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Adaptive-Comprehensive Policy: Levers of Long-Term Human Development in Local Government

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ABSTRACT

The trend of increasing HDI in Indonesia for the last few decades does not exceed 2% annually. In fact, human development is a critical factor in increasing the nation's quality of life. Although a bunch of studies have been done dealing with its determining factors, there is no available generalized conclusion on such determinants. This article aims to find out the empirical factors determining human development in Indonesia. The regression data panel analyzed data from 34 provinces between 2010 and 2024, sourced from the Ministry of Finance and Statistics Indonesia, utilizing STATA 17.0. The results showed that there were seven factors that influenced the success of human development in Indonesia by 85.31%. This finding also indicates that each factor has different strengths and directions of influence simultaneously or partially, implying the need to increase HDI with selective action in the form of determining policy priorities. Such policies can be a lever for the success of long-term human development, and in turn, become the foundation for the development of adaptive and comprehensive policies in local governments. The future study that needs to be carried out on the Gini ratio, which represents inequality, should have implications for HDI and local spending anomalies as a continuation of the findings of this study.

Keyword:
Adaptive-Comprehensive Policy, Human Development, Local Government, Panel Data.

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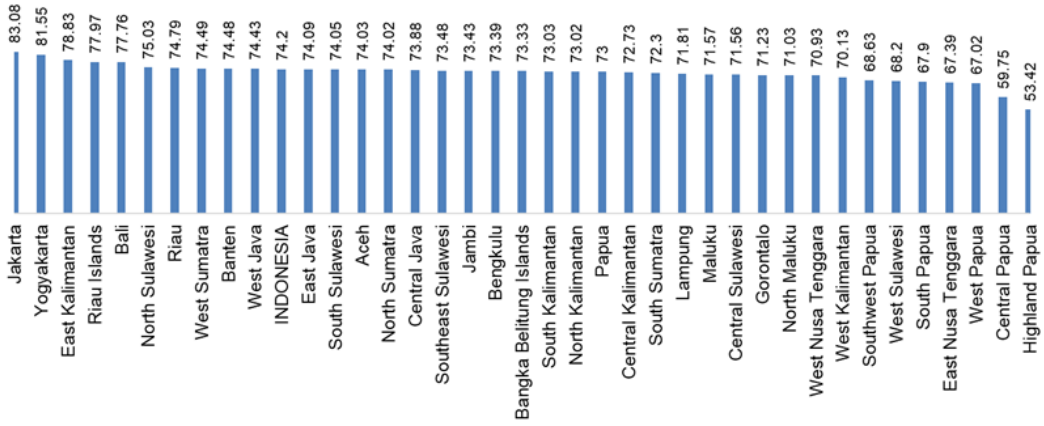
INTRODUCTION

Human development matters for people's lives and civilization. It becomes an essential criterion for evaluating how far a country can successfully prosper its citizens (Nayyar & Malhotra, 2023). The welfare dimensions are evaluated through the components of education, health, and economics, following UNDP's framework called the Human Development Index (HDI) (Liu et al., 2024). Conceptually, human development is defined as strengthening individual abilities and the quality of life in relation to increasing productivity and economic growth (Varona-Castillo & Gonzales-Castillo, 2025).

Making a better human life tends to be a fundamental objective of global development policies through the movement so-called the Sustainable Development Goals (SDGs) (Mohamed et al., 2022). It has addressed multiple objectives pertaining to the third SDGs (healthy and prosperous life), the fourth (excellent education), and the eighth (decent work and economic growth). The world HDI was moving toward the 2030 target, which is the SDGs' ultimate goal, until 2019. The progress of SDG policies has slowed down because of the pandemic (Hanna et al., 2024; Silveira et al., 2024), war (Bin-Nashwan et al., 2022), climate disasters (Adshead et al., 2024), mental health issues, and violence against women (UNDP, 2024). Indonesia has made the HDI a key measure in its planning and development work at both the national and local levels because of international policy.

Along with the global policies, Indonesia has made HDI an important part of its national development policies in order to fulfill its constitutional mandate for attaining a prosperous and just society. Nationally, it has increased from year to year. Data from 2010-2024 shows an increase in HDI of 7.67 (Statistics Indonesia, 2025). However, the increase is relatively slow, with an average of only 1.9% per year. Although it always increases annually, at the local level, the condition of each province still experiences significant differences. The HDI value of western Indonesia, such as Jakarta, Yogyakarta, and Riau Islands Provinces, is higher than that of eastern parts, such as Highland Papua, Central Papua, and West Papua Provinces (Figure 1).



