

Effects of Population, Technology and Education Dependence on Human Development in Indonesia during the Covid-19 Period

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Abstract

This This study aims to determine the effect of population dependence, technology, and education on human development. Human development in this Research is measured by adjusted per capita expenditure. The research method used in this study is in the form of panel data from 2019 – 2021 in 34 provinces in Indonesia with a descriptive quantitative model. Based on the partial analysis, the population dependency, technology variable has a positive and significant effect on human development by the probability value of smaller than alpha (0.05). While the education variable has a negative and significant effect on human development in Indonesia during the covid-19 period. Simultaneously, all variables have a significant effect on human development, that is shown through R² of 99.83% and 0.17% and is explained by other variables outside the study.

Abstrak

Penelitian ini bertujuan untuk melihat apakah terdapat pengaruh antara ketergantungan penduduk, teknologi, dan Pendidikan terhadap pembangunan manusia. Pembangunan manusia yang dimaksud diukur dengan pengeluaran per kapita disesuaikan. Metode penelitian yang digunakan dalam penelitian ini berbentuk data panel dari tahun 2019 – 2021 pada 34 provinsi di Indonesia dengan model kuantitatif deskriptif. Berdasarkan hasil analisis secara parsial, variabel ketergantungan penduduk, teknologi berpengaruh positif dan signifikan terhadap pembangunan manusia yang dilihat dari nilai probabilitas yang lebih kecil dari (0,05). Sedangkan variabel pendidikan berpengaruh negatif signifikan terhadap pembangunan manusia di Indonesia pada masa covid-19. Secara simultan semua variabel penelitian berpengaruh signifikan terhadap pembangunan manusia yang ditunjukkan R² sebesar 99,83% dan 0,17% dan dijelaskan oleh variabel lain diluar penelitian.

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INTRODUCTION

The issue of human resource development is still a homework for the Indonesian nation. The level of human resource development can be seen through the Human Development Index (IPM). HDI is a composite index formed from three dimensions, one of which is a decent standard of living dimension which is represented by adjusted per capita expenditure. Adjusted per capita expenditure can describe people's purchasing power in consuming goods and services (Prayogo & Sukim, 2021).

In 2019, in the midst of uncertain economic conditions, all components that make up GDP from the expenditure side grew to slow down. One of them is household consumption which grew 4.97% compared to the previous year (Bappenas, 2020). The slowdown in household consumption has a direct effect on adjusted per capita expenditure. So that in 2019 adjusted per capita expenditure grew 2.17%. The situation was exacerbated by entering early 2020, with the Covid-19 disaster causing adjusted per capita spending to contract.

The decline in economic activity which resulted in a decrease in employment and an increase in the Open Unemployment Rate (TPT) was seen based on data on a working population of 128.45 million people, which decreased by 0.31 million people compared to the previous year which reached 128.76 million people, while the TPT rate increased by 1.84 percent compared to the previous year which was at 5.23 percent. Household consumption expenditure (PK-RT) has decreased which has resulted in a decrease in real per capita expenditure (Central Statistics Agency, 2020) so that the dimensions of a decent standard of living are not met. Based on a survey conducted by LIPI, as many as 30.9% of the workforce in Indonesia were laid off, this figure is higher than the percentage of layoffs predicted by the ILO of 10.5% (Ngadi et al., 2020). In addition, there were 31% of workers who experienced a decrease in income of less than 50% and 8.6% of other workers claimed to have experienced a decrease in income of above 50%. 2,830 cooperatives, and 2019 as many as 449.

The highest decrease in adjusted per capita expenditure occurred in East Kalimantan Province, the decrease in adjusted per capita expenditure was inseparable from the decrease in people's purchasing power as a result of the decrease in the average wage by 6.81 percent. In Papua Province, this is illustrated by a decrease in household consumption expenditure of 5.48%. The same thing also happened in the provinces of North Kalimantan, Riau, North Maluku, North Sulawesi, DI Yogyakarta, North Sumatra, South Sumatra, the decline in per capita expenditure was caused by a decrease in people's purchasing power

According to BPS, the level of spending per capita illustrates the level of consumption spending by households. Household consumption expenditure is an important component that can indicate a country's economic condition (Mohd Bakri et al., 2017) . Especially Indonesia, where the contribution of household consumption reaches 57.66 percent of GDP (consumption driven economy). Increased consumption spending has driven economic growth over the last few decades (Mohd Bakri et al., 2017). The level of consumption spending also reflects the standard of living (Choudhury & Agarwal, 2018).

