

The Economic Value of Higher Education in Economic Growth against Labor Absorption and Human Development Index

*The Economic Value of
Higher Education in
Economic Growth*

Enny Diah Astuti^{1*}, Ria Estiana², Sofia Maulida³, Nika Sintesa⁴

¹Department of Management, Faculty of Economics and Business, Universitas Muhammadiyah Bekasi Karawang; Karawang, Indonesia

^{2,4}Department of International Business Administration, Politeknik LP3I Jakarta; Jakarta, Indonesia

³Department of Management, Faculty of Economics, Sekolah Tinggi Ilmu Ekonomi Tri Bhakti; Bekasi, Indonesia

*Corresponding Author E-Mail: ennydiah169@gmail.com

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ABSTRACT

Education is a key determinant of economic development and should be viewed as a long-term investment in improving the human development index. Weak support for the education sector can lead to issues such as unemployment, crime, drug abuse, and increased social dependency. This study examines the effect of completion levels in vocational, academic, and professional higher education on Indonesia's economic growth, as well as its implications for labor absorption and human development index improvement. Using a quantitative approach, the study applies multiple linear regression and panel data analysis, with higher education completion rates as independent variables and economic growth as the dependent variable. The results show that completion levels in vocational, academic, and professional higher education have a significant effect on economic growth. In addition, economic growth has a positive and significant influence on labor absorption and human development index improvement. The findings confirm that increasing access to and the quality of higher education contribute substantially to national economic growth, which in turn plays a key role in reducing unemployment and enhancing the quality of life of the Indonesian population through improved human development index.

Keywords: Economic Growth, Higher Education, Human Development Index, Labor Absorption.

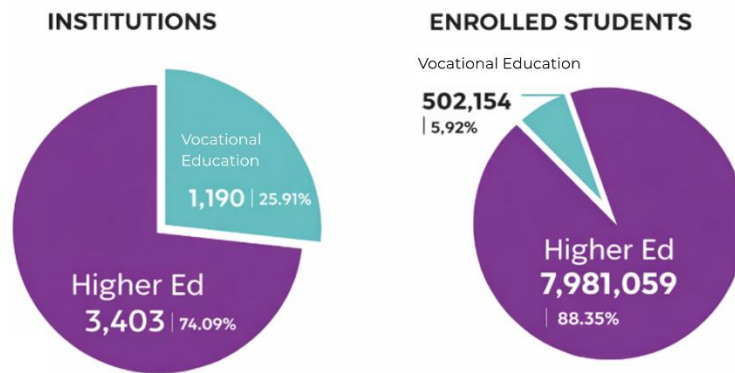
INTRODUCTION

Higher education in Indonesia has experienced significant growth of 67.2% in the last 10 years, with the dominance of private university students (60.3%) compared to public higher education institutions (39.7%). Despite the support of the community, the direction of its development is not fully aligned with national priority policies in supporting the high-tech industry. Maneejuk and Yamaka's (2021) study shows that the expansion of higher education has a significant but non-linear impact on economic growth, reflecting the principle of the "law of diminishing returns." The optimal impact of higher education on economic growth can be achieved when the expansion is accompanied by improvements in the quality of incoming students and a better alignment between fields of study and industry needs.

Figure 1 shows that academic education dominates higher education in Indonesia, with 74.09% of programs and 88.35% of students, while vocational education accounts for only 25.91% of programs and 5.92% of students. This indicates that students are more oriented toward academic degrees than toward industry-relevant vocational skills (OECD, 2016).

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Source: Higher Education Statistics (2021)

Figure 1. Number of Higher Education Institutions and Students, 2021

Indonesia's downstreaming strategy has strengthened macroeconomic growth, but its reliance on imported capital and expertise poses challenges for achieving a developed economy by 2045. A key challenge is strengthening higher education institutions to produce competent and innovative human resources capable of processing natural resources using advanced technology. Although higher education enrollment has increased by 67.2% in the last decade, dominated by private universities, the expansion is largely concentrated in non-priority fields rather than Science, Technology, Engineering, Arts, and Mathematics (STEAM) areas needed to support high-tech industry development (Hasibuan & Handayani, 2021).

