
STRATEGY FOR STRENGTHENING THE KNOWLEDGE ECONOMY THROUGH THE HUMAN DEVELOPMENT INDEX IN INDONESIA

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ABSTRACT

The objective of this research is to examine strategies for strengthening the knowledge economy through the human development index and the number of employed people in Indonesia. Indonesia's human development index is of moderate quality, and therefore, efforts must be made to improve it through the knowledge economy. Meanwhile, the number of employed people in Indonesia still requires significant time in Indonesia. The research method uses panel data regression estimation with a dummy variable least squares regression approach with interaction effects to measure the influence of the knowledge variables used on the human development index. Meanwhile, for the number of employed people, generalized least squares is used. The results of the study prove that the Human Development Index is capable and has a positive and significant effect on the knowledge variables, namely education, technology, innovation, and institutions. Technology has the highest coefficient on the human development index compared to other variables such as education, innovation, and institutions. Meanwhile, looking at the knowledge variables used for the number of employed people, such as education, technology, innovation, and institutions, although each number is small, it is still positive and significant. Ultimately, the quality of human resources through the human development index and the number of employed people in Indonesia will be one of the most important resources in Indonesia.

Keywords: Strategy, Knowledge Economy, Human Development Index

INTRODUCTION

The knowledge economy is a form of economics that is still rarely used in Indonesia. Developed countries already recognize the knowledge economy as a well-known branch of economics. Meanwhile, Indonesia, as a developing country, continuously utilizes the economy as a knowledge and as an economic resource. The concept of knowledge as an economic resource is widely recognized. Peter Drucker

(Eugenia, 2024) calls it a knowledge-based economy. According to Hadad (2017), the economy is related to traditional economics, while the knowledge economy is related to scarcity. There is no unique definition of a knowledge-based economy, but it is agreed that knowledge is information that can increase productivity, and the exploitation of knowledge can create new value in the economy.

Several previous studies have shown that the knowledge economy significantly influences economic growth (Amirat & Zaidi, 2020; Barkhordari et al., 2019; Nurunnabi, 2017; Parcero & Ryan, 2017). Meanwhile, research by Irawan and Akbar (2022) investigated the influence of economic growth on the Human Development Index (HDI) in South Sumatra Province, indicating that economic growth had a positive but insignificant effect. A study by Litriani (2021) noted a correlation between economic growth and the HDI in Indonesia. The findings of this study indicate a positive relationship between the two, with an increase in GDP potentially increasing the HDI. However, this study also emphasizes that human development, encompassing aspects of health, education, and a decent standard of living, plays a crucial role in improving the quality of human resources, which in turn can drive economic growth.

On the other hand, previous research has shown that GRDP per capita has a positive and significant influence on the HDI. Furthermore, local government budget allocations for the health sector also significantly influence HDI increases. However, allocations for the education sector do not show a significant impact in the short term, likely due to its long-term impact. In their study, Alamsyah et al. (2018) used open data to analyze and predict HDI values in various cities and regions in Indonesia. Using data analytics methods such as Artificial Neural Networks and K-means clustering, this study successfully identified important patterns that can support government policymaking in improving the HDI.

The motivation of the research is to refer to the principles of the 1945 Constitution of the Republic of Indonesia regarding the Human Development Index, namely Article 28C Paragraph (1), "Everyone has the right to develop themselves through fulfilling their basic needs, has the right to receive education and obtain benefits from science and technology, art and culture, in order to improve the quality of their lives and for the welfare of humanity. Article 31 Paragraphs (1) and (2) - Right to Education, "(1) Every citizen has the right to receive education. (2) *Every citizen is obliged to attend basic education and the government is obliged to finance it.*

Some of the main problems faced in measuring and improving the Human Development Index (HDI) include: (1) Not taking into account social inequality. Although the HDI provides a general picture of a country's well-being, it does not take into account social and economic inequality within the country. a) Income inequality between rich and poor, as well as unequal access to education and health, are not reflected in the HDI. b) Countries with a high HDI may have large disparities between certain social groups.

