accessibility (school participation) have strong elasticity regarding HDI fluctuations. This implies that the primary barrier to human development today is no longer the "absence of school buildings," but rather the community's "economic inability" to access these services. Therefore, this study is urgently needed to empirically test in East Java Province whether the dominance of socio-economic factors (poverty and per capita expenditure) and active participation (NER) truly outweigh the influence of physical facility availability (number of schools and teacher ratios) in determining the quality of human development.

Referring to the 1990 Human Development Report (HDR), the United Nations Development Programme (UNDP) first introduced the HDI as an assessment index focused on three dimensions of human development: a long and healthy life, knowledge, and a decent standard of living. Life expectancy at birth is utilized to measure the dimension of a long and healthy life; mean years of schooling and expected years of schooling are used to measure the knowledge dimension; and Gross National Product per capita is used to measure the decent standard of living dimension (Dewi & Purnomo, 2023). This aligns with Hendajani and Riadi (2022), who explain that the Human Development Index (HDI) depicts the ease with which a region's population can access education, health services, and decent income.

Debates regarding the determinants of the Human Development Index (HDI) often center on financial aspects. A recent study by Nasution et al. (2025) indicates that the efficiency of public expenditure in the education sector plays a vital role in boosting human quality. However, the magnitude of the budget is merely an initial input; its effectiveness depends heavily on physical realization in the field. Sanisah (2023), in her study, found that a disconnection or lack of relevance often occurs between budget allocation and the grand design of educational achievement in the regions.

Departing from this gap, this study attempts to go further by no longer testing the 'budget' variable (Rupiah), but rather testing 'Physical Availability' (Number of Schools). School

availability is assumed to be the most concrete form of government budget realization (Supply Side). Through this approach, the researcher aims to prove whether the massive construction of new school units in East Java truly contributes to accessibility leading to an increase in HDI, or whether the 'irrelevance' phenomenon as revealed by Sanisah (2023) also occurs in the aspect of physical infrastructure.

In the perspective of Human Capital Theory, which serves as the foundation for Widiyarini's (2023) study, education investment is not only measured by physical infrastructure but relies heavily on the adequacy and quality of teaching staff as the foundation of human productivity. The proportional availability of teachers, reflected through the student-teacher ratio, is considered the most vital form of input investment. Theoretically, an ideal ratio ensures the effectiveness of knowledge transfer and student competency formation, which ultimately contributes directly to the improvement of the knowledge dimension in the Human Development Index (HDI).

The urgency of this indicator is empirically reinforced by Putra (2023), who positions the student-teacher ratio as the main discriminant variable in mapping regional education quality clusters. The logic constructed is that there is a negative linear relationship between the ratio size and output quality: the smaller the ratio (one teacher handles fewer students), the higher the intensity of pedagogical interaction in the classroom. This condition is assumed to be capable of creating a conducive learning environment, minimising learning loss, and ensuring every student receives adequate academic assistance to boost the region's educational achievement

Based on this theoretical synthesis and empirical findings, this study positions the Student-Teacher Ratio variable as a key predictor to be tested within the complex demographic context of East Java. This study aims to verify whether the Human Capital postulate regarding the ideal ratio truly has a significant impact on HDI growth in East Java, or whether its influence is attenuated by other factors such as economic accessibility or poverty, given that the distribution of teacher quantity in this province has undergone massive improvement in recent years.

Educational participation serves as a vital bridge connecting budget investment with real human development results. Ivan (2025) asserts that the Net Enrollment Rate (NER) is an authentic indicator for measuring the effectiveness of the education system in absorbing the school-age population. Unlike mere infrastructure availability which is passive in nature, NER represents the outcome success of various policy interventions such as School Operational Assistance (BOS) and the Smart Indonesia Program (PIP), which directly contribute to the formation of the knowledge dimension in HDI.

In a broader economic development perspective, Rosyadah (2021) highlights that the quality of human resources is an indisputable indicator of a region's success, where school participation acts as the primary proxy for such human capital accumulation. The logic constructed is that the availability of education services holds no significance without active community participation. The higher the participation rate, the greater the opportunity for the region to accelerate productivity and boost HDI scores, particularly in developing areas.

Based on the synthesis of these two views, this study places NER as a crucial predictor variable to be tested in the context of East Java. The synergy between Ivan's view on "absorption effectiveness" and Rosyadah's on "human capital accumulation" strengthens the hypothesis that NER has a positive and significant impact on HDI. This variable is considered more representative in depicting the community's real accessibility to education services compared to mere physical infrastructure data.

