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Analysis of the Number of Educational Facilities, Health Facilities, and Job Training Institutions on HDI in Indonesia in 2023

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Abstract

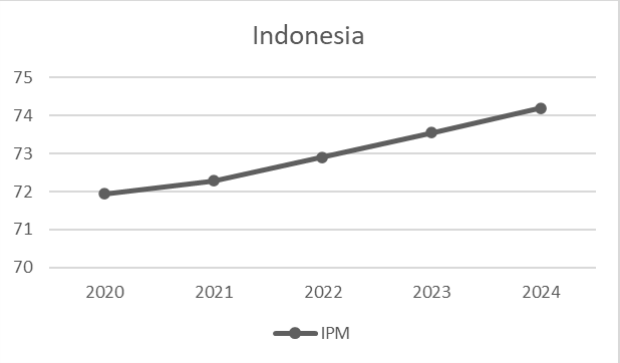
Indonesia is ranked 113 out of 193 countries in 2023 and is classified as high human development, but it shows a lag among ASEAN countries. This study aims to analyze the extent to which the quantity of schools, health centers, and vocational training institutions contribute to increasing the Human Development Index (HDI) in Indonesia by 2023. HDI is seen as a comprehensive indicator that represents the quality of life of people through three dimensions, namely health, education, and decent standard of living. The method used is a descriptive quantitative approach by utilizing cross-section secondary data from 34 provinces in Indonesia. The analysis was conducted using multiple linear regression with the Ordinary Least Squares (OLS) method through STATA software version 17. The results of the analysis revealed that the presence of health centers and vocational training institutions had a positive and significant impact on HDI. In contrast, the number of schools variable shows a negative relationship that is also significant to the index. This finding indicates that an increase in the quantity of schools does not guarantee an increase in HDI if it is not followed by an increase in the quality of education.

INTRODUCTION

The Human Development Index (HDI) is a composite measure designed to evaluate the well-being and quality of life of a population within a specific region (United Nations Development Programme, 2025). It also functions as a classification tool, categorizing countries as developed, developing, or underdeveloped based on the welfare of their citizens (Puling Tang & Puling Tang, 2021). The HDI framework was initially introduced by the United Nations Development Programme (UNDP) in 1990, with the primary aim of prioritizing people at the core of development efforts. This index quantifies human progress by examining select indicators (Piqqa et al., 2023). It assesses development through three fundamental dimensions: life expectancy and health, educational access, and a decent standard of living (Said et al., 2021). Evaluating these human development components can provide insights to enhance the overall quality of human development in Indonesia (Putri et al., 2024). The Central Bureau of Statistics (BPS) of Indonesia utilizes this framework by calculating the Human Development Index (HDI) through indicators such as life expectancy at birth, mean years of schooling, expected years of schooling, and adjusted real per capita expenditure. The HDI captures not only economic prosperity but also the accessibility of education, healthcare services, and job training, which are vital in enhancing the overall quality of life (Yusuf et al., 2024). Each dimension within the HDI plays a pivotal role, where progress in one area can stimulate advancements in others, either through cascading effects or multiplicative interactions. This demonstrates an interdependent relationship among the dimensions, collectively accelerating HDI improvement (Sangur & Leiwakabessy, 2025). The HDI offers a comprehensive reflection of human well-being that extends beyond mere economic growth metrics (Hutabarat et al., 2024). All Indonesian citizens possess the fundamental right to access public services, including education, healthcare, and social assistance. Enhancing the quality of human capital further supports sustainable economic development (Hamsani et al., 2024). Thus, the HDI serves as an indicator of how effectively a nation fulfills its citizens' basic rights (Wulandari et al., 2022).

Statistics published by BPS reveal a steady rise in Indonesia's human development over the past five years. The Human Development Index (HDI) grew from 71.94 in 2020 to 74.2 in 2024. This upward movement signifies advancements in multiple dimensions that enhance the population's quality of life, including better access to essential services, longer average schooling years, and improved purchasing power (Windiawan Pratama et al., 2025).