Source: Statistics Indonesia (2024)
Figure 1. Provincial HDI in Indonesia in 2024

The human development gap among provinces in Figure 1 illustrates the existence of social and economic inequality. This inequality is seen when the HDI in Jakarta is 83.08, while in Papua it is 53.42. This means a severe difference between the two provinces of almost 30 points. In addition, compared nationally, 28 provinces still have HDI below the national average. Judging from the provinces above the national value, seven are in Western Indonesia, while the other three are spread across several central parts. The provinces in eastern Indonesia as a whole are still below the national HDI. Empirical conditions show the importance of knowing the determinants that affect human development to be able to

formulate more effective long-term policies. In this regard, existing investigations of factors influencing human progress are mapped, and the result is displayed in Table 1.

Table 1. Determinants Selected in Study

No	Factors	Expectation	Data	Authors
1	The average length of schooling	+	84 countries in Europe (2011); local government in West Kalimantan (2012-2015)	Eren et al. (2014); Humaira & Nugraha (2018)
2	Life expectancy at birth	+	84 countries in Europe (2011); local government in West Kalimantan (2012-2015)	Eren et al. (2014); Humaira & Nugraha (2018)
3	GDP growth rate	+	35 regencies/cities in Central Java (2017-2019); 33 provinces in Indonesia (2015-2022); The South Asian Association for Regional Cooperation (SAARC) economies (2005–2020); Seven emerging countries (1992- 2021); Pakistan (1990-2014)	Yulianti et al. (2021); Sijabat (2024); Verma & Debata (2022); Kizilkaya et al. (2024); Khan et al. (2019);
4	Gini ratio	-	117 countries in the world (1970-2010); 19 districts/cities in West Sumatra (2017-2021)	Castells-Quintana et al. (2019); Amaluis et al. (2024)
5	Number of poor people	-	171 countries of the United Nations (1995-2010); 33 provinces in Indonesia (2010-2019)	Amate-Fortes et al. (2017); Syafri et al. (2022)
6	Open unemployment rate	-	Indonesia (2010-2013); 33 provinces in Indonesia (2004-2013; 2010-2019)	Herianingrum et al. (2019); Sofilda et al. (2015); Syafri et al. (2022)
7	Local spending	+	Indonesia (2010-2013); 33 provinces in Indonesia (2004-2013).	Herianingrum et al. (2019); Sofilda et al. (2015)

Source: Authors (2025)

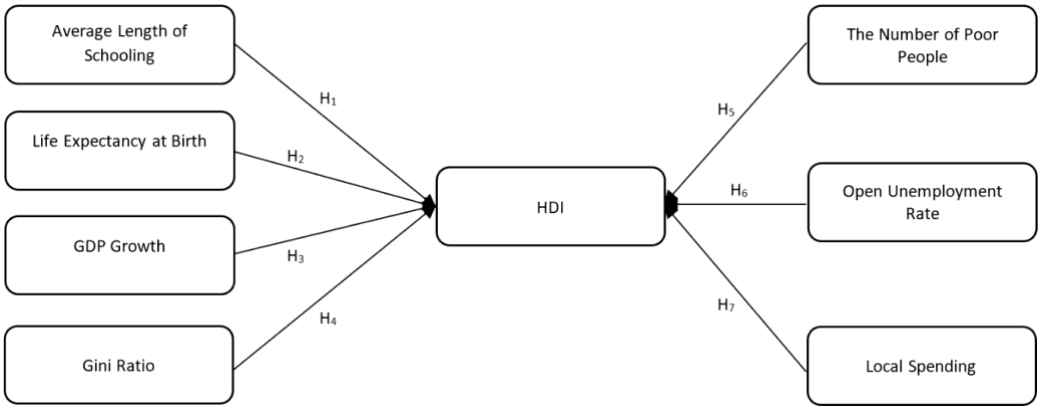
Various previous findings have shown different determinants that affect the progress of HDI. Government spending allocated for education and health has a positive impact, while the opposite finding occurred regarding the insignificant effect of unemployment on HDI. However, these two variables have a significant impact simultaneously in Indonesia (Herianingrum et al., 2019). Sumiyarti et al. (2022) presented distinct findings indicating that unemployment significantly affects HDI. Similar points related to expenditure, education, and population budgets have a positive impact, but other findings show that the health budget has no impact on increasing HDI (Ernanto et al., 2024). In theory, increasing municipal revenues significantly raises local spending, especially on health, education, and infrastructure, which in turn raises the HDI (Melgiana et al., 2020). Yet, such a big rise

requires the wise use of resources in line with the priority on people's quality of life improvement projects (Sabilla & Sumarsono, 2022).