Poverty is often positioned as the antithesis of human development success. Suhendi and Astuti (2023), in their study in Eastern Indonesia, confirm the postulate that poverty creates a structural barricade that prevents households from accessing the fruits of development. Economic limitations directly restrict community capabilities in reaching quality health and

education services, which ultimately degrades HDI scores significantly. This finding provides a strong empirical foundation that the issue of economic welfare is an absolute prerequisite (sine qua non) for improving the quality of life in a region.

This destructive impact of poverty is further quantified by Maulana et al. (2022), who provide evidence that poverty elasticity toward HDI is negative. This means that every percentage decrease in poverty figures will provide a tangible leverage impact on the increase of the human development index. This premise asserts that poverty alleviation policies possess a dual impact: improving the economy while simultaneously and automatically boosting HDI scores.

Furthermore, Sidabutar et al. (2020) highlight the complex interaction between government intervention and social reality. Their study warns that the effectiveness of public spending, such as education budgets or physical school construction, is often blunted and its effectiveness eroded when confronted with low purchasing power. In conditions of acute poverty, even the availability of free facilities often cannot be utilized optimally due to the high opportunity costs for poor families.

Departing from the synthesis of these three views, this study positions the Percentage of Poor Population and Per Capita Expenditure variables as main predictors, not merely complementary ones. This study aims to test a crucial hypothesis in the context of East Java: whether the dominance of these economic factors can "outweigh" the influence of physical school infrastructure availability in determining the level of HDI, while simultaneously proving that a welfare approach is more relevant than a purely physical approach.

A decent standard of living is a fundamental dimension in the construction of the Human Development Index, proxied through adjusted per capita expenditure. Fauziyyah et al. (2022), in their analysis in Banten Province, emphasize that this variable is not merely a consumption statistic, but a representation of the community's real economic capability. Strong purchasing power functions as an "entry ticket" for the community to access quality basic services. Without adequate economic ability, the availability of health and education facilities often cannot be utilized optimally, making per capita expenditure an absolute prerequisite for the formation of a dignified quality of life.

Furthermore, Soleha and Faizin (2023) expand this perspective by postulating that per capita expenditure is essentially an indicator of human resource investment capability. Societies with high expenditure levels tend to have income surpluses allocated not only for primary needs but also for superior goods such as tertiary education and preventive health services. In this context, an increase in per capita expenditure transforms into human capital accumulation, which directly boosts HDI scores through improvements in the knowledge and life expectancy dimensions.

The significance of per capita expenditure also proves to be superior when compared to top-down policy interventions. Recent findings by Syafira et al. (2024) provide crucial insight that real per capita expenditure has a more tangible and elastic impact on HDI improvement compared to mere amounts of government transfer funds or special autonomy funds. This indicates that individual welfare at the micro level, reflected in what households actually spend, plays a more dominant and direct role in boosting human quality compared to macroeconomic interventions alone.

Based on the synthesis of this literature, this study positions Per Capita Expenditure as the determinant predicted to have the strongest influence (most dominant predictor) on HDI in East Java. The premise constructed is that an increase in purchasing power will stimulate effective demand for better education and health quality, surpassing the impact produced by the provision of physical infrastructure alone. Therefore, this variable becomes the key to answering the hypothesis regarding the hegemony of economic factors in human development.

METHOD

This study employs a quantitative approach to analyze the contribution of educational and economic factors to the variation in Human Development Index (HDI) scores across districts/municipalities in East Java Province. The data used are secondary data sourced from the 2023 publication of Statistics Indonesia (BPS), covering all 38 districts/municipalities in East Java as the unit of analysis.

The independent variables in this study include educational and economic indicators, namely the Number of Senior High Schools (SMA), the Senior High School Student–Teacher Ratio, the Senior High School Net Enrollment Rate (NER), Poverty Percentage, and Per Capita Expenditure. Meanwhile, the dependent variable is the Human Development Index (HDI).

Data analysis was conducted using multiple linear regression to examine the simultaneous and partial effects of each variable on HDI. Before model construction, classical assumption tests, including normality, multicollinearity, heteroscedasticity, and autocorrelation tests were performed to ensure model feasibility. The F-test was utilized to assess the influence of variables simultaneously, while the T-test was used to determine which variables contributed significantly on a partial basis. The coefficient of determination (R2) value was used to assess the extent to which educational and economic variables are able to explain HDI variability. The entire analysis process was carried out using SPSS software.

RESULTS AND DISCUSSION

This study aims to determine the contribution of educational and economic factors to the Human Development Index (HDI) achievements across 38 districts/municipalities in East Java Province. The analysis was conducted using multiple linear regression, employing educational variables (number of senior high schools, student–teacher ratio, senior high school net enrollment rate) and economic variables (poverty percentage and per capita expenditure) as predictors.