Table 1
Human Development Index



Source: BPS Indonesia, 2023

The United Nations Development Program (UNDP) identifies three core dimensions for assessing human development: health, indicated by life expectancy and overall well-being; educational attainment; and living standards quality (Yulianti & Qomariah, 2025). These dimensions are quantified using specific metrics, including life expectancy at birth to gauge health, average and expected years of schooling to capture educational progress, and adjusted real per capita expenditure as a measure of living standards (Grimm et al., 2010). This integrated method offers a detailed evaluation of the population's quality of life across nations, including Indonesia

(Puling Tang & Puling Tang, 2021). The 2023 Human Development Report highlights that disparities in education, healthcare accessibility, and workforce skills present significant obstacles to sustainable human development (UNDP, 2024).

The Indonesian government pays great attention to education, which can be seen from two main indicators, namely average years of schooling and expected years of schooling (Gaol et al., 2024). Average years of schooling indicates the level of education actually attained by the population aged 25 years and above, while expected years of schooling describes the expected duration of education that school-age children will pursue (Sabrina et al., 2022). The improvement in these two indicators reflects wider access to education as well as the effectiveness of national education policies, including the compulsory education program, the Indonesia Smart Card (KIP), and various affirmative policies for marginalized groups (Desliana & Danas, 2023). In health indicators, life expectancy is a reference that reflects the condition of health services, nutrition, the environment, and people's lifestyles. Indonesia has recorded an increase in life expectancy from year to year, which is supported by public health programs such as the National Health Insurance (JKN), increasing the number and distribution of health workers, and the construction of health facilities such as Puskesmas and Hospitals (Wardhana & Kharisma, 2023). Health is a crucial aspect due to its direct impact on key dimensions of the Human Development Index (HDI) (Siregar, 2024). The public budget allocated to the health and education sectors should be considered as a form of strategic investment that is very important for the progress of a society (Jurnal & Mea, 2025). Meanwhile, the per capita income aspect is measured through adjusted per capita real expenditure that reflects the community's ability to meet the needs of a decent life (Siswati & Tri Hermawati, 2018). This indicator not only reflects macroeconomic conditions, but also the distribution of welfare at the individual and household levels. In recent years, the government's efforts to reduce extreme poverty, expand employment, and increase MSMEs have contributed to increasing people's purchasing power (Nursini, 2020). The importance of comprehensive policy implementation can drive human development progress (Rahmawati et al., 2024).

The Human Development Index (HDI) is related to human capital theory because it basically reflects a country's investment in its human resources through education, health, and quality of life or living standards (Ayu Jalil & Nadzur Kamaruddin, 2018). Human capital theory emphasizes that improving individual quality through education and health is a form of investment that will result in higher productivity and income in the future (Abrha & Weldeyohans, 2025). The increase in average years of schooling, expected years of schooling, life expectancy, and per capita expenditure in Indonesia shows that the country is actively developing its economic potential through strengthening its human capacity (Simatupang et al., 2024).

Indonesia is ranked 113th out of 193 countries in 2023 and classified as high human development, but this shows a lag among ASEAN countries, such as Singapore, Brunei Darussalam, Malaysia, Thailand, and Vietnam, which are ranked 13th, 60th, 67th, 76th, and 93rd respectively (United Nations Development Programme, 2025). A high level of human development plays a crucial role in increasing the capacity of individuals to access, manage, and utilize economic resources effectively, including in the context of utilizing technology and institutional systems, as indicated by indicators of high life expectancy, adequate educational attainment, and decent living standards (Hasiana, 2022). Thus, the availability of basic infrastructure facilities or facilities, such as hospitals, schools, and adequate job training institutions is an important part of supporting the Human

Development Index (HDI) for Indonesia. The purpose of this study is to determine whether the three aspects of human development proposed by the United Nations Development Programme, namely health, education, and decent living standards, each represented by the number of basic health facilities or health centers, the number of schools, and the number of vocational training institutions, affect the Human Development Index (HDI) in Indonesia in 2023.

