

Determinants of Human Development Index (HDI) in City Districts of Central Java Province



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ABSTRACT: This study aims to measure the impact of Regional Original Revenue (PAD), Revenue Sharing Fund (DBH), General Allocation Fund (DAU), Special Allocation Fund (DAK) and Covid 19 Dummy Variables on the Human Development Index (HDI). The data in this study include PAD, DBH, DAU and DAK of Central Java Province in 2016-2023. Identification of the effect of PAD, DBH, DAU and DAK on HDI uses panel data regression analysis with the *Fixed Effect Model* (FEM). This study found that PAD and DBH had no effect on the HDI of Central Java Province. Meanwhile, DAU, DAK and Covid 19 have a significant influence on HDI in Central Java Province. In addition, PAD, DBH, DAU, DAK AND Covid 19 simultaneously have a significant influence on HDI in Central Java Province. The covid dummy variable before covid 19 starting in 2016-2019 is presented using the value 0, so that the period before covid, covid has no effect on HDI. Meanwhile, the period after covid starting in 2020-2023 is presented with the number 1, so that covid has an influence on HDI of 64.970549.

KEYWORDS: PAD, Balancing Fund, Covid Dummy, HDI, Panel Data

1. INTRODUCTION

People in Indonesia still experience social disparities and welfare gaps between regions. This is due to differences in natural conditions, the potential of different natural resources, geographical location and the quality of natural resources that differ between regions. The cause of the welfare gap between regions is the existence of financial and infrastructure gaps. Infrastructure is one of the important things in the development of a region. Infrastructure is one of the inputs in the production process which can increase the marginal productivity of the output. Proper and supportive infrastructure can launch the economic activities of a region by facilitating the production process and mobility of people, goods and services. Meanwhile, the gap in terms of regional financial capacity can be seen from the aspect of the amount of regional income, and the quality of regional spending. Infrastructure and regional finance are aspects that have a real influence on regional economic performance. (Juliarini, 2018).

Human development is a process that enlarges human choices (United Nations Development Programme, 1990). This index was compiled as one of the alternative indicators to assess the success of development carried out by a country in addition to national income per capita, UNDP defines HDI as "a process of enlarging people's choices" or a process that improves aspects of people's lives (Putra and Ulupui, 2015). In addition, this theory exists to improve the previous concept of human resource analysis based on gross domestic product (GRDP) or average per capita income. Meanwhile, according to UNDP (1990), average income does not in detail describe the condition of people in an area. This is because the gap between the rich and poor tends to be high, so that people who are in fact poor are recorded as having high welfare.

The human development paradigm emphasizes two processes, namely the development of human capabilities and how people use their capabilities to be useful in social life and make decisions from several choices where they have all aspects of their lives. The phenomenon of economic development considers the interrelationship between economic, social, cultural, spatial, education and health, including a secure economy, adequate nutrition, environmental protection, personal safety, community security and political security (UNDP, 2018).

The purpose of calculating the Human Development Index (HDI) is to rank global economies by the level of the Human Development Index (HDI) and to compare these rankings based exclusively on Gross Domestic Product (GDP) per capita (PPP US\$). Three possible cases are: First, if the HDI ranking is close to the GDP per capita, it means that there is alignment between available resources and development outcomes. Second, if the HDI ranking is higher than the GDP per capita ranking, it means that the region has made the best use of its potential, a possible way is that development policy is a function of the entire population.

Determinants of Human Development Index (HDI) in City Districts of Central Java Province

Third, if the HDI ranking is lower than the GDP per capita ranking, it means that the best allocation of resources is that their development policies are not functioning as a whole, but in favor of the ruling class (Dasic, et al, 2020).

Human development remains focused on the lives, freedoms and abilities of the people. Success in the advancement of human development should be seen through the lives people live and the skills they possess. Through the HDI analysis, it was concluded that among the 189 countries observed, there were significant differences in Life Expectancy at birth, Average Years of Schooling and Gross National Income (GNI) per capita (Dasic, et al, 2020). The level of human capital development can be characterized by indicators such as HDI, share of population with higher education, ratio of R&D expenditure to GDP (Yumashev, 2020).

The HDI in Central Java Province has increased every year. The Human Development Index of Central Java Province in 2016, 2017, 2018 was 69.98, 70.52, 71.12, respectively. Then the Central Java Provincial Development Index from 2019 to 2023, respectively amounted to 71.73, 71.87, 72.16, 72.79, 73.39. The Human Development Index (HDI) of Central Java Province continues to increase from 2018 to 2023.

The value of PAD of Central Java Province from 2016 to 2019 is fluctuating. The value of PAD 2016-2019 is 22,747, 26,945, 26,766, 28,648 respectively. Furthermore, in 2020 the value of PAD has decreased slightly compared to last year, the value of PAD is 28,056. From 2021 to 2023 the value of PAD has increased every year. The value of PAD in 2021 is 31,611. Then the value of PAD in 2022 amounted to 32,762. Finally, the value of PAD in 2023 amounted to 34,420 (Central Bureau of Statistics).