(2) Does not assess the quality of education and health. a) The quality of education, such as literacy and skills levels, is not included in the HDI calculation. b) The quality of health services, such as nutritional levels or access to good medical care, is also not measured by the HDI. (3) Ignores environmental factors. Development that ignores environmental sustainability can produce a high HDI value but has a negative impact on long-term quality of life. (4) Reliance on

incomplete or inaccurate data. The data used to calculate the HDI is often incomplete, especially in developing countries that may have weak statistical systems. (5) Does not measure social and political well-being. The HDI does not include political and social dimensions that are also important in determining quality of life.

Indonesia is currently developing its human resources. Indonesia's Human Development Index (HDI) is categorized as moderate. According to the 2020 UNDP report, Indonesia ranks 107th out of 189 countries, still lagging behind ASEAN countries such as Malaysia, Brunei Darussalam, and Thailand. Meanwhile, according to the 2023 Global Knowledge Index (GKI) report, Indonesia ranks 79th out of 133 countries with a GKI score of 44.7. One of the pillars of knowledge measured is education. The education pillar consists of three sectors: pre-university, technical education & training, and higher education. Based on these education sectors, Indonesia ranks 93rd for pre-university, 81st for technical education & training, and 68th for higher education.

The low level of workforce education, uneven development of Information and Communication Technology (ICT) infrastructure, a still-poor innovation system, and the suboptimal role of democratic and political institutions in Indonesia are challenges the Indonesian government must address. Meanwhile, infrastructure development in the tourism and culture sector remains prioritized in Java and Bali, with weak governance and low human resource quality.

Indonesia has achieved relatively rapid economic growth for most

countries over the past 50 years (Hill, 2021). The increasingly rapid advancement of science and technology will continue to accelerate the development process, and the replacement of manual labor patterns by sophisticated machines will impact the efficiency, quality, and quantity of economic development, ultimately resulting in accelerated economic growth.

Programs to increase food and energy self-sufficiency and nutritious food are key themes promoted by President Prabowo Subianto, following programs to improve the quality of human resources by previous presidents. A strategy to strengthen the knowledge economy is crucial for Indonesia to achieve a golden Indonesia by 2045.

Based on the background of the problem described above, the objective of this research is to determine strategies for strengthening the knowledge economy through the Human Development Index in Indonesia. This article was previously divided into three sections, which are still in the proposal stage. The first is an introduction containing a brief description of the research problem. The second is a literature review relevant to this research. The third section relates to the methodology used.

Knowledge Economy

The first research on the knowledge economy was conducted by Machlup, written by Choong & Leung (2021), who measured the contribution of knowledge production and distribution to the United States' national income. Furthermore, Choong & Leung (2021) attempted to divide the evolution of the knowledge economy concept into two waves of thought: one

on the knowledge economy and the other on knowledge management. The development of thought in the first stage emphasized the importance of considering the knowledge aspect in policymaking. This included how knowledge is used to create an education industry, foster a society that relies on information and knowledge to create jobs, drive economic growth, and impact broader economic activity. The second wave of knowledge economy thought focused more on the creation, role, and implementation of knowledge in management science, organizations, business, and innovation. This era is known as the concept of knowledge management.

The knowledge economy framework released by the World Bank in 2012 has been widely used in research. Following the World Bank, the UNDP's Global Knowledge Index emerged. The World Bank's framework consists of four pillars (Dima et al., 2018), as follows.

1. Economic incentives and institutional regimes that provide sound economic policies and institutions that enable the mobilization, efficient allocation of resources, encourage creativity and incentives for the efficient creation, dissemination and use of existing knowledge.
2. Educated and skilled workers who can continuously improve and adapt their skills efficiently create and use knowledge.
3. An effective innovation system of companies, research centers, universities, consultancies and other organizations that can keep pace with the knowledge revolution and tap into the

growing stock of global knowledge, assimilating it and adapting it to local needs.

4. Modern and adequate information infrastructure that can facilitate effective communication, dissemination, and processing of information and knowledge.