The rise in HDI is also influenced by the population's poverty level (Sijabat, 2024; Sumiyarti et al., 2022), total population, employment rate, households with adequate sanitation (Yulianti et al., 2021), and the increase in per capita income (Sofilda et al., 2015). This rise will boost people's buying power, which will eventually affect the quality of health and education. This situation supports the claim made by Ningrum et al. (2020) that the number of poor people and unemployment can affect people's welfare. High levels of poverty can make it harder for people to get health care and education, which can make it harder to improve HDI. Reducing poverty improves the HDI, while strategies that focus on the population can help create development policies that are more inclusive and effective.

HDI is also greatly affected by economic growth, especially GDP and inflation (Sijabat, 2024; Yulianti et al., 2021), as well as foreign investment in Indonesia (Sumiyarti et al., 2022), Pakistan (Khan et al., 2019), and even in United Nations member states (Amate-Fortes et al., 2017). The education aspect also affects HDI, especially the rate of school attendance (Eren et al., 2014; Yulianti et al., 2021) and the average length of schooling (Humaira & Nugraha, 2018). The HDI progress is more important when these two things are higher. Growth has positively impacted people's welfare when it comes to the economy. This relationship suggests that with increasing economic growth, improvements in health, education, and overall quality of life are probable (Aswanto & Arif, 2024).

Another finding is that corruption encroaches development in various Latin American regions, while China presents a contrasting picture, showing the valuable effect of corruption in dealing with human progress (Márquez et al., 2020). The availability of infrastructure – physical, energy, communications, and social – affects development achievement in Indonesia (Kusharjanto & Kim, 2011) and several developing countries in Asia, Africa, and Latin America (Acheampong et al., 2022). Likewise, income inequality, which is measured through the Gini ratio (Castells-Quintana et al., 2019; Taresh et al., 2021). Therefore, the better the government can reduce the income inequality of the community, the more it will influence the improvement of the HDI. On the other hand, it turns out that government effectiveness and financial development could notably improve the level of human advancement (Verma et al., 2022).



Source: Authors (2025)

Figure 2. Hypothesis Model

There are seven hypotheses employed in this inquiry as follows:

H1: The mean duration of education positively influences the HDI. This indicates that an increase in the duration of schooling correlates with a higher HDI.

H2: Life expectancy at birth has substantially influenced HDI. Increased life expectancy is associated with higher HDI.

H3: The growth of GDP positively influences HDI. This indicates the association between GDP growth rate and the progress of HDI.
H4: The Gini coefficient adversely affects the HDI. A lower Gini ratio corresponds to a better HDI.
H5: The prevalence of poverty has adversely affected HDI. A decrease in the population of disadvantaged individuals is associated with an enhancement in HDI.
H6: The open unemployment rate has negatively influenced the HDI. This means that the lower the open unemployment rate, the higher the HDI will be.
H7: Local spending has a beneficial effect on the HDI. Increased local expenditure correlates with a higher HDI.

This inquiry intends to examine determinants of HDI, including the average length of schooling, life expectancy at birth, GDP growth rate, Gini ratio, number of poor people, open unemployment rate, and local spending. The remainder of the paper delineates the methodologies employed to evaluate hypotheses, the exposition of outcomes and discussions, conclusions including theoretical and practical ramifications, along with suggestions for future study endeavors.

METHODS

By applying a quantitative design, this inquiry analyzes the HDI's determinants using panel data. These factors have been identified from economics, education, health, and population. These various fields are researched to understand the factors influencing human progress in Indonesia comprehensively.

This study will examine the following factors: average length of schooling, life expectancy at birth, GDP growth rate, Gini coefficient, number of impoverished individuals, open unemployment rate, local expenditure, and HDI (Table 2). The usage of panel data in this work is related to the addressing of challenges associated with the clarification of partial regression coefficients in multiple regression models that contain just cross-sections and time series (Pillai, 2017; Sriyanto et al., 2024). In addition, the panel data is also able to control the heterogeneity between regions that are the unit of analysis, so that it can avoid bias in the estimation results (Ernanto et al., 2024).