LITERATURE REVIEW

2.1. *Human Capital* Theory

2.1.1. Adam Smith

Adam Smith argued that skills, knowledge and abilities acquired through education and training are forms of human capital that contribute to productivity and economic growth (Spalletti, 2014). Smith analogized skilled individuals as machines capable of generating higher incomes and reimbursing education costs just like fixed capital (Spalletti, 2014). Smith saw education as an investment, not consumption, as it leads to increased income and technological advancement (Spalletti, 2014).

2.1.2. Gary S. Becker

Gary S. Becker developed the human capital theory which explains that investment in people through education, job training, health, and experience can increase individual productivity and income in the future (Becker, 1994). This concept places humans as capital like machines or physical assets because they can generate income in the long run (Becker, 1964). Education and training are considered a form of investment because they incur current costs to obtain future benefits, reflected in the income-to-age curve that steepens as investment increases (Becker, 1994). Becker also emphasized that these investments can be measured through earnings data and contribute substantially to income differences between individuals, even after controlling for ability factors (Becker, 1994).

In addition to individual effects, investment in human capital also brings social impacts such as increased national productivity and community welfare (Becker, 1964). Becker refutes the extreme view of *credentialism* that considers education only as a marker of basic ability, by showing evidence that education and training do improve job skills (Becker, 1994).

2.2. Human Development Concept (*United Nations Development Program*)

Human development according to the United Nations Development Programme (UNDP) emphasizes that development is not simply economic improvement or GDP growth, but rather the process of expanding individual choices and abilities to lead a better life. According to the United Nations Development Programme (UNDP), the primary objective of development is to enhance the overall quality of life, encompassing social, political, and cultural facets. A significant contribution from UNDP is the formulation of the Human Development Index (HDI), which evaluates a nation's advancement through three critical dimensions: health, represented by life expectancy; education, assessed via average and expected years of schooling; and economic status, indicated by income per capita. The HDI strives to offer a holistic

view of development progress that extends beyond mere economic growth. This perspective frames human development as the process of expanding opportunities for individuals to access essential services, engage actively in social and economic activities, and exercise autonomy in shaping their own lives, underscoring that development fundamentally aims to augment human capabilities in their entirety (Stewart & Samman, 2018).

2.3. Empirical Studies

Prior research indicates that the Human Development Index (HDI) is considerably shaped by a range of socio-economic determinants, notably education, health, and economic progress. Hasiana (2022) demonstrated that the quantity of elementary, junior high, and senior high schools influenced the HDI in East Java. Nevertheless, the regression analysis exhibited classical assumption violations, including homoscedasticity and autocorrelation issues, which compromised the efficiency of the estimators. On the other hand, Jam'an et al. (2024) established that education exerts a positive and statistically significant impact on HDI in Makassar City, with an education coefficient of 3.586 and a p-value of 0.000, underscoring that advancements in education correspond with increases in HDI.

Correspondingly, the study by Nurdianti et al. (2025) revealed that education, health, and per capita income collectively and individually exert a significant influence on the Human Development Index (HDI) within the Bangka Belitung Islands Province. This underscores the pivotal role of these three factors as key determinants in enhancing the community's quality of life. Similarly, Rosyid et al. (2025) highlighted that education and health positively affect HDI, whereas unemployment negatively affects it. Consequently, efforts aimed at lowering unemployment rates and elevating the standards of education and healthcare services are crucial for advancing human development across Indonesia.