The Human Development Index can also be used as a benchmark to measure human welfare, which is closely related to fiscal decentralization. Fiscal decentralization is the responsibility of the central government to ensure the allocation of monetary assets for local government financial management (Pratami, 2020). Law Number 32 of 2004 which regulates Regional Government which gives full authority to each region, whether at the provincial, district or city level to regulate and manage their households and little interference from the central government this policy is known as regional autonomy (Putra and Ulupui, 2015).

Expenditures made by the central government to the regions help increase local revenue and reduce regional expenditures and allocate more targeted funds. Local revenues come from local own-source revenues (PAD), transfers to regions (TKD), and other legal local revenues. The transfer and delegation of funding sources to the regions occurs due to differences in financial resources between regions.

Financial Relations between the Central Government and Regional Governments, Transfers to Regions are funds sourced from the APBN and are part of state expenditure allocated and channeled to regions to be managed by regions to fund the implementation of government affairs that fall under regional authority. Transfers to Regions (TKD) consist of the General Allocation Fund, Revenue Sharing Fund, Special Allocation Fund, Special Autonomy Fund, Privilege Fund, and Village Fund (Law No. 1 of 2022). According to the Ministry of Finance, Revenue Sharing Fund, General Allocation Fund and Special Allocation Fund are included in the balancing fund.

According to Law No. 23/2014 on Regional Government, Revenue Sharing Funds (DBH) are funds sourced from certain APBN revenues allocated to producing regions according to certain percentage figures with the aim of reducing imbalances in financial capacity between the central and regional governments. DBH is allocated to finance regional needs in implementing regional autonomy and is used to overcome vertical fiscal imbalances.

Based on Law Number 25 of 2005 concerning financial balance between the Central Government and Regional Governments, it consists of the General Allocation Fund (DAU), Special Allocation Fund (DAK) and Revenue Sharing Fund (DBH). The balancing fund aims to reduce the *imbalance* in financial capacity between regions (*horizontal imbalance*) which only comes from Regional Original Revenue (Putra and Ulupui, 2015). Based on Law Number 32 of 2004, the balancing funds derived from the APBN are funds for regions intended to fund the implementation of decentralization. DAU and DAK are balancing funds whose allocation emphasizes aspects of equity and justice in line with the implementation of government affairs (Putra and Ulupui, 2015).

Based on the description of the situation of Indonesia, especially Central Java Province above and previous research, this study is expected to find out how the effect of fiscal decentralization policies consisting of PAD and Balance Funds on the HDI of Central Java Province when before the pandemic and after the COVID 19 pandemic.

2. LITERATURE REVIEW

In some countries with low human development, inequality in the HDI is approximately as large, or perhaps even larger, than income inequality. This is strongly influenced by the massive inequalities in the two education indicators used and the use of geometric averages to average across components that heavily penalize such inequalities (Harttgen and Klasen, 2011). An illustrative sample of 13 low- and middle-income countries and two rich countries shows that within-country human development inequality is indeed high, especially in Sub-Saharan Africa. Inequality in income is generally higher than inequality in education and life expectancy. The results also show that the level of inequality is only moderately related to the level of human development

Determinants of Human Development Index (HDI) in City Districts of Central Java Province

itself. The hypothetical rankings of the richest and the poorest on the global HDI scale results in large differences in ranking positions of more than 100 in medium human development countries (Grimm, et al., 2008). Research by Hou, et al (2014) shows that HDIF and HDI tend to converge for rich countries and diverge for poor countries, especially those with low HDI rankings. The diverse patterns can be attributed to the initial level of development and wealth transfer to non-income dimensions. Human development index (HDI) has an influence on the rate of economic growth in Bengkulu Province (Supianti, 2023).

In general, decentralization funds, economic growth, public spending, and a decrease in the number of poor people in autonomous regions have a significant positive effect on HDI, thus increasing decentralization funds as an equalization grant to autonomous regions can be used to finance regional spending, especially public social spending in the fields of education and health increases from year to year. Fiscal decentralization policy plays an important role in supporting the success of Indonesia's human development (Soejoto, et al, 2015). Local revenue and the General Allocation Fund have a positive and significant effect on local expenditure for districts/cities in Bali Province. The effect of local revenue on local expenditure is more dominant than the general allocation fund. It can be concluded that fiscal illusion does not occur in district / city spending in Bali Province. Fiscal decentralization has a positive and significant effect on economic growth and human development index for districts/cities in Bali Province. Fiscal Decentralization has a positive and significant effect on Economic Growth and Human Development (Jati, et al, 2017). The effect of fiscal decentralization on HDI through panel data regression shows that the degree of fiscal decentralization has a positive and significant effect on the Human Development Index (HDI) (Malau, 2022).