Based on the explanation above, there are things that must be done to improve human development. The factor that allegedly influences human development is Population Dependence. Todaro & Smith (2006: 81) say that the problems experienced by developing countries are not only about rapid population growth but also the high burden of population dependency (Ginting et al., 2020) . According to international organizations such as ITU, World Bank and IMF, technology is a key factor in enhancing human development, especially in developing countries and has great prospects for reducing poverty, increasing productivity and increasing economic growth. Technology is a crucial mediation in bridging all activities Public. The emergence of e-commerce, digital payments, e-learning, e-health and other online platforms has changed people's behavior patterns to become a digital society. Without use it is impossible for economic actors to carry out their functions effectively (Karaman Aksentijevic et al., 2021) Efforts to improve human development in Indonesia do not stop there. This is because there is another crucial thing that must be addressed, namely the low quality of human resources in Indonesia. The low quality of human resources will have an impact on low human development. Schultz (1961) said that human capital is a key factor to increase the productivity of a country. Todaro (2000) argues that human capital can be measured through education (Nurkholis,2016). The quality of human resources can be reflected through the level of education. Based on the background of the problems above, the problem can be formulated as follows:

1. Does population dependence have a significant effect on human development?
2. Does technology have a significant effect on human development?
3. Does education have a significant effect on human development?
4. Does the dependence of population, technology, and education together have significant

influence on human development?

METHOD

This study uses a quantitative approach, because the data obtained is presented in the form of numbers and analyzed using statistical analysis, and using secondary data sourced from the Central Bureau of Statistics (BPS). The collection was carried out by studying the literature from books, research reports, bulletins, scientific journals, and other publications that are relevant to this research. The analysis used in this study is the panel data regression analysis technique using Eviews 10. Regression analysis is an analysis related to the dependence of one variable (dependent variable) on another variable (independent variable) with the aim of analyzing or predicting the mean value (mean).) or the average (population) dependent variable, in terms of known or fixed values (Gujarati & Econometrics, 2004) The data used in this study is panel data. The initial step taken to perform panel data regression analysis is to determine the best estimation model to be used. This can be done through several testing steps. Then this analysis detects symptoms of classical assumptions to find out whether the selected estimation model can be the best estimator or not. The classical assumption test is carried out by applying several tests, namely the normality test, heteroscedasticity test, and multicollinearity test. The final step is to test the hypothesis. The hypothesis testing is carried out using the t test and F test. Then finally an analysis of the coefficient of determination (R is done to find out how much the independent variable is capable of explaining the dependent variable). Panel data regression is a combination of cross section data and time series data, where the same cross section unit is measured at different times. So in other words, panel data is data from the same individuals observed over a certain period of time. If we have T time periods ($t = 1, 2, \dots, T$) and N number of individuals ($i = 1, 2, \dots, N$), then with panel data we will have a total of NT observation units. If the number of time units is the same for each individual, then the data is called a balanced panel. If on the contrary, that is, the number of time units is different for each individual, then it is called an unbalanced panel.

RESULTS AND DISCUSSION

Selection of a suitable model in panel data regression analysis must perform the following tests:

Chow Test

Based on the test results using the Chow test, the probability value of cross section $f = 0.0000 < 0.05$ is less than 0.05. So it can be concluded that the Fixed Effect Model (FEM) was selected in the test, so that H_0 was rejected, H_1 was accepted.

Hausman Test

Based on the results of the Hausman test, the probability value of random cross section $f = 0.0000 < 0.05$ is less than 0.05. Then H_0 is rejected or it can be concluded that the Fixed Effect Model was chosen to be the best model in this study, so there is no need to proceed to the lagrange multiplier test

Classic Assumption Test

Normality Test

Based on the results of the Normality test conducted by the researcher, the calculated Jarque-Bera probability value is 0.422349, this result is greater than 0.05. So that it can be concluded that the residuals are normally distributed.

Multicollinearity Test

Based on the results of the Multicollinearity Test by looking at the Variance Inflation Factor (VIF) value, none is above 10 (VIF values range from 1,154 to 1,526). so it can be concluded that there is no multicollinearity.

Heteroscedasticity Test

Based on the test results, the probability value of the independent variable is greater than 0.05, which means that H0 is accepted, which means that there are no symptoms of heteroscedasticity.