Studies by Zulfikar et al. (2025) demonstrate that higher education contributes to national economic growth, particularly when supported by regional fiscal capacity from local taxes and levies. This contribution is more pronounced when universities produce qualified graduates in STEAM fields aligned with high-tech industry demands and supported by strong secondary education. However, in Indonesia, this condition remains suboptimal, as higher education is still dominated by academic programs, while vocational education remains limited, accounting for only 11.6% compared to 88.4% in academic tracks (Kurnianto, 2019). Consequently, students are better prepared for academic achievement than for professional and industry-oriented competencies required in the global economy (Yudhoyono et al., 2024; Putri et al., 2024).

This study examines the economic value of education in economic growth. Based on economic theory, education is considered a form of investment in human capital that contributes significantly to economic development and long-term productivity, rather than being viewed merely as consumption or expenditure, education develops human resources by enhancing knowledge, skills, and technological capabilities, while also fostering a supportive business environment that promotes economic growth. Consequently, investment in education benefits not only individuals but also businesses and society as a whole by increasing income, productivity, and social prosperity (Schultz, 1961; Grant, 2017; Surur et al., 2020). Although education was previously not seen as having a direct economic impact, it is now widely recognized as a strategic investment and a prerequisite for the development of other sectors (Khan et al., 2020).

Various studies show that economic growth is positively associated with labor absorption and HDI. Research by Lumbantoruan and Hidayat (2014) demonstrates a long-term equilibrium between economic growth and the HDI, while Izzah and Hendarti (2021) find that labor and gross domestic product have a significant effect on the HDI. However, Handayani (2015) highlights that the increasing number of universities is not always balanced with the quality of facilities and employment opportunities, contributing to higher educated unemployment. These findings emphasize the importance of human capital as a strategic investment in improving productivity and income. Education is also

recognized as a driver of economic expansion by increasing labor productivity and earnings (Solehuddin, 2023; McCluskey, 2023; Purnamasari et al., 2025).

This study aims to analyze the economic value of education in supporting economic growth and its implications for labor absorption and the Human Development Index (HDI) in Indonesia. Furthermore, it seeks to address existing gaps in the literature by contributing to the theoretical understanding of higher education, refining methodological approaches in model development, and providing empirical insights into the interrelationships among education, economic growth, labor absorption, and HDI.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The Influence of Higher Education on Economic Growth

Higher education plays an essential role in strengthening economic growth through the development of human capital and the improvement of workforce productivity. Vocational higher education is particularly oriented toward practical competencies and industry-oriented skills, enabling graduates to adapt quickly to labor market demands and technological changes. By producing skilled workers with applied technical abilities, vocational institutions contribute to productivity improvements within various economic sectors (Nurwardani et al., 2016). Academic higher education also supports economic development through the generation of knowledge, research activities, and innovation (Apostu et al., 2022). Universities function as centers of scientific advancement that produce new ideas, technologies, and analytical capabilities, which can enhance industrial competitiveness and national productivity (Faggian et al., 2019).

In addition to vocational and academic pathways, professional higher education plays a strategic role in preparing graduates with specialized competencies and professional certification standards (Zheng, 2024). Professional programs focus on equipping individuals with practical expertise and ethical standards required in specific occupations, such as medicine, law, engineering, and education. These competencies strengthen the quality of human resources and support the efficiency of economic activities. From the perspective of human capital theory, education increases individual productivity and contributes to higher economic output (Becker, 1993; Herzog, 2016). Similarly, the Cobb–Douglas production framework suggests that improvements in human capital, including education, enhance the productivity of labor and physical capital, which ultimately supports sustained economic growth (Mankiw et al., 1992).

H1: Vocational higher education has a significant and positive effect on economic growth.

H2: Academic higher education has a significant and positive effect on economic growth.

H3: Professional higher education has a significant and positive effect on economic growth.

The Influence of Economic Growth on Labor Absorption and HDI

Economic growth reflects an increase in the production of goods and services within an economy and is closely related to labor market dynamics. As economic activity expands, businesses require additional labor to sustain production and service delivery, which increases employment opportunities in the formal sector. The expansion of industries, investment activities, and technological development encourages firms to recruit more workers with appropriate skills and educational backgrounds. Higher economic growth, therefore, contributes to greater labor demand and supports the absorption of formal workers across different sectors of the economy (Badriyah et al., 2021). In this context, the interaction between economic performance and labor markets becomes an important mechanism through which economic expansion influences employment structures.