The multicollinearity test results indicate that all independent variables possess Tolerance values ranging from 0.345 to 0.683 and Variance Inflation Factor (VIF) values between 1.464 and 2.895. These values are well above the minimum Tolerance threshold of 0.10 and substantially below the maximum VIF limit of 10, leading to the conclusion that the model is free from multicollinearity. This condition demonstrates that each predictor variable contributes unique information and does not excessively interfere with others in explaining HDI variation.

The residual normality test using Kolmogorov–Smirnov (Sig = 0.200) and Shapiro–Wilk (Sig = 0.658) indicates that the p-values exceed 0.05; thus, the residuals satisfy the normality assumption. This is supported by the Q–Q Plot, which displays residual points following the diagonal line without significant deviation, as well as the Detrended Q–Q Plot, which exhibits a random distribution without any specific pattern. Further residual analysis reveals that standardised residual values range from –2.526 to 2.434, with a mean residual of 0.000, indicating the absence of systematic bias in the model. The skewness value of 0.078 and kurtosis of 1.293 also remain within a range depicting a normal and symmetrical residual distribution.

Descriptive statistical analysis of the residuals shows a standard deviation of 0.98895, illustrating a reasonable variation in prediction error. Meanwhile, the residual range from –2.68595 to 2.58866 indicates a symmetrical spread and the absence of extreme outliers. Collectively, these findings confirm that the regression model employed has met the normality assumption, is free from multicollinearity issues, and is suitable for further analysis.

Table 1. Statistical Results

No	Ukuran	Nilai
1	R	0.978
2	R Square	0.956
3	Adjusted R Square	0.949
4	Std. Error of Estimate	1.063
5	Durbin–Watson	1.243

Source : Research Data

The analysis results demonstrate that the regression model constructed to elucidate the influence of educational and economic factors on the Human Development Index (HDI) across 38 districts/cities in East Java exhibits excellent performance. The correlation coefficient (R) of 0.978 indicates that the relationship between the independent variables, number of senior high schools, student–teacher ratio, senior high school Net Enrollment Rate (NER), poverty percentage, and per capita expenditure and HDI falls into the very strong category. According to Sugiyono (2019), a correlation value above 0.90 denotes a statistically very strong relationship, thereby confirming that these variables move in the same direction as changes in HDI at the regional level.

Furthermore, the coefficient of determination (R2) of 0.956 shows that 95.6% of the variation in HDI can be explained by the five predictor variables within the model. This implies that the regression model possesses a very high predictive capability in explaining the phenomenon of human development. Only 4.4% of HDI variation is influenced by factors outside the model, such as health quality, infrastructure, social development, or demographic factors. This aligns with the perspective of Todaro and Smith (2020), who explain that education and economy are two fundamental pillars of human development; thus, their contribution to HDI often dominates compared to other factors.

The robustness of the model is further reinforced by the Adjusted R2 value of 0.949, indicating that the model remains stable and excellent despite employing five predictor variables. A high Adjusted R2 signifies that the addition of variables does not cause the model to become overfitted, but rather strengthens the explanation of HDI. Gujarati (2015) emphasises that Adjusted R2 is crucial in models with multiple predictors as it provides a more realistic estimate of model fit compared to the pure R2. With a value approaching 1, this model can be considered highly fit to depict the condition of human development in East Java.

Subsequently, the Standard Error of Estimate (SEE) value of 1.063 indicates a very low level of prediction error. A small error indicates that the difference between the actual HDI values and the regression model's prediction results lies within reasonable limits and does not deviate significantly. According to Hair et al. (2019), a low SEE reflects good predictive accuracy and demonstrates that the regression model does not produce predictions that are biased or too far from the actual values.

Regarding model assumptions, the Durbin–Watson value of 1.243 indicates that the data does not suffer from serious autocorrelation issues. Although the ideal value is close to 2, the figure of 1.243 remains within the safe category and does not exhibit correlated residual patterns. This means the regression model can be used with confidence for inference and prediction purposes. Gujarati (2015) asserts that low autocorrelation is an essential prerequisite in regression as it ensures the precision of coefficient estimation and the validity of hypothesis testing.

Overall, all these statistical indicators demonstrate that the constructed regression model is highly feasible, stable, and accurate in explaining how educational and economic factors influence the HDI of districts/cities in East Java. The strength of this model simultaneously reinforces the research finding that senior high school NER, poverty percentage, and per capita expenditure are the primary determinants of human development, as also asserted by UNDP

theory that education quality and economic capacity are the two most fundamental components in improving community welfare.