The pillars of the knowledge economy can then be written down, which are the variables used in this study.

Education

Education is the first pillar of the knowledge economy. Human resources are a crucial component of development. The quality of human resources can only be improved through education and training. Esther Duflo's research on education in Indonesia demonstrated that residents who participated in educational programs implemented at the time had better incomes. This study used the same indicators as the World Bank framework: Literacy Rate, School Participation Rate, and Average Years of Schooling.

Information Technology

The definition of Information and Communication Technology refers to all technical equipment for processing and conveying information, encompassing two aspects: information technology and communication technology. Information technology encompasses everything related to the process, use as a tool, manipulation, and management of information, while communication technology is everything related to the use of tools to process and transfer data from one device to another. Therefore, information technology and communication technology are two inseparable concepts. Information and

Communication Technology infrastructure is the backbone of the knowledge economy. Many studies have proven that information technology is an engine of economic growth. The information technology proxy in this study uses indicators of the percentage of telephone, internet, and computer usage.

Innovation System

An innovation system can be demonstrated by the number of high-quality scientific publications, intellectual property rights, and the amount of foreign investment. Scientific publications and patents are indicators of an innovation system. New discoveries in the form of products, services, processes, or systems will increase productivity, create more effective and efficient work methods, and ultimately contribute to development, as evidenced by an increase in per capita GRDP. Meanwhile, foreign investment can provide learning and adapt or improve technology through knowledge transfer and technology imports.

Democratic-Political Institutions

The role of democratic-political institutions as a source of efficiency and economic progress has long been a concern. Democratic-political institutions influence development. Poor-quality democratic-political institutions can contribute to economic problems. Conversely, good-quality democratic-political institutions can promote development. Banik (2022) stated that democracy is important because it provides political rights to determine economic, social, cultural, and ecological needs. Democracy guarantees citizens alternative development directions. This study uses a democracy index to measure the

influence of democratic-political institutions on development. There are three aspects of democracy: civil liberties, political rights, and democratic institutions. The primary function of democratic-political institutions is to carry out the mandate of the Indonesian Constitution, namely the welfare of all Indonesian people.

Human Development Index

The Human Development Index (HDI) is a comparison of life expectancy, education, and living standards across countries worldwide. The HDI can be used as an indicator to assess the quality of development and classify a country as developed, developing, or underdeveloped, and to measure the impact of economic policies on quality of life.

The HDI was subsequently introduced by a United Nations agency in 1990 and published periodically in its annual Human Development Index report. The UNDP attempts to rank all countries on a scale of 0 to 1 in terms of their human development. Several key premises in human development include (Human Development Report, 1995):

1. Development must prioritize the population as the center of attention.
2. Development is intended to expand people's choices, not just increase their incomes. Therefore, the concept of human development must focus on the population as a whole, not just the economic aspect.
3. Human development focuses not only on efforts to improve human capabilities but also on efforts to optimally utilize these human capabilities.

4. Human development is supported by four main pillars, namely: productivity, equity, sustainability, and empowerment.
5. Human development is the basis for determining development goals and analyzing options for achieving them.

METHOD

This study uses a quantitative approach. The data used are secondary data sourced from publications by the

Indonesian Central Bureau of Statistics, the portal of the Ministry of Education and Culture, and the Ministry of Law and Human Rights. The unit of analysis is all 33 provinces in Indonesia, covering the period 2011-2022. North Kalimantan is not included in this study. In this study, two research models were developed, each with the dependent variable being the Human Development Index and the Number of Employed Persons. Table 1 shows the operational definitions of the variables used in this study.