Table 2. Overview of the Variables Tested

Determinants	Code	Description	Unit	Source
The average length of schooling	ALS	The mean duration of years that individuals aged 15 and older have engaged in various forms of education throughout their lives.	Year	Statistics Indonesia
Life Expectancy at Birth	LEB	The average life expectancy at birth serves as an indicator of public health quality.	Year	
GDP Growth Rate	GDPGR	Increase in the output of products and services within an economic region over a specified time period.	percent	
Gini Ratio	GR	The coefficient used to measure the degree of unevenness in the distribution of the population.	point	
Number of Poor People	NPP	The quantity of individuals residing beneath the poverty	people	

		threshold at a specific point in time.		
Open Unemployment Rate	OUR	The unemployment rate corresponds to the magnitude of the labor force.	percent	
Local spending	LS	All disbursements from the regional general cash account that diminish the current fund equity, becoming a regional liability during a fiscal year, shall not be reimbursed by the region.	Billion	Ministry of Finance
Human Development Index	HDI	Composite indicators for assessing the attainment of human quality of life development.	point	Statistics Indonesia

Sources: Processed from Statistics Indonesia and the Ministry of Finance (2025)

Data Collection

The dataset comprises longitudinal data, encompassing time series observations from 2010 to 2024. Such secondary data was sourced from Statistics Indonesia and the Ministry of Finance. Indonesia comprises 38 provinces. The sample included in this study encompassed 34 provinces selected regarding data availability over the past decade, specifically from 2015 to 2024. Four provinces are excluded from analysis, namely, Southwest Papua, Central Papua, Highland Papua, and South Papua, as they were constituted only in 2022. This indicates that these provinces have restricted data for the specified timeframe, available solely for the previous two years, specifically 2023 and 2024. The selection of these 34 provinces was conducted with the understanding that Indonesia comprises dispersed islands, and these provinces are deemed representative of all islands in the nation.

Classic Assumption Test

Evaluating the fundamental assumptions in panel data regression is a crucial process designed to confirm the model's validity and reliability. This assumption test incorporates a normality assessment to determine if the regression model's residuals adhere to a normal distribution, especially when the p-value exceeds 0.05 (Baltagi et al., 2015). The heteroscedasticity test identifies instances where residual variance is inconsistent across the data spectrum, potentially leading to inefficiencies in the computed regression coefficients (Firmansyah et al., 2022). The autocorrelation test identifies patterns in residuals, suggesting a correlation between the error at time t and the error at time t-1 (Larbi et al., 2021). The multicollinearity test evaluates the presence of a substantial correlation among two or more independent variables in a regression model, signified by a variance inflation factor value not above 10 (Khasanah & Suryanto, 2023). This test is exclusively applicable to FEM and CEM models. The conventional assumption test is not entirely relevant to the REM model, as it is estimated using Generalized Least Squares (GLS), which accounts for individual variability that may vary (Yuliana, 2022).

Data Analysis

This study utilizes linear regression, particularly simple linear regression, to clarify the relationship between two continuous variables which is, between X variable (respectively

consists of seven X variables, namely, average years of schooling, life expectancy at birth, GDP growth rate, Gini coefficient, poverty population, open unemployment rate, and local expenditure) and Y variable (HDI). Furthermore, the study also employs multiple linear regression aimed at clarifying the effects of seven X variables on HDI.

The results of regression testing will produce an additive model, which is a statistical model that can explain the effects of several X variables on the Y variable through the addition of effects to each variable X (Grech & Calleja, 2018; Jäntschi et al., 2016). This regression model test was carried out with several tests. First, the Wald test, which evaluates the null hypothesis that a given coefficient equals zero. The value of zero denotes the fact that there is no correlation between the X variables and the Y variable (Castilla et al., 2020; Shieh, 2005). This test is done to find out if the common effect model (CEM) is better than the fixed effect model (FEM). CEM is one of the statistical test tools that is useful for assuming the nonlinear function of independent variables in the presence of the same factor (De Vos & Westerlund, 2019). FEM is a statistical test that handles heterogeneity beyond the observation range and assumes that individual-specific effects remain constant over time and are associated with independent variables (Breuer & Dehaan, 2024; Pforr, 2014).