Economic growth also has broader implications for human development, particularly through improvements in living standards and access to essential services. An expanding economy can increase government revenues and public spending capacity, enabling greater investment in education, healthcare, and social infrastructure. These

improvements contribute to higher levels of human well-being and development, which are commonly measured using HDI (Vel, 2011). HDI reflects progress in key dimensions such as educational attainment, life expectancy, and purchasing power. Sustainable economic growth, therefore, plays an important role in supporting long-term improvements in human development and socio-economic welfare (Baeti, 2013; Kurniawan & Ramadhan, 2025).

H4: Economic growth has a significant and positive effect on labor absorption.

H5: Economic growth has a significant and positive effect on the human development index.

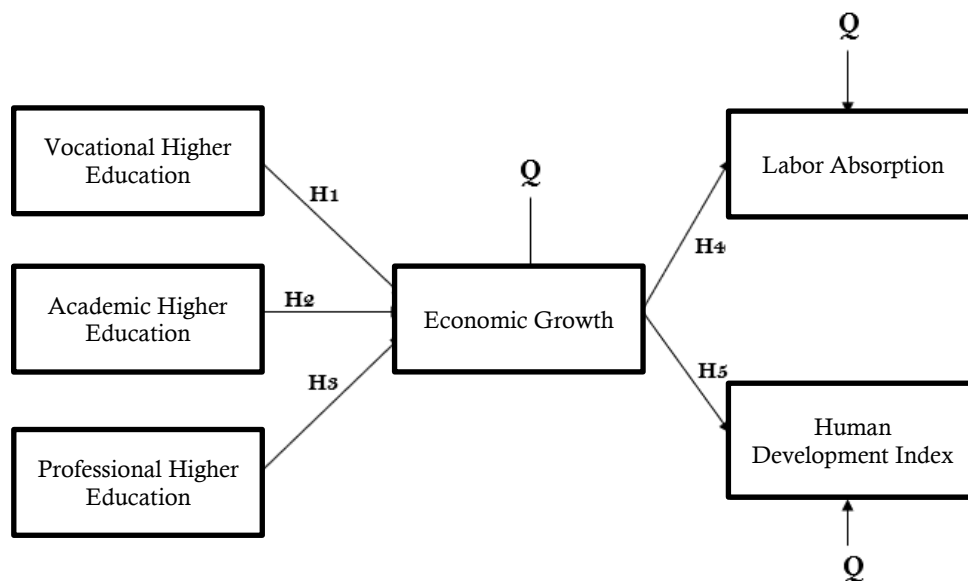


Figure 2. Conceptual Framework

Figure 2 illustrates the relationships between higher education pathways, economic growth, labor absorption, and HDI. Vocational, academic, and professional higher education all have significant and positive effects on economic growth, which in turn positively influences both labor absorption and HDI. This framework highlights that improvements in higher education directly enhance economic performance, which subsequently drives employment opportunities and overall human development.

RESEARCH METHODS

This study employs an explanatory quantitative method to investigate the relationships between variables, which allows the researcher to understand both the existence and the nature of these relationships (Bowen et al., 2017). The research relies on secondary data in the form of annual reports, collected from official sources such as the central statistics agency, the ministry of education and culture, and the ministry of manpower. The dataset spans five years of time data from 2017 to 2021. Data analysis in this study combines descriptive analysis to summarize the data patterns and verifiable analysis using panel data regression (pooled data) to test hypotheses. Data processing and analysis are conducted with Microsoft Excel and EViews 12 software.

The research model conceptualizes economic growth as an outcome jointly and individually influenced by vocational higher education, academic higher education, and professional higher education. Within this framework, economic growth subsequently functions as a key determinant of both formal labor absorption and the human development index. Accordingly, the model reflects a structured causal relationship in which higher education contributes to economic performance, which in turn directly shapes employment outcomes and broader human development, consistent with causal

modeling approaches that emphasize systematic cause–effect relationships among variables.

This study employs multiple linear regression analysis, where several independent variables are used to explain the behavior of a dependent variable. Unlike simple linear regression, which uses only one independent variable, this study applies the Ordinary Least Squares (OLS) technique within a panel data regression framework. This approach allows the model to analyze the simultaneous effects of multiple explanatory variables on the dependent variable. Based on this framework, the research model is formulated as follows:

The formulation in the study uses the following equations:

$$\hat{Y} = \beta_0 + \beta_{x_1}x_1 + \beta_{x_2}x_2 + \beta_{x_3}x_3 + \varepsilon_1$$

$$Z_1 = \beta_Y + \beta_0 + \varepsilon_2$$

$$Z_2 = \beta_Y + \beta_0 + \varepsilon_3$$

Information :