Aryanti (2023) found that in East Java Province, the education and health indices, along with labor force size, significantly and positively influence the Human Development Index (HDI), whereas population growth exerts a negative impact. These findings underscore the necessity of managing population expansion and enhancing workforce quality to advance human development. Similarly, Indriani (2022) demonstrated that in East Nusa Tenggara, expenditures on education and the number of educational institutions positively contribute to HDI, while a higher student-to-teacher ratio adversely affects it. This stresses the critical need for balanced teacher allocation and strategic oversight of education funding.

Sumiyarti & Lazuardy Pratama (2024) in their research showed that education spending, health spending, and economic growth have a significant influence on HDI in West Java Province. These three variables are able to explain changes in the quality of life of people in the region. Similarly, Arbiansah et al. (2024) found that economic growth and the number of high school graduates have a positive

influence on HDI, while population actually puts pressure on development resources. Therefore, government policies are needed to balance population growth so as not to hinder the increase in HDI. In addition, Maulana & Ari Wibowo (2013) proved that economic growth and education significantly affect HDI in 33 provinces in Indonesia in the 2007-2011 period. However, these studies noted that the technology variable has not shown a significant influence on HDI, so efforts are needed to increase the utilization of technology in human development.

Another research model that examines government spending on health is proven to have a significant positive impact on HDI, but education spending is effective if accompanied by improved management and quality of use of funds Beauty, (2016). Meanwhile, Varlitya et al. (2023) tested in the context of a pandemic with the findings that the effectiveness of health spending on HDI decreased during COVID-19 in Aceh, indicating the importance of policy adaptation during the crisis. At the micro level, Islam & Sim (2021) present evidence that higher education is associated with increased consumption of healthy food and decreased consumption of unhealthy food, suggesting an intermediary path between education, healthier consumption patterns, and increased human capital or Human Development Index (HDI).

Febrian & Suhartini (2023) also show that physical DAK special allocation funds have a negative impact on HDI if not managed optimally but can increase HDI through capital expenditure. In contrast, non-physical DAK special allocation funds have a direct and positive effect on HDI, especially through the education and health sectors. Maharda & Aulia (2020) found that in 12 provinces with low HDI, education spending had a significant positive effect on HDI, while health spending was not significant due to inefficient use of the budget. Hannan et al. (2023) showed that education contributes positively and significantly to HDI in Indonesia and plays a role in reducing poverty, which indirectly increases HDI. In contrast, unemployment and economic growth have a negative impact. This finding emphasizes that the quality of education is a major factor in human development. In addition, Aswanto et al. (2024) also found that the average years of schooling had a significant effect on HDI in the districts/cities of Riau Province with a contribution of 93.97%, reinforcing the important role of education in improving community welfare. Furthermore, Shoolihah & Musyaropah (2024) found that average years of schooling has a positive and significant influence on HDI in Java Island, while unemployment has a negative effect with a contribution of 98.74%.

METHODOLOGY

This research is a descriptive quantitative study. Quantitative research is conducted to gain knowledge by utilizing numerical data as a tool to analyze information about what we want to know. This type of research is filled with numerical elements (Fitriani Djollong, 2014). Descriptively, the information that has been processed and analyzed will then be interpreted and concluded so that others can gain an understanding of

the nature and characteristics (Nugroho, 2016).

This study uses secondary data in the form of cross section data obtained from 34 provinces in Indonesia in 2023. Data were obtained from official websites, such as the Indonesian Central Bureau of Statistics (BPS), the Ministry of Health, and the Ministry of Manpower of the Republic of Indonesia. The data analysis technique used is multiple linear regression ordinary least square (OLS) estimation method with using STATA 17 software. The dependent variable in this study is the Human Development Index (HDI). There are three indicators that serve as independent variables, namely the number of health centers (X1), the number of schools (X2), and the number of vocational training institutions (X3). In the data analysis, it passes the classical assumption test, namely the normality test, heteroscedasticity test, and multicollinearity test. The regression model used is as follows:

$ln\,IPM_i = \beta_0 + \beta_1 lnmedic_i + \beta_2 lnedu_i + \beta_3 lnlpk_i + \varepsilon$.....(1)