Furthermore, the Lagrange Multiple (LM) test, known as a score test, is used to evaluate a specific set of constraints/effects in a model (Tauchmann, 2023). This test was carried out to confirm or reject the random effect model (REM) compared to CEM. REM refers to models that capture heterogeneity beyond observation and are useful for data with hierarchical or storied structures (Fernandez, 2006; Lee & Thompson, 2008). Finally, the Hausman test, which is in a panel data model, is used to evaluate whether a unique error (individual-specific effect) correlates with the regressor (Amini et al., 2012; Baltagi & Liu, 2007). This test was conducted to ascertain if REM or FEM is the most suitable method for estimating panel data (Gujarati, 2015; Gujarati & Porter, 2009). The comparison of the three models is mentioned in Table 3.

Table 3. Comparison of Test and Model

Type of Test	Model Compared	Test Result	Conclusion	Selected Model
Wald Test	FEM vs CEM	H_0 rejected (Prob. <0.05)	There is a fixed effect.	FEM
		H_0 not rejected (Prob. >0.05)	There is no fixed effect.	CEM
Lagrange Multiplier Test	REM vs CEM	H_0 rejected (Prob. <0.05)	There is a random effect.	REM
		H_0 not rejected (Prob. >0.05)	There is no random effect.	CEM
Hausman Test	FEM vs REM	H_0 rejected (Prob. <0.05)	There is a correlation between individual effects and the independent variable.	FEM
		H_0 not rejected (Prob. >0.05)	There is no correlation between individual effects and the independent variable.	REM

Source: Processed from Das (2019)

The data analysis of this panel was carried out using STATA 17.0. It is one of the adequate tools that is considered more effective than other statistical packages (Acock, 2023), because it has many advantages, especially in the management, customization, and arrangement of large datasets (Kothari, 2015). The use of panel data with the STATA application has also been carried out by several previous studies related to poverty-based inequality (Rashmi & Paul, 2024), the company's financial performance (Nguyen & Nguyen, 2025), Central financial transfers to the regions (Fitrianti et al., 2025).

Based on the factors that have been identified, the equation of the determinant model of the HDI is formulated as follows:

$$HDI = \alpha_0 + \beta_1 ALS + \beta_2 LEB + \beta_3 GDPGR + \beta_4 GR + \beta_5 NPP + \beta_6 OUR + \beta_7 LS + \varepsilon_{it}$$

Where: HDI (human development index) is the dependent variable, while ALS (average length of schooling), LEB (life expectancy at birth), GDPGR (GDP growth rate), GR (Gini ratio), NPP (number of poor people), OUR (open unemployment rate), and LS (local spending) are independent variables.

RESULTS AND DISCUSSIONS

Descriptive Statistics

This analysis utilizes seven X variables and a Y variable. The descriptive statistics for these variables are displayed in Table 4.

Table 4. Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
ALS	340	8.55	0.98	5.99	11.49
LEB	340	69.99	2.56	64.22	75.22
GDPGR	340	4.64	3.70	-15.74	22.94
GR	340	0.35	0.04	0.24	0.45
NPP	340	781.89	1105.17	39.69	4789.10
OUR	340	5.12	1.79	1.40	10.95
LS	340	9547.16	11391.47	1407.90	66771
HDI	340	70.95	4.15	57.25	83.08

Source: Processed from STATA (2025)

The seven variables in the study showed averages that varied according to the standard deviation they had. Of the seven variables, there are two of that have a large standard deviation, namely NPP and LS, which start from the existence of minimum and maximum values that are far apart in these two variables.

Regression analysis conducted in this inquiry generates FEM, REM, LM, and the Hausman test presented in Tables 5, 6, 7, and 8.

Table 5. Fixed Effect Model Regression Results

HDI	Coefficient	Std. err.	t	P>t	[95% conf. interval]	
ALS	3.082039	0.1119668	27.53	0.000	2.861697	3.302382
LEB	0.6239396	0.0704075	8.86	0.000	0.4853827	0.7624966
GDPGR	0.0024458	0.0050385	0.49	0.628	-0.0074696	0.0123612
GR	-1.169055	1.293177	-0.9	0.367	-3.713936	1.375827
NPP	-0.0008133	0.000167	-4.87	0.000	-0.0011419	-0.0004846
OUR	-0.1076858	0.0193682	-5.56	0.000	-0.1458012	-0.0695705

LS	0.0000118	0.00000713	1.66	0.098	-0.0000022	0.0000259
_cons	2.389907	4.216912	0.57	0.571	-5.90868	10.68849

Source: Processed from STATA (2025)

The regression findings of the FEM test (Table 5) indicate a significant value (Prob>F) of 0.0000 (<0.05). This value indicates that the chosen model is the Finite Element Method (FEM), utilized for analyzing the relationship among variables. Subsequently, the analysis confirms the suitability of FEM in estimation compared to CEM regression. Additionally, a REM regression analysis was conducted, as illustrated in Table 6.