X_1 = Vocational Higher Education

X_2 = Academic Higher Education

X_3 = Professional Higher Education

\hat{Y} = Economic Growth

Z_1 = Formal Labor Absorption

Z_2 = Human Development Index

$\beta_{x_{iy}}$ = Regression coefficients of variables X_1, X_2, \dots, X to i against variable Y_1

β_{yZ_1} = The regression coefficient of the variable Y_1 against the variable Z_1

β_{yZ_2} = The regression coefficient of the Y_1 variable against the Z_2 variable

ε = Error

RESULTS

This section presents the results of the data analysis conducted to examine the relationships between the research variables. The analysis begins with descriptive statistics to provide an overview of the data distribution across provinces during the 2017–2021 period, followed by further analysis to evaluate the relationships among the variables in the research model.

Table 1. Descriptive Statistics of Research Variables (2017–2021)

Variable	Mean	Standard Deviation	Highest Value (Province, Year)	Lowest Value (Province, Year)	Highest Provincial Average	Lowest Provincial Average
Vocational Higher Education	7,949.68	10,520.04	49,498 (West Java, 2019)	184 (Gorontalo, 2017)	West Java (38,315.00)	North Kalimantan (300.80)
Academic Higher Education	29,437.85	39,765.39	186,883 (East Java, 2019)	1,115 (Bangka Belitung, 2017)	East Java (146,097.80)	North Kalimantan (1,601.40)
Professional Higher Education	1,973.86	2,970.41	17,304 (East Java, 2020)	7 (North Maluku, 2017)	East Java (11,247.20)	Bangka Belitung (38.80)
Economic Growth	42,439.20	31,729.39	174,941.72 (DKI Jakarta, 2021)	11,863.41 (East Nusa Tenggara, 2017)	DKI Jakarta (168,149.77)	East Nusa Tenggara (12,590.60)
Labor Absorption	41.23	10.59	71.55 (DKI Jakarta, 2017)	19.53 (Papua, 2021)	Riau Islands (67.31)	Papua (20.80)
Human Development Index	70.72	3.96	81.11 (DKI Jakarta, 2021)	59.09 (Papua, 2017)	DKI Jakarta (80.63)	Papua (60.21)

As shown in Table 1, the descriptive statistics indicate substantial variation across the observed variables during the 2017–2021 period. Vocational higher education has an average value of 7,949.68 with a relatively high standard deviation of 10,520.04, indicating an uneven distribution across provinces. The highest value is recorded in West Java in 2019 (49,498), while the lowest occurs in Gorontalo in 2017 (184), reflecting the concentration of vocational institutions in more developed regions. Academic higher education shows a much higher average value of 29,437.85, with the largest variability among the education variables, confirming that academic programs dominate Indonesia’s higher education system. The highest value is observed in East Java in 2019 (186,883), while the lowest is in Bangka Belitung in 2017 (1,115). Meanwhile, professional higher education records a smaller average value of 1,973.86, with East Java showing the highest value (17,304) and North Maluku the lowest (7), indicating relatively limited participation in professional education.

In terms of macroeconomic indicators, economic growth has an average value of 42,439.20 with a standard deviation of 31,729.39, where the highest value is recorded in DKI Jakarta in 2021 (174,941.72) and the lowest in East Nusa Tenggara in 2017 (11,863.41). Labor absorption shows an average value of 41.23, with the highest value found in DKI Jakarta in 2017 (71.55) and the lowest in Papua in 2021 (19.53). Meanwhile, the Human Development Index has an average value of 70.72, with relatively low variation compared to other variables, with DKI Jakarta recording the highest value in 2021 (81.11) and Papua the lowest in 2017 (59.09). These results indicate notable disparities in the distribution of higher education participation, economic growth, and human development across Indonesian provinces.

A research model that can produce results according to expectations and theory is the basis for thinking. The feasibility test of the theoretical plausibility model can be presented in the following Table 2.

Table 2. Theoretical Plausibility

Model	Variable	Pre-Estimate	Post Estimation	Information
Influence on Economic Growth (Model 1)	Vocational Higher Education	Significant	Significant	On Expectations
	Academic Higher Education	Significant	Significant	On Expectations
	Professional Higher Education	Significant	Significant	On Expectations
Influence on Labor Absorption (Model 2)	Economic Growth	Significant	Significant	On Expectations
Influence on the Human Development Index (Model 3)	Economic Growth	Significant	Significant	On Expectations

Table 2 presents the theoretical plausibility of the research models by comparing the expected relationships before estimation (pre-estimate) with the empirical results obtained after estimation (post-estimation). The table aims to assess whether the observed relationships among variables are consistent with theoretical expectations. The results indicate that all variables across the three models are statistically significant and align with the expected theoretical relationships, suggesting that the models are theoretically and empirically well supported.