Description:

a) *Ln* : Natural logarithm
b) IPM : Indonesia's Human Development Index (HDI) in 2023
c) β_0 : Intersept
d) $\beta_1, \beta_2, \beta_3$: Regression coefficient
e) Medic : Number of health centers in Indonesia in 2023
f) Edu : Number of schools in Indonesia in 2023
g) LPK : Number of Job Training Institutions in Indonesia in 2023
h) ε : *Error Terms*
i) I : Provinces in Indonesia

Hypothesis

H1: The number of health centers has a significant effect on Indonesia's Human Development Index (HDI) in 2023.

H2: The number of schools has a significant effect on Indonesia's Human Development Index (HDI) in 2023.

H3: The number of vocational training institutions has a significant effect on Indonesia's Human Development Index (HDI) in 2023.

RESULT AND DISCUSSION

Results

4.1. Classical Assumption Test

Table 4.1.1

Normality Test

Variables	N	Individual Test		Combined Test	
		Pr(Skewness)	Pr(Kurtosis)	Adj chi 2(2)	Prob>chi2
Residuals	34	0.4790	0.5951	0.82	0.6629

Table1 Data processed, Stata 17

Based on the results of the residual normality test, the regression model meets the normality criteria as seen in the probability value of Pr (Skewness) of 0.479 and Pr (Kurtosis) of 0.5951 where both are greater than the 5% significant level, so there is no evidence to refute the assumption of normality. In addition, the adjusted chi-square value of 0.82 and the probability value of 0.6629 indicate that the overall residuals show no deviation from the normal distribution.

Table 4.1.2

Heteroscedasticity Test

Statistical Test	Null Hypothesis	Chi2 statistic	df	p-value
Breusch-Pagan Cook-Weisberg	Constant Variance (Homoscedasticity)	3.17	1	0.0749

Heteroscedasticity test using *Breusch-Pagan/Cook-Weisberg* obtained a chi^2value of 3.17 with one degree of freedom and a *p-value* of 0.0749 greater than the 5% significance level, so there is not enough evidence to reject the null

hypothesis claiming that the residual variance has homoscedasticity.

Table 4.13

Multicollinearity Test

Variables	VIF	1/VIF (Tolerance)
lnedu	3.86	0.25921
lnmedic	3.85	0.25970
lnlpk	1.00	0.99626
Mean VIF	2.90	-

The results of the multicollinearity test using the *Variance Inflation Factor* (VIF), obtained an average VIF value of 2.9 with each variable, namely the number of schools (edu) of 3.86, the number of health centers (medic) of 3.85, and the number of job training institutions (lpk) at 1.00. All VIF values of each variable are below 5, which means there is no multicollinearity problem between the independent variables.

Table 4.2

Ordinary Least Square Regression Test

Variables	Coefficient	Std. Error	t-statistic	p-value
Constant	4.071	0.373	108.99	0.000***
lnmedic	0.671	0.081	8.32	0.000***
lnedu	-0.557	0.107	-5.20	0.000***
lnlpk	0.088	0.031	2.80	0.009***

*Note: Significant *** 1%, ** 5%, *10%*

Based on the regression test results, the variable number of health centers (medic) shows a positive and significant impact on the dependent variable as seen from the coefficient and *p-value* of 0.671 and 0.000 respectively, meaning that every additional 1% unit of the number of health centers will increase HDI by 67.1% assuming other variables are considered constant. Meanwhile, the variable number of schools (edu) shows a negative and significant relationship with HDI with a coefficient of -0.557 and a *p-value* of 0.000, which means that every additional 1% of school units will reduce HDI by 55.7%, assuming other variables are held constant. In addition, the variable number of vocational training institutions (lpk) has a positive and significant effect with a coefficient of 0.088 and a *p-value* of 0.009 which indicates that a 1% increase in the number of vocational training institutions will increase HDI by 8.8%, assuming other variables are held constant. Overall, these three variables make a significant contribution in explaining the variation in the dependent variable in this model.