Table 6. Regression Results of Random Effect GLS regression

HDI	Coefficient	Std. err.	z	P>z	[95% conf.	interval]
ALS	2.98971	0.102527	29.16	0.000	2.788761	3.19066
LEB	0.707681	0.061988	11.42	0.000	0.5861854	0.8291756
GDPGR	0.001669	0.005137	0.32	0.745	-0.0083996	0.0117368
GR	-0.405568	1.286794	-0.32	0.753	-2.927638	2.116502
NPP	-0.000501	0.00014	-3.58	0.000	-0.0007755	-0.0002272
OUR	-0.104759	0.019556	-5.36	0.000	-0.1430871	-0.0664311
LS	0.0000167	0.00000688	2.43	0.015	0.00000322	0.0000302
_cons	-3.251973	3.708499	-0.88	0.381	-10.5205	4.016551

Source: Processed from STATA (2025)

Regarding REM values mentioned in Table 6, the significance level (Prob>chi2) is 0.0000 (<0.05). Furthermore, for the selection between the REM and CEM models, the LM test is carried out to show different predictions, as exhibited in Table 7.

Table 7. Estimation result of the LM Test

	Var	SD = sqrt (Var)
Y	17.22244	4.149993
e	0.0736664	0.2714155
u	1.963386	1.401209
Chibar2(01) = 1263.59		
Prob > chibar2 = 0.0000		

Source: Processed from STATA (2025)

Regarding the LM test, the significance value (Prob>chibar2) is 0.0000 (<0.05), so the best model for the estimation test in this study is REM. Furthermore, the Hausman test was conducted in order to decide whether FEM or REM is the most proper model. Table 8 provides those results. From these results, the significance value (Prob>chi2) is 0.0630 (>0.05), so the best model in gauging panel data in this study is REM.

Table 8. Hausman Test

	Coefficients			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	Std. err.
ALS	3.082039	2.98971	0.0923292	0.0449976

LEB	0.6239396	0.707681	-0.0837409	0.0333863
GDPGR	0.0024458	0.001669	0.0007772	.
GR	-1.169055	-0.40557	-0.7634863	0.1283281
NPP	-0.0008133	-0.0005	-0.0003119	0.0000912
OUR	-0.1076858	-0.10476	-0.0029267	.
LS	0.0000118	0.0000167	-0.00000487	0.00000188

b = Consistent under null hypothesis (H_0) and alternative hypothesis (H_a); derived from xtreg.
B is inconsistent under the Ha and efficient under the H_0, as derived from xtreg.

Hypothesis Test H_0: Coefficients exhibit no systematic difference

chi2	= (b-B)'[(V_b-V_B)^(-1)](b-B)
	= 11.95
Prob > chi2	= 0.0630
(V_b-V_B is not positive definite)	

Source: Processed from STATA (2025)

Among the three tests utilized to identify the optimal model among FEM, CEM, and REM—specifically the Wald, Lagrange Multiplier, and Hausman tests, as delineated in Table 9—the chosen REM yielded a Wald Chi2 value of 10664.70 with a significance level of 0.0000 (<0.05). Such figures denote the substantial effects of seven independent variables on the dependent variable.

Table 9. Comparison of Test Results

Type of Test	Results	Selected Model
Wald Test	H_0 rejected (Prob>F = 0.000)	FEM
Lagrange Multiplier Test	H_0 rejected (Prob>chibar2 = 0.0000)	REM
Hausman Test	H_0 not rejected (Prob > chi2 = 0.0630)	REM

Source: Processed from STATA (2025)

Determination coefficient analysis conducted in this inquiry mentions that the overall R-squared value is 0.8531 (Table 10). That value indicates the influence of seven independent variables on HDI, as the dependent is 85.31%.

Table 10. REM Regression Results as the Selected Model

R Square	Value
Within	0.9730
Between	0.8343
Overall	0.8531
Wald chi2 (7) = 10664.69	
Prob > chi2 = 0.0000	

Source: Processed from STATA (2025)

Furthermore, by using the amount of the regression coefficient of each variable as listed in Table 6, the following is the equation of regression.