The study provides several key findings first, the existence of a comprehensively justified significant relationship between fiscal decentralization, economic growth, and human development in different directions. In particular, the impact of fiscal decentralization on economic growth is statistically negative, but the impact is positive in terms of human development. Second, the human development index can promote economic growth through statistical evidence from the study sample, but this result is only consistent in the case of expenditure-based decentralization. Third, economic growth does not increase the efficiency of fiscal decentralization, but it does decrease the human development index (Thanh and Thanh, 2022).

Based on research conducted by Handayani, et al (2023) states that the degree of fiscal decentralization has an effect, but not significant, and shows a negative relationship to the human development index. This shows that if there is an increase in the degree of fiscal decentralization, it will reduce the human development index. Research conducted by Suhyanto, et al (2020) suggests that the results of the analysis have shown that all transfer funds have an effect on increasing HDI, as well as local revenue and village funds. Regional revenues with the greatest total effect on HDI in order are DAU, PAD, and DAK.

According to Najmi Research (2019) states that the independent variables of Economic Growth and PAD simultaneously affect the dependent variable (HDI). Regional Original Revenue (PAD) has a significant positive effect on the Human Development Index. So it can be interpreted that high local revenue will increase the regional Human Development Index in districts / cities in Aceh province. Research conducted by Melgiana and Riasning (2020) suggests that Regional Original Revenue (PAD) has a significant positive effect on the Human Development Index (HDI).

According to Melgiana and Riasning (2020) stated that the General Allocation Fund/DAU has no effect on the Human Development Index/IPM. According to research conducted by Kurniasari (2021) states that the general allocation fund directly or indirectly has an influence on the human development index. Based on research conducted by Patadang, et al (2021) stated that the results of the General Allocation Fund research did not significantly affect the Human Development Index. Further research, conducted by Rusydi, et al (2022), suggests that the general allocation fund has an insignificant effect on the human development index in the districts / cities of South Sulawesi province.

According to research from de Fretes (2017), the ratio of DAU to capital expenditure has a significant negative effect on the human development index in the Yapen Islands Regency. In other words, the greater the ability of DAU to finance capital expenditure, the lower the human development index. The DAU variable is the only variable that has a negative effect on HDI. Based on research by Riviando, et al (2019) the results showed that the ability of local revenue, general allocation funds and special allocation funds in explaining the human development index through capital expenditure was 14.4% while the remaining 85.6% was influenced by other factors outside this research model.

Based on research conducted by Wulandari, et al (2018), it states that the results of the regression analysis of Revenue Sharing Funds are directly influenced by the Human Development Index. The results of the regression analysis of Revenue Sharing Funds are variables that affect the Human Development Index through Capital Expenditure. According to research conducted by Kurniasari (2021) states that revenue sharing funds directly or indirectly have no effect on the human development index. Based on research conducted by Patadang, et al (2021) stated that the results of the Revenue Sharing Fund research had a significant effect on the Human Development Index. Further research, conducted by Rusydi, et al (2022) suggests that revenue sharing funds have a negative and significant effect on the human development index in the districts / cities of South Sulawesi province.

Determinants of Human Development Index (HDI) in City Districts of Central Java Province

Based on research conducted by Harahap (2011) suggests that simultaneously DAU, DAK and DBH affect HDI. Partially DAK has no effect on HDI. According to research from Williantara and Budiasih (2016) states that this study shows that the Special Allocation Fund shows results that have a negative effect on HDI. This indicates that the greater the DAK in financing capital expenditure, the lower the HDI achievement. According to research conducted by Kurniasari (2021) states that the special allocation fund has no influence on the human development index but has an indirect influence through capital expenditure on the human development index. Based on research conducted by Patadang, et al (2021), it states that the results of the Special Allocation Fund research have no significant effect on the Human Development Index. Further research, conducted by Rusydi, et al (2022), suggests that the Special Allocation Fund has a significant effect on the human development index in the districts / cities of South Sulawesi province.

3. RESEARCH METHODS

In this study the authors used a quantitative research approach. The quantitative approach is an approach that emphasizes theory testing through measuring research variables with numbers and analyzing data using statistical procedures. Quantitative research is used to solve and limit problems to be measurable. Quantitative approach. The quantitative approach is also called the traditional method, because this method has long been used and many have used this method in research (Sugiyono, 2018).

The objects used in this study are Regional Original Revenue (PAD), General Allocation Fund (DAU), Special Allocation Fund (DAK), Revenue Sharing Fund (DBH) and dummy variables covid to Human Development Index (HDI) and potential PAD. This study takes the object 4 years before and 4 years after the covid 19 pandemic hit Indonesia, namely 2016-2019 before the pandemic and 2020-2023 after the pandemic. Then the object of the place taken is the City or Regency of Central Java Province in 2016-2023.