Discussions

Number of Health Centers to Indonesia's Human Development Index (HDI) in Indonesia 2023

The regression analysis run in this study indicates that the number of community health centers has the potential to increase HDI. This indicates that the presence of health facilities, such as puskesmas, is important in improving the quality of life of the community, which is reflected in an increase in HDI. This finding is consistent with the framework that the health dimension is one of the main components in calculating HDI. Puskesmas as first-level health services have an important role in accessing basic health services to the community.

Basic health services are highly influential in calculating HDI. This is shown by a study by Lee et al. (2007) that an increase of one primary care physician per 10,000 population in the United States was associated with a decrease of 1.44 deaths per 10,000 population, even after considering income inequality and other sociodemographic factors. This means that primary healthcare has a direct impact on reducing mortality and increasing life expectancy, which are key components in calculating the HDI. In addition, Bruna et al. (2014) also mentioned their findings that health centers have a role in addressing social determinants of health, where integrating public health priorities into

the local strategic planning process shows that health centers not only provide medical services but also contribute to the social and economic development of the community. Thus, strong primary health care is able to create synergies between the health and development sectors of a country that can accelerate the achievement of sustainable human development goals.

In line with human capital theory and the concept of HDI according to UNDP, which places health as one of the main pillars of human development, in human capital theory, health is seen as a productive asset that determines the capacity of individuals to participate in economic and social activities. Health centers as first-level health service providers play an important role in ensuring community access to health services. The UNDP version of the HDI concept emphasizes the importance of longevity and healthy living, which is reflected in the indicator of life expectancy at birth. With the increase in the number of community health centers, people have better access to basic health services, thereby reducing mortality and increasing life expectancy. This shows that the availability of health facilities not only directly improves quality of life, but also strengthens the foundation of human development.

Number of Schools to Indonesia's Human Development Index (HDI) in Indonesia 2023

The results of the regression analysis that has been carried out indicate that if the number of schools is increased, it will actually reduce the HDI value. Several studies provide an explanation for this phenomenon, such as research conducted by Zahroh & Pontoh (2021) revealed that although the number of schools in Indonesia has increased, the uneven quality of education in various provinces has caused HDI to not be positively related to the level of education, so this phenomenon shows that the number of schools alone is not enough to increase HDI, but it must also be followed by the quality of education that must be considered.

The quality of education is an important aspect in determining the effectiveness of education sector development, so as to increase the Human Development Index (HDI) (Ayu Wandirah & Joko Setyono, 2024). The increasing number of schools will not have a positive impact on the HDI if it is not accompanied by an increase in the quality of education services, such as teacher competence, learning facilities, and a curriculum that is relevant to the needs of students (Hasanah et al., 2024). Hanushek & Woessmann (2015) explain in their book entitled The Knowledge Capital of Nations: Education and the Economics of Growth, the quality of education has a much stronger relationship to economic growth and human welfare than just school enrollment rates or the number of educational institutions. This means that countries that successfully improve the quality of learning in their schools show more rapid HDI and economic growth.

Indonesia has experienced a rapid increase in access to education, but the overall quality of education still faces serious problems. This can be seen from the results of the 2018 Program for International Student Assessment (PISA) survey which shows that the quality of Indonesia's education lags behind 79 countries, which is ranked 74th, which means that in terms of the education system, Indonesia is in a very worrying position (Tarigan et al., 2024). One of the factors influencing this low quality is the lack of professional qualifications among teachers. Data shows that in 2017, of the 3.9 million teachers in Indonesia, around 25% had not met the academic qualification requirements, and 52% did not have a professional certificate (Kawuryan et al., 2021). In addition, disparities in the distribution of education facilities and teaching quality between urban and rural areas exacerbate the situation with many schools in remote areas lacking basic infrastructure and adequate teaching staff (Juharyanto et al., 2023).