In model 1 (influence on economic growth), vocational higher education, academic higher education, and professional higher education are theoretically expected to significantly influence economic growth. The estimation results confirm that all three variables are significant, indicating that different forms of higher education contribute to improving human capital and productivity, which are important drivers of economic growth. In model 2 (influence on labor absorption) and model 3 (influence on the human development index), economic growth is also found to have a significant effect, consistent with theoretical expectations. This indicates that economic growth plays an important

role in expanding employment opportunities and improving broader human development outcomes.

The theoretical plausibility test shows that all models before and after the estimate are in accordance with expectations. The research model produces an accurate feasibility test for future estimation purposes if each variable has a p-value of $\leq \alpha = 0.05$ and $\alpha = 0.10$.

Table 3. Hypothesis Testing

Model	Variable	Coefficient	Standard Error	1/2 Beta	p-value	Information
Influence on Economic Growth (Model 1)	Vocational Higher Education	0.044659	0.011506	0.022330	0.0001 < 0.05	Appropriate
	Academic Higher Education	0.307292	0.020166	0.153646	0.0000 < 0.05	Appropriate
	Professional Higher Education	0.030440	0.008701	0.015220	0.0006 < 0.05	Appropriate
Influence on Labor Absorption (Model 2)	Economic growth	19.32801	0.806315	9.664005	0.0000 < 0.05	Appropriate
Influence on the Human Development Index (Model 3)	Economic growth	7.639702	0.319254	3.819851	0.0000 < 0.05	Appropriate

Table 3 indicates that all variables across the three models have p-values < 0.05, signifying that their effects are statistically significant. In Model 1, vocational higher education (p = 0.0001), academic higher education (p = 0.0000), and professional higher education (p = 0.0006) all exert significant effects on economic growth. In Model 2, economic growth significantly influences labor absorption (p = 0.0000), while in Model 3, economic growth has a significant effect on the human development index (p = 0.0000). Therefore, all research hypotheses are supported, as the independent variables significantly affect their respective dependent variables. The Standard Error of Estimates (SE) is low, where the variance error of estimates = $SE^2 < \text{mean square of regression in the Anova table}$. Similarly, all standard errors of the positive and significant regression coefficient are worth less than 1/2 times the value of the regression coefficient, as can be seen in the table below.

As shown in Table 3, the explanatory ability test indicates that all models meet the required criteria, as the standard error values are smaller than $\frac{1}{2}\beta$. This result suggests that the research model has strong explanatory power in describing the relationships among the studied variables. In Model 1, vocational higher education, academic higher education, and professional higher education all appropriately explain economic growth, with academic higher education showing the largest coefficient, indicating a stronger contribution compared to the other education variables. Furthermore, in Model 2 and Model 3, economic growth also demonstrates strong explanatory ability in influencing labor absorption and HDI. These findings confirm that the proposed model is appropriate and capable of explaining the relationships between higher education, economic growth, labor absorption, and human development.

Table 4. R Square Result

Model	Variable	Coefficient of Determination	Information
Influence on Economic Growth (Model 1)	Vocational Higher Education	75.04% > 50%	Appropriate
	Academic Higher Education		
	Professional Higher Education		
Influence on Labor Absorption (Model 2)	Economic Growth	77.09% > 50%	Appropriate

Model	Variable	Coefficient of Determination	Information
Influence on the Human Development Index (Model 3)	Economic Growth	86.86% > 50%	Appropriate

All models had a coefficient of determination (R-square) value above 50%, indicating good predictive potential for the dependent variables, according to the forecasting ability test, as Table 4 illustrates. Vocational, academic, and professional higher education together account for 75.04% of the variation in economic growth in Model 1, suggesting that factors related to higher education have a significant role in forecasting economic growth. Economic growth accounts for 77.09% of the variation in labor absorption in Model 2 and 86.86% of the variation in the human development index in Model 3. These findings imply that the suggested models meet the feasibility requirements and have a strong predictive capacity for elucidating the connections between economic growth, labor absorption, higher education, and human development.