Table 1. Operational Definitions of Research Variables

Variables	Data source	Indicators used
Human Development Index	Central Bureau of Statistics	Human Development Index (HDI)
Number of People Working	Central Bureau of Statistics	Number of People Working
Education	Central Bureau of Statistics	Literacy Rate, School Enrollment Ratio, Average Years of Schooling
Technology	Central Bureau of Statistics	Mobile Phone User Ratio, Internet Access Ratio, Computer Access Ratio
Innovation	Central Statistics Agency; Ministry of Law and Human Rights; Ministry of Education and Culture	Intellectual Property Rights, Number of Scientific Publications, Foreign Investment
Institutional	Central Bureau of Statistics	Civil Liberties, Political Rights, Democratic Institutions

Panel data regression analysis generally uses three approaches: Ordinary Least Squared, Random Effect, and Fixed Effect methods. In the Fixed Effect method, the intercept in the regression can be differentiated between individuals because each individual is considered to have its own characteristics. To differentiate the intercept, a dummy variable can be used, so the model is known as the Least Squared Dummy Variable model

(Falah, Mustafid, Sudarno, 2016). Least Squared Dummy Variable (LSDV) is a panel data regression using the least squares method by adding a dummy variable that allows for differences in intercept values between individuals and over time. Meanwhile, LSDV with interaction effects is the interaction of independent variables with dummy variables that allow for differences in slopes on certain variables used (Falah, Mustafid, Sudarno, 2016). LSDV with

interaction effects is very effective for data with a short time period (Ahmad, Raupong, 2023). The use of the LSDV model with interaction effects provides a new contribution to the development of models for analyzing the knowledge economy and culture on inequality, poverty, and development in Indonesia.

To determine whether heteroscedasticity is present, the Wald test is used, while to determine serial

correlation, the Wooldridge test is used. Multicollinearity can be identified by the variance inflation factor (VIF) or by the high correlation between independent variables. To address heteroscedasticity and time series (autocorrelation), regression is performed using the robust-standard error technique (Wooldridge, 2016). The regression estimation model used can be written as follows.

$$\begin{aligned} \text{IPMit} &= \alpha + \beta_1 \text{EDUit} + \beta_2 \text{ICTit} + \beta_3 \text{INOit} + \beta_4 \text{INSTit} + \beta_5 \\ \text{P2it} &= (\text{D-IEPit} * \text{ICTit}) + \beta_6 \text{D-IEPit} + \epsilon_{it} \end{aligned} \quad (1)$$

Where

IPMit : growth of HDI of province i in period t

EDUit : education index in province i and in period t

ICTit : technology index in province i and in period t

INOit : innovation index in province i and in period t

INSTit : democracy index in province i and in period t

P2it=(D-IEPit*ICTit) : interaction variable between technology variables and dummy variables

iep (D-IEP*TIK) in province i period t

D-IEPit : dummy variable for provinces with a good knowledge economy index = 1 and provinces with an average knowledge economy index = 0

α , variable : intercept, or the average Gini value if the independent

issued

$\beta_1 \dots \beta_6$ tested : the coefficient value of each independent variable to be

estimate

ϵ_{it} : error term

Next, to calculate the number of people employed, write it here. The regression estimation model can be written as follows.

$$\begin{aligned} \text{JOBit} &= \alpha + \beta_1 \text{EDUit} + \beta_2 \text{ICTit} + \beta_3 \text{INOit} + \beta_4 \text{INSTit} + \beta_5 \\ \text{D3it} &= \text{D-Jawait} * \text{INOit} + \beta_6 \text{D-Provinceit} + \epsilon_{it} \end{aligned} \quad (2)$$

Where

JOBit : number of people working in province i in period t

EDUit : education index in province i and in period t

ICTit	: technology index in province i and in period t
INOit	: innovation index in province i and in period t
INSTit	: democracy index in province i and in period t
D3it=D-Jawait*INOit	: interaction variable between the innovation variable and the D-Java variable, provinces in Java Island = 1, other provinces = 0 (D-Java*INO) in province i period t
D-Province	: dummy variable of province code in province i and in period t
α , variable	: intercept, or the average Gini value if the independent variable issued
$\beta_1 \dots \beta_6$ tested	: the coefficient value of each independent variable to be estimate
ε_{it}	: error term

RESULTS AND DISCUSSION

Table 2 summarizes the best model test and heteroscedasticity test results for each panel data regression result.