Education in *human capital* theory is considered an investment in building individual capacity to increase productivity and welfare. However, an increase in the number of schools without an increase in the quality of education will not necessarily produce quality human capital. Therefore, the negative result of the lnedu variable indicates that simply increasing the number of schools is not enough to promote human development if it is not accompanied by an equitable increase in the quality of education.

Number of Vocational Training Institutions to Indonesia's Human Development Index (HDI) in Indonesia 2023

Analysis of the regression results shows that an increase in the number of vocational training institutions contributes to an increase in HDI in Indonesia. Although the magnitude of the effect is relatively smaller than other variables such as lnmedic, this effect is still important because it shows that vocational training has a role in shaping the quality of human resources, especially in the aspect of skills and work productivity and is indirectly connected to the aspect of income to be received.

Vocational training institutions function as a bridge between the world of education and the world of work. The existence of vocational training institutions helps individuals improve the technical and non-technical competencies needed in the labor market (Titi Kinapti, 2025). This is in line with the decent standard of living aspect of the HDI calculation because improved skills are likely to increase access to more productive work, better income and higher economic welfare. Moreover, vocational training can also encourage the participation of vulnerable groups, such as youth who do not continue formal education or productive-age job seekers to enter the workforce more competitively.

Fribourg et al. (2023) found that skills training programs that included practical experience, soft skills training, and job referrals consistently increased participants' employment opportunities and earnings. In addition, Chakravarty et al. (2019) also found that vocational training programs increased non-farm employment by 10 percentage points and participants' monthly income, especially among women who started independent businesses at home. This suggests that vocational training can empower vulnerable groups and increase their economic participation.

Compared to general education, vocational education shows better labor market outcomes for women, although there is no significant difference for men (Pritadrajati, 2022). However, many private vocational schools show poor performance in terms of job formality and graduate earnings. Quality vocational training programs that match industry needs contribute positively to socioeconomic mobility and regional development (Mustajab & Irawan, 2023).

The concept of HDI according to UNDP includes a decent standard of living as one of its dimensions, which is closely related to the ability of individuals to obtain decent work and earn sufficient income. Vocational training institutions bridge the gap between formal education and the real needs of the labor market by equipping individuals with the necessary technical and non-technical skills. Quality vocational training can expand employment opportunities, increase incomes and support social mobility, thereby contributing directly to welfare improvement and indirectly to HDI achievement.

The findings in this study are also consistent with *human capital* theory, which states that vocational training is included in the human capital component with most of the increase in income occurring as work experience comes from vocational training. Thus, the presence of public facilities in the form of vocational training institutions in Indonesia will encourage the formation of skills needed by the market. The training provided in these institutional facilities helps strengthen the relationship between workers and

companies and makes the workforce more stable especially in high-skilled jobs which in turn will form a more decent standard of living from the income of workers with these skills.

CONCLUSION

This study shows that three aspects of human development are influential in shaping the Human Development Index (HDI) in Indonesia in 2023. The availability of community health centers (puskesmas) is shown to be a factor that drives up the HDI, signaling the importance of access to basic health services in improving life expectancy and quality of life. Similarly, the existence of vocational training institutions shows a positive contribution to the HDI through improving the skills and income potential of individuals. However, the number of schools shows a negative relationship with HDI, indicating that an increase in the number of educational institutions is not enough to improve the quality of human resources if it is not accompanied by an equal improvement in the quality of education.

These findings have implications for development policy, especially in education in Indonesia. The government needs to strengthen the quality of education services, not only by increasing the number of schools, but also by improving the competence of teachers, learning facilities, and equitable distribution of education. In addition, the expansion and equitable development of health centers in underdeveloped areas should be prioritized to improve the overall health status of the community. Furthermore, the development of vocational training institutions must be aligned with industry needs in order to produce a competent and adaptive workforce for the market.

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