Panel Data Regression Analysis

The Panel Data Regression Equation used by researchers aims to estimate the dependent variable if the independent variable is increased or decreased. Following are the results of the Fixed Effect Model (FEM) panel data regression conducted by the researcher.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	11799.88	16.081	158338	.000
X1	9.290025	1.49854	38639	.287
X2	64.16704	1.22847	543437	.126
X3	-19.99491	1.47431	-561235	.000

Based on the results of data processing, the following results are obtained:
 $Y = 11799.88 + 9.290025 X_1 + 64.16704 X_2 - 19.99491 X_3$. Population, Technology and Education dependency at a constant value of 0 will cause the value of Y (Human Development) as measured by adjusted per capita expenditure to increase to 11799.88. If X1 (Population Dependence) increases by 1%, the value of Y will increase by 9.290025. If X2 (Technology) increases by 1% then the value of Y will increase by 64.16704. If X3 (Education) increases by 1% then the value of Y will decrease by 19.99491

Partial Regression Coefficient Test (T Test)

Based on the results of data processing, it was found that the probability value of the Population, Technology, and Education Dependence variable was <0.05, indicating that the test had significant value. This means that the Population, Technology and Education Dependency variables have an influence on the dependent variable.

This study yielded $df(n-k)$ worth 98 (102-4) where $n = 102$ is the number of observations and $k = 4$ is the number of independent and dependent variables. The value of df_{98} and significant is 0.05, so the t-table value is 1.66055.

Statistical F Test

Based on the test results in the table it can be seen based on the F-count probability value of 0.000000. Calculated with a 95% confidence level, $\alpha=0.05$. The probability value is less than 0.05 so that the three independent variables simultaneously affect the dependent

variable. Table F values are sought by knowing the degrees of freedom (df) 1 and 2. Df 1 with the formula $k-1$. k is the number of variables. Then df_1 is obtained, namely $4-1 = 3$, df_2 with the $n-k$ formula. n is the number of observation samples. So df_2 is obtained, namely $102-4 = 98$ based on the known degrees of freedom, so the results obtained for the F table are 2,697. It can be concluded that F-count (1076,425) is greater than F table (2,798). Which means it shows that this model test is feasible to use in research.

Coefficient of Determination

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.998351	Mean dependent var	824.89
Adjusted R-squared	0.997424	S.D. dependent var	61.671
St. of regression	9.7206	Akaike info criterion	.51019
Sum squared resid	0470.7	Schwarz criterion	.46820
Log likelihood	34.7644	Hannan-Quinn criter.	.89802
F-statistic	76.425	Durbin-Watson stat	1.51831
Prob(F-statistic)	000000		

From the table above it can be seen that the R-squared value is 0.998351. while the value of Adjusted R-squared is 0.997424. R-squared values range from zero to one. Based on the R-squared value of 0.998351, it means that the independent variable is able to explain the dependent variable by 99.83% and the remaining 0.17% is influenced by other factors. Adjusted R-squared value is R squared which has been adjusted to the number of independent variables. In this study, the Adjust R square results were 0.997424, which means that the dependent variable, namely human development, can be explained by the independent variables, namely the dependence of population, technology, and education by 99.74%, while the remaining 0.26% is influenced by other factors outside the model.

DISCUSSION

Population Dependence on Human Development in Indonesia during the Covid-19

Period

The test results using the panel data method show that population dependence has a positive influence on human development as measured by adjusted per capita expenditure .

Based on the results of the t test on the population dependency variable, it produces a t-count of 2.238639 which is greater than the t table of 1.66055 and has a probability value of 0.0287,

which is less than the significant level of 0.05 , which means that the population dependency variable has a significant relationship to the dependent variable. A positive value on the t-count indicates a positive relationship between variables. So that it can be partially concluded that Population Dependence has a significant and positive influence on Human Development in Indonesia during the Covid-19 period.

Population dependence can increase human development as measured by adjusted per capita spending, this is in accordance with the theory of the Life-cycle Hypothesis Model put forward by Franco Modigliani and Brumberg (1980) assuming that there is a link between demographic structure and household spending and saving levels. A person's consumption expenditure depends on age, the older a person is, the level of expenditure increases, but the ability to earn income decreases. So that the unproductive and unproductive age population will become a burden for the productive population. A decrease in the number of dependents in a household who are not yet productive or unproductive will have a higher savings rate due to less spending. This is also said by (Ginting et al., 2020) the increasing dependence of the unproductive and unproductive population in line with the increase in spending allocated by the productive population to meet their needs and themselves. This research is also in line with the results of research (Xu et al., 2022) which says that the dependency burden of the elderly population has a significant effect on household per capita expenditure in China. This research is also in line with the results of a survey conducted by the Central Bureau of Statistics, which shows that in 2021, the dependency ratio of the elderly population in Indonesia will increase by 7.85% from the previous year which was 15.54%, so that this increase is directly proportional to the increase in the needs of the elderly who are the burden of the productive age population.