Regression equations:
Y= -3.251 + 2.989*X1 + 0.707*X2 + 0.001*X3 – 0.405*X4 – 0.0005*X5 – 0.104*X6 + 0.00001*X7

The regression equation demonstrates the effect of the respective X variable on the Y variable. The + symbol denotes a correlation between two variables; precisely, an increase in one variable corresponds with an increase in the other, and similarly, a reduction in one variable causes a alleviation in the other. Moreover, the minus sign signifies an inverse association; when one variable increases, the other variable decreases. This study found a positive influence from four of the seven independent factors and a negative influence from three. In addition, three of the seven variables had large regression coefficients, two with positive influence directions, namely average length of schooling and life expectancy at birth, and one negative (Gini ratio).

This study aims to simultaneously judge independent variable effects on the dependent variable. In so doing, the test was conducted to assess the extent of the impact on the sustainability of future policies. According to the hypothesized model illustrated in Figure 2 and the notable value presented in Table 6.

The research demonstrates that the average duration of education significantly affects HDI, as indicated by a p-value of 0.000. The null hypothesis (H0) is rejected since this result is below 0.05. This prompts an increase in the average years of education is positively correlated with a significant increase in the HDI. Secondly, life expectancy at birth possesses a significant value of 0.000. This number underpins the rejection of the null hypothesis (H0), given that the p-value is below 0.05. An increase in life expectancy will subsequently lead to an enhancement of HDI. The GDP growth rate is 0.745. The result is above 0.05; hence, H0 is not rejected. This confirms that despite the GDP growth rate in comparison to the HDI, the impact was minimal. The Gini coefficient is 0.753, which is significant (>0.05); hence, the null hypothesis (H0) is not rejected. This figure indicates that a decrease in the Gini ratio does not affect an improvement in HDI. Fifth, the number of impoverished people shows a significant value of 0.000, leading to the rejection of the null hypothesis (H0) since the p-value is below 0.005. A diminished population of disadvantaged individuals is associated with a higher Human Development Index (HDI). The open unemployment rate is statistically significant at 0.000 (<0.05), resulting in the rejection of H0. This indicates that a reduced open unemployment rate is associated with a more significant increase in HDI. The local expenditure demonstrates a substantial value of 0.015 (<0.05), so H0 is discarded. Augmented local expenditure is positively correlated with an increase in HDI.

The findings of this study show that seven factors significantly determine most of the success or failure of HDI improvement. The influence of these seven factors on HDI is unique when they are simultaneously or partially present.

Simultaneously, the seven independent variables can explain 85.31% of the variation in HDI conditions as dependent variables. Judging from the regression results mentioned in Table 6, three variables have coefficients that tend to be high, namely the average length of schooling (2.989), life expectancy at birth (0.707), and the Gini ratio (0.405) while the other four tend to be low, namely the GDP growth rate, the number of poor people, the open unemployment rate, and local spending which coefficients range from 0.001 to 0.104.

Partially, the determination and direction of the relationship becomes the basis of the independent variable influence. From Table 11, the average length of schooling is the variable with the greatest influence (66.20%), followed by life expectancy at birth (61.97%), and local spending (15.82%). The other four variables had a small influence of no more than 6%.

Specifically, this finding indicates that the impact of local spending on HDI is noteworthy, despite the minuscule regression coefficient of 0.00001, which is statistically significant with a p-value of 0.015 (<0.05). This finding not only substantiates the substantial and affirmative impact of local expenditure on HDI but also suggests the reliability of that impact. This situation also affects budgeting policy, specifically the necessity for effective budget management by accountable implementing entities.

Table 11. Partial Test Results

Variable	Direction	R square
ALS	+	66.20%
LEB	+	61.97%
GDPGR	+	1.18%
GR	-	0.39%
NPP	-	0.01%
OUR	-	5.96%
LS	+	15.82%

Source: Processed from STATA (2025)

Simultaneous and partial pairing of results shows at least two things. First, there is an alignment of the direction between the coefficient in simultaneous regression and the magnitude of the influence on partial regression, namely, the variable with a high coefficient on simultaneous regression also has a great influence on partial regression. Second, the inconsistency results from the magnitude of the coefficient in simultaneous regression and the magnitude of the influence on the partial regression. This tendency underscores the need to conclude simultaneous regression, accompanied by juxtaposing the results with the partial regression results. Through this pairing, a solid basis can be obtained for the possibility of representative application of the results. This finding can have implications for affirming the requirements for policy determination, namely the need for a more detailed check of the conditions of validity and reliability of a variable and the relationship between variables that will be used as the substance of the policy. Through these checks, it will be possible to avoid the occurrence of policy-making whose implementation will lead to ineffective results and even create surprise situations.