DISCUSSION

Based on the multiple linear regression results for the 2017–2021 period, the three higher education pathways demonstrate a positive relationship with economic growth, which is consistent with the theory proposed by Santoalha et al. (2018) and Maneejuk and Yamaka (2021), stating that higher education graduates play an important role in regional development and contribute significantly to economic growth, although the impact may not always be linear. In addition, vocational higher education also shows a significant positive influence on economic growth because it produces graduates with practical skills that directly meet labor market needs. This finding is supported by Cholik et al. (2021) and Toepper et al. (2022), who emphasize that vocational education accelerates economic growth by providing skilled labor and improving workforce productivity, although its distribution remains concentrated in the Java region.

The results show that academic higher education completion has a significant and positive effect on Indonesia's economic growth. However, unequal access to academic education, particularly in remote and border areas, remains a major challenge in achieving equitable distribution of higher education in Indonesia (Malaikosa et al., 2022). These findings are supported by Verma et al. (2024), who argue that academic education plays an important role in producing skilled and professional human resources and contributes to economic growth through innovation and research. Thus, academic higher education functions not only as a learning institution but also as a center for scientific development that generates innovation and strengthens national competitiveness in the global economy.

The results show that professional higher education completion has a significant and positive effect on Indonesia's economic growth. However, participation in professional education remains uneven across regions due to differences in access, financial capacity, and educational infrastructure. These findings are supported by Simatupang and Yuhertiana (2021) and Olcott (2022), who emphasize the importance of transforming professional higher education to respond to global demands, produce highly competitive graduates, and drive innovation. Therefore, professional education plays a strategic role in improving human resource quality and supporting national economic growth through the strengthening of professional competencies and alignment with evolving labor market needs.

The results show that economic growth has a significant and positive effect on labor absorption in Indonesia. However, disparities in labor absorption across regions remain evident, reflecting differences in economic activity and development levels. These findings are consistent with Hanushek and Woessmann (2023), who emphasize that improvements in education and workforce skills are essential for enhancing productivity and supporting economic growth. Regions with stronger economic activity tend to

demonstrate higher labor absorption, highlighting the importance of government policies that encourage regional investment and balanced economic development to expand employment opportunities across Indonesia (Muttakin, 2017).

The results show that economic growth has a significant and positive effect on the HDI, indicating that improvements in economic performance contribute directly to a better quality of life. HDI reflects three key dimensions: health, education, and standard of living, which collectively represent the success of human development. These findings are consistent with Maulana and Bowo (2013) and Lumbantoruan and Hidayat (2014), who demonstrate a long-term relationship between economic growth and HDI. Therefore, inclusive and equitable economic growth is essential to improve human resource quality through better education, health services, and economic infrastructure, ultimately increasing national human development levels.

Policymakers and educational institutions must prioritize expanding and equitably distributing higher education in Indonesia. Strengthening vocational, academic, and professional programs in underserved regions, aligning curricula with industry needs, and fostering practical skills and innovation are essential to produce competitive human resources. Coordination between government, universities, and industry is crucial to ensure higher education effectively drives sustainable economic growth and improves the nationwide quality of life.

CONCLUSION

Based on the results of the analysis, it can be concluded that vocational education produces a skilled workforce, academic education strengthens mastery of knowledge, and professional education produces graduates with specialized skills. Economic growth, in turn, encourages optimal labor absorption and positively impacts the Human Development Index (HDI) by improving living standards, education, and health. These findings imply that higher education in Indonesia must be adaptive to changing times, with curricula reformed to produce flexible, innovative, and industry-ready graduates. Vocational programs should integrate with industry needs and expand to regions with industrial potential, academic programs should foster both theoretical knowledge and innovation to meet the challenges of the Industrial Revolution 4.0, and professional programs should align with technological developments and labor market demands to produce professionals who are also policymakers and job creators.

The government is encouraged to strengthen leading sectors such as industry, agriculture, and tourism to increase labor absorption, while cross-sector collaboration among students, society, and industry is essential to develop human resources capable of competing nationally and globally. The study is limited by its use of national-level data, which may overlook regional differences, and by its quantitative approach, which does not capture qualitative aspects such as teaching quality, graduate readiness, and motivational factors. Future research should explore comparative studies across provinces, incorporate qualitative insights on curriculum-industry integration, and employ longitudinal designs to examine the long-term effects of higher education on economic growth, labor absorption, and HDI more comprehensively.

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