Technology for Human Development in Indonesia during the Covid-19 Period

The test results using the panel data method show that technology has a positive influence on human development. Based on the results of the t-test on technology (E-commerce) variables, the t-count results are 2.543437 which is greater than the t-table of 1.66055 and has a probability value of 0.0126 which is smaller than the alpha significance of 0.05, which means that the technology variable has a significant relationship.

A positive value on t-count indicates that the relationship between variables is positive. So that it can be partially concluded that technology has had a positive and significant influence on human development in Indonesia during the Covid-19 period.

Kotler and Armstrong (2008), assume that convenience in product selection, brand selection, time efficiency, and payment methods resulting from technological advances, makes people's decisions to consume easier. Technological developments have had a huge impact, especially during the Covid-19 era, where the existence of the Social Distancing policy made people's access more limited so that people turned into a digital society. Technology acts as an intermediary in economic activity, one of which is consumption. For example, there are many people who buy and sell online. The flexibility, efficiency and promotion offered by technological developments can increase spending. This is in line with research (Faizah & Prakoso, 2021) showing that there was a positive and significant influence between technology (E-commerce) and consumption spending in Indonesia during Covid-19. In addition, research (Li et al., 2020) also shows that technology in online shopping, digital payments, obtaining online credit and purchasing financing products on the internet drives an increase in household per capita spending in China.

Education for Human Development in Indonesia during the Covid-19 Period

The test results using the panel data method show that education has a negative influence on human development. Based on the results of the t test on the education variable, the t-count results are 6.561235 which is greater than the t-table of 1.66055.

Probability value of 0.000 is smaller than the alpha significance of 0.05, which means that the education variable has a significant relationship. A negative value on t-count indicates that the relationship between variables is negative. So that it can be partially concluded that education has a negative and significant influence on human development in Indonesia during the Covid-19 period. Based on the t test data processing, the hypothesis that technology has an influence on human development is acceptable. This is inconsistent with the hypothesis which assumes that education has a positive relationship with human development as measured by adjusted per capita expenditure. However, this is in line with research (Christelis et al., 2020)

which shows that education has a significant negative effect on consumption spending in six European Union countries during the Covid-19 period.

This is due to a higher sense of anxiety experienced by highly educated people about the household's financial situation as a result of income shock. So they are more careful and vigilant in spending. In addition, in line with research conducted by (Najmi Illahi, Melti Roza, 2018) , higher education has a significant negative effect on household consumption expenditure in Indonesia.

Population, Technology and Education Dependence on Human Development in Indonesia during the Covid-19 Period

Based on the test results in the test table f, it can be seen that the F-count probability value is 0.000000. Calculated using a 95% confidence level, $\alpha = 0.05$. The probability value is less than 0.05, meaning that the Population Dependence, Technology and Education variables simultaneously affect Human Development in Indonesia.

This result is in line with the People Centered Development Theory or the theory of population-oriented development. Where in this theory describes efforts to improve human development which are explained through a population-responsive policy that talks about the importance of education and technology in enhancing sustainable human development, as well as the importance of empowering the productive age population and the welfare of the non-productive population (elderly) in improving human development .

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the results of research conducted by researchers regarding the influence of population dependency, technology, and education on human development in Indonesia during the Covid-19 period. Producing several conclusions based on the results of tests carried out using the t test, it can be concluded that partially:

1. Population dependence has a significant positive effect on human development in Indonesia during the Covid-19 Period

2. Technology has had a significant positive effect on human development in Indonesia during the Covid-19 period

3. Education had a significant negative effect on human development in Indonesia during the Covid-19 period

4. Simultaneously, dependence on population, technology, and education has had a significant effect on human development in Indonesia during the Covid-19 period

From these results it can be said that the success of the cooperative business is strongly influenced by the variables of member participation, the number of members and capital where the success of the cooperative business is very important to provide welfare to the members of each cooperative.

Suggestion

Human development as measured by adjusted per capita expenditure is very important in the Indonesian economy where the economy is largely contributed by household consumption (consumption driven economy). Besides reducing the burden of dependency, improving technology and education, there are other factors that can enhance human development. Therefore it is hoped that future researchers can use other variables that support human development in order to enrich previous research.

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