Based on the Hausman test results, where $H_0 = RE$ and $H_1 = FE$, the $Prob > \chi^2 = 0.0000$ test value indicates that the best model uses fixed effects.

Table 2 Summary of the Best Model Selection Test

Model	Best Model Selection Test Results
<i>Ordinary Least Square</i> (OLS)	The OLS model in this study was ignored due to the assumption of constant slope and intercept.
<i>Random Effect</i> Model (REM)	Based on the Hausman test, the model value $Prob > \chi^2 = 0.0000$, $H_0 = RE$ is rejected, so the best model uses the Fixed Effect Model.
<i>Fixed Effect Model</i> (FEM)	The results of the Wald test indicate that there are symptoms of heteroscedasticity so that the regression results will cause bias. Modified Wald test for groupwise heteroscedasticity in fixed effect regression model; $H_0: \sigma(i)^2 = \sigma^2$ for all I; $\chi^2 (33) = 1467.96$; $Prob > \chi^2 = 0.0000$
<i>LSDV with interaction</i>	LSDV with interactions allows for differences in intercepts and slopes between entities. The analysis focuses on regional aspects, so this model does not incorporate time-invariant effects.
<i>Generalized Least Square</i> (GLS)	The GLS regression estimation results do not show symptoms of heteroscedasticity and serial correlation. Coefficients: generalized least squares Panels: homoscedastic Correlation: no autocorrelation

In the Fixed Effects model, intercepts can be differentiated between individuals because each individual is

considered to have its own characteristics. To differentiate intercepts between entities and slopes

for selected variables, the LSDV model with interactions can be used (Falah, Mustafid, Sudarno, 2016).

The results of the LSDV panel data regression estimation with interaction effects for the knowledge economy on the Human Development Index (HDI) show that education, technology, innovation systems, and democratic institutions have a positive and significant effect on the HDI. Improved education levels, technology utilization, innovation systems, democratic institutions, and cultural participation

activities are able to improve human development.

The coefficient results for the D-IEP dummy variable indicate an average difference between provinces with a high Knowledge Economy Index (IEP) and those with a low IEP. Provinces with a high IEP have a higher HDI than those with a low IEP. Meanwhile, the P2 interaction effect indicates that provinces with a high IEP have a greater influence on the HDI than those with a low IEP.

Table 3 Results of regression estimation on the Human Development Index (HDI)

Human Development Index (HDI)	Coef	Robust Std. Err	t	P>t	[95% Conf.	Interval]
Education (EDU)	.949***	.084	11.19	0,000	.782	1,116
Technology (ICT)	1,318***	.142	9.27	0,000	1,038	1,598
Innovation (INO)	.302***	.083	3.61	0,000	.137	.467
Institution (INST)	.268**	.125	2.14	0.033	.021	.516
D-IEP*Technology (P2)	.315**	.155	2.03	0.044	.009	.622
D-IEP	2,299***	.251	9.13	0,000	1,804	2,795
_cons	68,698	.199	344.69	0,000	68,306	69,090
observations				330		
R-squared				0.8322		
Number of provincial code				33		
Robust standard errors in parenthesis						
*** p<0.01, ** p<0.05, * p<0.1						

The D-IEP is calculated based on each province with a regular IEP with a regular province code, namely: Lampung, Central Kalimantan, West Nusa Tenggara, Maluku, Bengkulu, South Kalimantan, Jambi, Bangka Belitung, East Tenggara, Gorontalo, North Maluku, West Papua, Central Kalimantan, West Sulawesi, and Papua. And the rest are provinces with high IEP. Meanwhile, D-IEP* Technology (P2) is a dummy variable D-IEP*

Technology. Technology plays an important role in the HDI in Indonesia.

Education is the second-largest variable contributing to the HDI increase. A 10% increase in education can increase the HDI by 9.49%. Meanwhile, a 10% increase in technology can increase the HDI by 13.18%. Technology contributes the largest portion of the total compared to other variables.