Furthermore, regarding the strength of the relationship between the X variable and the Y variable, both simultaneous and partial, the finding indicates two points. First, increasing HDI is a cross-sectoral policy, which requires the involvement of many parties with many variables. However, for the effectiveness of its handling, selective action is needed on many of these variables. This action is carried out by arranging the priority of a number of variables as indicated by the size of the determination coefficient of each variable. In addition, a balance is also needed between policies for improvement for variables with a positive relationship and policies for reduction for variables with a negative relationship.

Second, the implication of setting priorities by focusing only on policies on variables with high determination coefficients is that it makes it possible to be more efficient in the use of resources. Local spending, for example, the government does not only focus on spending for social assistance purposes but also on education and health. In the regulation, it has been stipulated that the education budget allocation is 20% of the local budget (Jasmina & Oda, 2022). In this case, normatively, provinces that have special autonomy, such as the provinces on the island of Papua, which generally have a large amount of local budget, while the population is small, then the HDI should also increase significantly.

Ironically, there is now a development that the education budget is reduced with the efficiency of the 2025 budget. This reality is regulated in Presidential Instruction Number 1 of 2025, which includes provisions related to primary and secondary education and universities regarding the provision of scholarships to students, lecturers, and education

staff. Even though the empirical condition so far, 20% of the education budget has never reached the maximum number. In fact, the budget for education programs in several provinces, such as Southwest Papua, West Papua, and Papua, is still below 10% (Ministry of Education and Culture, 2023).

The average length of schooling, life expectancy at birth, the number of impoverished individuals, the open unemployment rate, and local expenditure had substantial influences; however, the GDP growth rate and Gini coefficient did not significantly affect HDI. The negligible influence of the Gini coefficient on the Human Development Index is a research discovery that contradicts previous studies, which suggested a substantial negative impact of the Gini coefficient on the HDI (Amaluis et al., 2024; Anand & Sen, 2000; Cifuentes et al., 2008). Statistically, this finding likely arises from a substantial p-value of 0.05 (Kwak, 2023), an extensive number of predictors (Sileshi, 2015), or the presence of multicollinearity (Paetzold, 1992). These diverse potential causes may warrant further investigation.

Judging from empirical conditions, one of the indicators of economic growth, investment, has not focused on the education and health sectors or other related ones to support these sectors. Data shows that the base metal industry, metal goods, not machinery and equipment, will be the highest investment subsector, followed by the mining sector in mid-2024 (Ministry of Investment, 2024).

CONCLUSION

The purpose of this inquiry is to examine HDI determinants consisting of average length of schooling, life expectancy at birth, GDP growth rate, Gini ratio, number of poor people, open unemployment rate, and local spending. There are different influences from these seven factors simultaneously and partially. In this case, the significance of a number of independent variables in simultaneous regression does not indicate the magnitude of the influence of each variable partially. These findings indicate the need to increase HDI with selective action in the form of determining policy priorities based on respective variable leverage. The insignificance of some determinants is also due to the lack of focus on the sectors that drive the top priorities suggested by the inquiry findings. Such policies can be a lever for the success of long-term human development, and in turn, become the foundation for the development of adaptive and comprehensive policies in local governments. This study merely uses secondary data that cannot comprehensively capture dynamic conditions in human development empirically. Another limitation of this study is that it does not cover all provinces in Indonesia because four provinces have just bloomed since 2022. In the future, studies on HDI can be more associated with the Gini ratio variable. In general, the Gini ratio, which represents inequality, should have implications for the amount of HDI, namely, the higher the inequality, the lower the HDI. In this study, it was revealed that the Gini ratio, which has a regression coefficient with a magnitude in the third position of the seven variables, has a low determination coefficient as well as an insignificant influence. Further research can also be carried out on anomalies related to local spending, which, in this study, presents the fact that it has a minimal regression coefficient but with a determination coefficient greater than the other four variables and has a significant influence on HDI.

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