Table 2 F-Test Statistical Result

F	Sig.
138.844	0.000

Source: Research Data

The regression analysis results indicate that the regression model is statistically significant as a whole, as evidenced by a significance value (Sig.) of 0.000 < 0.05. This implies that educational and economic variables simultaneously have a significant effect on the Human Development Index (HDI) of districts/municipalities in East Java. In other words, changes occurring in educational and economic factors collectively are capable of influencing the increase or decrease of the HDI in the region.

This finding is reinforced by the ANOVA test results showing an F-value of 138.844 with a Sig. of 0.000, indicating that the constructed regression model possesses a good level of goodness of fit. Furthermore, the R-Square value of 0.956 demonstrates that the research model is capable of explaining 95.6% of the HDI variation, signifying a very strong contribution of educational and economic variables to the HDI. Only 4.4% of the HDI variation is influenced by other factors outside the model.

Theoretically, this result aligns with the view of Todaro & Smith (2020), who state that education and economy are two primary pillars of human development as both enhance human resource quality, productivity, and welfare. Similarly, UNDP (2022) emphasises that the HDI is heavily influenced by good education levels and stable economic conditions, as both sectors improve individual access to health, income, and opportunities for a decent life.

Thus, the results of this study confirm that education and economy are crucial determinants in HDI improvement. It further indicates that regional government policies focused on enhancing education quality and strengthening the local economy will have a significant impact on human development in East Java.

Table 3 t-test statistical results

Variable	B	T	Sig.	Interpretation
(Constant)	56.512	19.261	.000	Constant
Number of High School (HS)	-0.004	-0.567	.575	Not Significant
Teacher-student ratio (TS)	-0.159	-1.496	.145	Not Significant
Net Enrollment Rate (NER)	0.089	4.092	.000	Significant, positively affecting
Poverty Percentage (Pov)	-0.271	-3.944	.000	Significant, negatively affecting
Per Capita Expenditure (Exp)	0.001	11.767	.000	Very Significant, positively affecting

Source: Research Data

The research results indicate that educational and economic factors play distinct roles in influencing the Human Development Index (HDI) of districts/municipalities in East Java. Although the number of Senior High Schools (SMA) in a region is often considered an indicator of educational service availability, regression results reveal that this variable does not have a significant effect on HDI. This finding aligns with the view of Hanushek (2016) that physical educational facilities do not automatically enhance educational outcomes without support from internal factors such as teacher quality, learning processes, and school management. Thus, a high number of schools does not necessarily raise the community's quality of life if the quality of educational services remains suboptimal.

The student-teacher ratio variable also shows no significant influence on HDI. Theoretically, a lower student-teacher ratio can indeed improve learning quality by providing space for teachers to engage in more intense interactions with students (OECD, 2019). However, this effect does not appear to be directly reflected in the HDI. This may be caused by the relatively small variation in ratios across districts/municipalities, or because teacher quality possesses a far stronger influence than the quantitative aspect of the student-teacher ratio itself (Hanushek & Woessmann, 2020). In other words, learning quality is determined more by instructor competence than by class size.

In contrast to the previous two variables, the Net Enrollment Rate (NER) proves to have a positive and significant impact on HDI. This finding reinforces Human Capital Theory (Becker, 1993), which emphasizes that education is a critical investment for improving human resource quality. The higher the educational participation at the senior secondary level, the greater the opportunity for the community to acquire skills and knowledge that contribute to welfare improvement. This also aligns with the UNDP (2022) report, stating that education is a primary component of human development that directly influences productivity and quality of life.

The poverty percentage emerges as a variable with a significant negative influence on HDI. Every increase in the poverty rate in a region is followed by a decline in HDI. This finding strengthens the poverty trap theory explained by Banerjee and Duflo (2011), stating that poverty conditions hinder society from accessing education, health, and other basic services. When people live in limitations, their ability to invest in the quality of life becomes low, thereby impeding human development. Thus, poverty can be understood as a structural factor limiting a region's ability to achieve welfare improvements.

Per capita expenditure proves to be a variable with a very significant positive influence on HDI. Although the regression coefficient value is small, the significance level indicates that household economic welfare has a very strong relationship with human development. According to Amartya Sen's (1999) capability approach, higher purchasing power provides space for individuals to meet basic needs, access health and education services, and improve overall living standards. This is also supported by World Bank (2020) findings asserting that household expenditure is one of the most consistent indicators in explaining human development variations in developing regions.