Innovation and institutional variables can influence the HDI. A 10%

contribution from innovation can increase the HDI by 3.02%. Meanwhile, a 10% contribution from institutional variables can increase the HDI by 2.68%.

Strengthening of the knowledge economy occurred across all variables used. This strengthening was particularly evident in technology, which was the strongest factor in the HDI, followed by education. Furthermore, each of these strengthening HDI variables was followed by innovation and institutional variables.

Beliefs and values can enhance competence. Based on this, cultural participation demonstrates that individuals who possess beliefs and values related to customs, traditions, and behavior are able to enhance competence, which in turn will increase the Human Development Index (HDI). China, Japan, and South Korea are renowned for their strong cultural traditions. Many of these countries' residents live long lives because they practice healthy lifestyles. Indonesia is known for its local wisdom, rooted in regional customs, and a simple and healthy diet, mindset, and lifestyle. One traditional village in the Cianjur region,

the Javanese community, and communities in other remote parts of Indonesia, are renowned for their longevity.

Regression estimates for the HDI have shown positive results. Education is indeed closely related to the HDI. Meanwhile, information technology can also improve the HDI by providing quick access to information related to healthy lifestyles. On the other hand, innovation and institutionalization can increase the HDI through improvements in existing products, services, and processes, as well as the rules, norms, and procedures that govern individuals and groups within an organization or society.

The Influence of the Knowledge Economy and the Cultural Economy on the Number of People Employed

The role of education, technology, innovation systems, and democratic institutions has made a positive contribution to the increase in the Number of Employed People, as reflected in the results of the GLS panel data regression with interactions which show that the four variables have positive coefficients.

Table 4 Results of regression estimation on the number of people employed

Number of people working	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Education (EDU)	.011**	.0036549	3.10	0.002	.0041544	.0184814
Technology (ICT)	.051***	.002653	19.52	0.000	.0465797	.0569791
Innovation (INO)	.019**	.008631	2.28	0.023	.0027327	.0365658
Institution (INST)	.001*	.000225	1.29	0.196	-.0001503	.0007316
D-Java*Innovation (D3)	-.023**	.0086815	-2.67	0.008	-.0401633	-.0061325
D-Province						
North Sumatra	1.075981	.0140895	76.37	0.000	1.048366	1.103596
West Sumatra	.0910781	.0140114	6.50	0.000	.0636164	.1185399
Riau	.2341593	.0135992	17.22	0.000	.2075055	.2608132
Jambi	-0.28095	.0140767	-19.96	0.000	-.308543	-.2533635

South Sumatra	.6035665	.0143609	42.03	0.000	.5754197	.6317134
Bengkulu	-.802895	.0132732	-60.49	0.000	-.8289109	-.7768808
Lampung	.6435975	.0148429	43.36	0.000	.614506	.6726891
Bangka Belitung	-1.17824	.0156279	-75.40	0.000	-1.208924	-1.147664
Riau islands	-.967847	.0135801	-71.27	0.000	-.9944592	-.9412262
DKI Jakarta	.6777662	.0194529	34.84	0.000	.6396392	.7158932
West Java	2.239857	.0207382	108.01	0.000	2.199211	2.280503
Central Java	2.070177	.0174614	118.56	0.000	2.035953	2.104401
DI Yogyakarta	-.174218	.0135217	-12.88	0.000	-.20072	-.147716
East Java	2.229451	.0187913	118.64	0.000	2.192621	2.266282
Banten	.8572702	.0152167	56.34	0.000	.827446	.8870943
Bali	.0373899	.0139224	2.69	0.007	.0101024	.0646774
West Nusa Tenggara	.1360268	.0167934	8.10	0.000	.1031123	.1689413
East Nusa Tenggara	.2091334	.0142194	14.71	0.000	.1812638	.237003
West Kalimantan	.1213651	.015545	7.81	0.000	.0908974	.1518328
Central Kalimantan	-.550582	.0142017	-38.77	0.000	-.57842	-.5227505
South Kalimantan	-.099710	.0161939	-6.16	0.000	-.1314499	-.0679711
East Kalimantan	-.389662	.0134888	-28.89	0.000	-.4161004	-.3632253
North Sulawesi	-.711167	.0132266	-53.77	0.000	-.7370906	-.6852433
Central Sulawesi	-.406562	.0136897	-29.70	0.000	-.4333933	-.3797307
South Sulawesi	.5315934	.0161709	32.87	0.000	.4998991	.5632878
Southeast Sulawesi	-.608822	.0137904	-44.15	0.000	-.6358514	-.5817942
Gorontalo	-1.37304	.0149349	-91.94	0.000	-1.40232	-1.343776
West Sulawesi	-1.17848	.0155826	-75.63	0.000	-1.209023	-1.147941
Maluku	-1.11880	.012831	-87.20	0.000	-1.143953	-1.093656
North Maluku	-1.40761	.0128219	-109.7	0.000	-1.432744	-1.382483
West Papua	-1.66648	.0137363	-121.3	0.000	-1.69341	-1.639565
Papua	-.093931	.0234607	-4.00	0.000	-.1399135	-.0479495
_cons	14.60816	.02324	628.58	0.000	14.56261	14.65371
observations			330			
Number of provincial code			33			
Robust standard errors in parenthesis						
*** p<0.01, ** p<0.05, * p<0.1						

Meanwhile, the interaction dummy variable D3 (D-Java*Innovation) shows a difference in the average innovation system of provinces in Java compared to provinces outside Java on the Number of Employed People. The innovation system of provinces in Java has a smaller influence on the Number of Employed People compared to provinces outside Java.

According to BPS data, the highest percentage of workers by education level in Indonesia is elementary school graduates, at 24.54% in 2019, rising to 26.11% in 2021. Second place is for workers with general high school graduates, followed by junior high school graduates. The lowest percentage of workers with college degrees is only 9.74% in 2019 and rising to 10.18% in 2021. The low educational

quality of the workforce is a challenge in itself. The highest number of workers with low levels of education are in the industrial and agricultural sectors and in rural areas. This has the potential to cause income inequality. Indonesia has succeeded in increasing its reading literacy rate, as reflected in the Literacy Rate (AMH), which has reached above 90% in almost all provinces. However, the Average Years of Schooling (ALS) must be increased, which is still around 8 years. Only a few provinces, including DKI Jakarta and DI Yogyakarta, have achieved an ALS of 10 years. Regression estimates show that a 10% contribution from education can increase the number of people employed by 0.11%.

Meanwhile, technological advances and innovation are still able to absorb or increase the workforce. A 10% contribution from technology and innovation is still able to absorb 0.51% and 0.19% of the workforce, respectively. This indicates that the increase in the use of technology and innovation is still relatively low and has not significantly impacted the increase in the number of workers. Economic growth that relies on labor absorption will face efficiency and productivity issues and will reduce economic output.

CONCLUSION

The research findings demonstrate that education, technology, innovation, and institutions have a positive and significant impact on the Human Development Index (HDI) and the number of employed people. Technology has proven capable of addressing the challenges of economic

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empowerment, particularly the HDI. The research findings indicate that technology provides the most tangible improvement to the HDI. Educational empowerment also yields tangible results for the HDI. Innovation represents a breakthrough, a new approach, and a new discovery capable of addressing challenges to the HDI. The role of democratic-political institutions remains significant and significantly influential as determinants of the Human Development Index. The roles of technology and education are crucial and can be a viable alternative solution.

The role of knowledge can also have a positive and significant impact on the number of people employed. While not as significant as education, technology, innovation, and institutions, it can have a real and positive impact on the number of people employed.

For further research, strategies to strengthen the knowledge economy must be continued, both through the Human Development Index (HDI) and the Number of Employed Persons. The knowledge economy has a significant impact on the growth of the HDI and the Number of Employed Persons in Indonesia.

The discussion related to this research is still very limited and requires a lot of input and suggestions for future authors to study more deeply and comprehensively the influence of the knowledge economy on the Human Development Index and the Number of Employed People in Indonesia.

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