Overall, these findings demonstrate that human development in East Java is influenced more by factors related to educational access and community economic capacity. This conclusion aligns with Todaro and Smith (2020), who assert that human development is determined not only by the improvement of basic services but also by the community's economic capacity to utilize those services. Therefore, regional development strategies need to pay special attention to increasing educational participation and strengthening household economic capabilities as keys to accelerating HDI growth. Based on these results, the multiple linear regression equation formed is:

$$\mathbf{HDI = 56.512 – 0.004(HS) – 0.159\ (TS) + 0.089\ (NER) – 0.271\ (Pov) + 0.001(Exp)}$$

This equation indicates that the Human Development Index (HDI) in districts/municipalities in East Java is influenced by five educational and economic variables: the number of senior high schools, student-teacher ratio, net enrollment rate, poverty percentage, and per capita expenditure. The constant of 56.512 indicates that if all independent variables are assumed to be zero, the baseline HDI formed is 56.512. This value represents the starting point of the HDI when there is no contribution from either educational or economic factors within the model.

The regression coefficient for the number of senior high schools (HS) variable is –0.004, indicating a negative but negligible relationship. This means that a one-unit increase in the number of senior high schools does not have a meaningful impact on the increase of HDI. This suggests that the quantitative availability of schools does not automatically improve the quality of human development, possibly due to school distribution, service quality, or other more dominant factors.

The student-teacher ratio (TS) has a coefficient of –0.159, meaning that every increase in the ratio (e.g., more students per teacher) actually lowers the HDI. This is theoretically consistent: the greater the teacher's workload, the lower the quality of learning, thus having a negative impact on education quality and ultimately lowering the human development index. The Net Enrollment Rate (NER) variable has a positive effect with a coefficient of 0.089. This indicates that the more school-age children who actually attend school according to their age, the better the HDI achievement. A high NER reflects optimal educational access and contributes directly to improving the community's quality of life.

The regression coefficient of –0.271 for the poverty percentage variable (Pov) signifies that poverty has the strongest negative influence compared to other variables. Every 1% increase in the poverty rate lowers the HDI by 0.271. This finding aligns with development theory, which posits that poverty is a major inhibiting factor in improving the quality of health, education, and welfare, thereby having a significant impact on HDI achievement. The final variable, per capita expenditure (Exp), has a positive coefficient of 0.001. Although the influence is relatively small, this positive direction confirms that the higher the economic capacity of the community to meet living needs, the more human development increases. Per capita expenditure reflects the community's purchasing power, which is associated with quality of life, health access, and educational investment. Overall, this equation demonstrates that educational and economic variables play a crucial role in explaining HDI variation, with poverty and net enrollment rate emerging as the variables with the strongest influence in the model.

Overall, the findings of this study confirmed that educational participation and economic capacity, as indicated by the net enrollment rate at the senior high school level, the poverty rate, and per capita expenditure, play a significant role in explaining variations in the Human Development Index (HDI) across districts and cities in East Java Province. The high explanatory power of the regression model indicated that these factors are key drivers of human development at the regional level. Meanwhile, the analysis results for the number of schools and the student-teacher ratio indicated that they are unable to explain variations in the Human Development Index (HDI). This likely occurs because the simple regression model we chose cannot fully describe the variables influencing the HDI score. To describe other unobservable HDI indicators, a linear mixed model and a multilevel regression approach would be the best choice. The multilevel regression approach can account for unmeasured data heterogeneity and intra-group correlation (Santi et al. 2022b). In particular, the linear mixed model can account for the incorporation of random effects, which is common in educational research (Santi et al. 2022a, 2024).

CONCLUSION

This study demonstrates that human development in East Java Province is significantly influenced by educational and economic factors, although not all indicators provide equal contributions. The results of the multiple linear regression analysis prove that the Senior High School Net Enrollment Rate (NER), poverty percentage, and per capita expenditure are variables that significantly influence the variation in district/municipality HDI scores. This finding underscores that higher educational participation rates and stronger community economic conditions lead to higher regional HDI achievements. Conversely, the number of senior high schools and the student–teacher ratio did not exhibit a significant influence, indicating that these two variables are not currently determining factors in improving the quality of human development at the regional level.

The research model exhibits a high R-square value, implying that the combination of educational and economic variables is capable of explaining the vast majority of HDI variations across districts/municipalities in East Java. Based on these results, it can be concluded that efforts to improve HDI need to be directed toward expanding access to secondary education, reducing poverty, and strengthening the economic capacity of the community. Such interventions serve as primary strategies to drive the acceleration of human development and reduce welfare disparities between regions in East Java Province.

Therefore, future studies examining HDI determinants may consider adopting multilevel or linear mixed modelling frameworks to enhance analytical precision and policy relevance.

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