The data used is quantitative data, where the data is obtained from third parties. Data on Regional Original Revenue (PAD), General Allocation Fund (DAU), Special Allocation Fund (DAK) and Revenue Sharing Fund (DBH) come from the Directorate General of Taxes (DGT). Meanwhile, the Human Development Index (HDI) data comes from the Central Statistics Agency (BPS).

The dependent variable is the variable that is influenced or that becomes the result of the independent variable (Sugiyono, 2016). The dependent variable (Y) in this study is the Human Development Index (HDI). Independent variables are variables that affect or cause changes or the existence of dependent variables (Sugiyono, 2016). Variables of Regional Original Revenue (X1), Revenue Sharing Fund (X2), General Allocation Fund (X3), Special Allocation Fund (X4), and Covid Dummy Variable (X5).

Furthermore, to answer the determinants of HDI in Central Java using panel data regression or pooled data and using dummy variables to determine the effect of independent variables on the dependent variable. Then to find out the development of the Regency or City of Central Java Province, it is calculated using a matrix of potential local revenue. The panel data regression equation model is as follows:

$$\text{HDI} = \beta_1 + \beta_2 \text{ PAD} + \beta_3 \text{ DBH} + \beta_4 \text{ DAU} + \beta_5 \text{ DAK} + \beta_6 \text{ D.Cov} + u_{it}$$

Where:

D.Cov 2016-2019 = 0

D.Cov 2020-2023 = 1

The Common Effect Model (CEM) accounts for differences in intercept and slope coefficients over time and individuals. It combines time series and cross section data to perform regression. Ordinary Least Square (OLS) regression is used to estimate the results (Hutagalung, et al., 2022).

The Fixed Effect Model (FEM) assumes that the slope coefficient is constant, but the intercept is not constant. The method that can be used to estimate the model in FEM is Least Square Dummy Variable (LSDV). The LSDV method is estimated by including dummy variables used to explain differences in intercept values due to differences in unit values (Gujarati, 2004).

Random Effect Model (REM) is used to solve the problems derived from the fixed effect model. In panel data, the fixed effect model with dummy variables raises the problem of degrees of freedom missing from the model. Then, dummy variables can obscure the original model. Thus, the random effect model is used to estimate (Hutagalung, et al, 2022). In this study, the model chosen was the *Fixed Effect Model* (FEM).

4. RESULTS AND DISCUSSION

Central Java Province is located at 5040' - 8030' South latitude and 108030' - 111030' East longitude, with an area of 3,254,412 ha or 25.04% of Java Island. Administratively, it is bordered by the Indian Ocean and the Special Region of Yogyakarta to the South, West Java Province to the West, East Java Province to the East, and the Java Sea to the North. Central Java Province consists of 29 regencies and 6 cities, 573 sub-districts covering 7,809 villages and 753 urban villages.

Determinants of Human Development Index (HDI) in City Districts of Central Java Province

The population of Central Java Province in 2016 was 34,019,095 people. The population of Central Java Province in 2017 was 34,257,865 people. In 2018 the population of Central Java Province was 34,490,835 people. In 2019 the total population in Central Java Province was 34,718,204 people. The total population in Central Java Province in 2020 was 36,516,035 people. The total population in Central Java Province in 2021 is 36,742,501 people. In 2022 the population of Central Java Province is 37,032,410 people. In 2023 the population in Central Java Province is 37,540,962 people.

This research uses a quantitative research approach and the data used is secondary data. This research will discuss the determinants of HDI in Central Java Province before and after covid. The data analysis used in this study is panel data regression analysis.

The selection of the best model in panel data regression goes through three stages, namely the chow test, hausman test and lagrange multiplier test. The *chow* test is used to determine which panel data regression model is better between CEM or FEM. If the probability value of the cross section F and cross section chi-square > 0.05 then, the regression model chosen is the Common Effect Model (CEM). If the probability value of the cross section F and cross section chi-square < 0.05 then, the regression model chosen is the Fixed Effect Model (FEM).

The Hausman test is used to compare between the Fixed Effect Model (FEM) and the Random Effect Model (REM). If the probability value of the random cross section > 0.05 then, the regression model chosen is the Random Effect Model (REM). If the probability value of the random cross section < 0.05 then, the regression model chosen is the Fixed Effect Model (FEM).

The Lagrange Multiplier test is used to determine whether the Random Effect Model is better than the Common Effect Model. If the Breusch-pangan cross section value > 0.05 then, the selected model is the Common Effect Model (CEM). If the Breusch-food cross section value < 0.05 then, the selected model is the Random Effect Model (REM) (Hutagalung and Darnius, 2022).

Table 1. Chow test

Cross-section Chi-square	1038.331931	34	0.0000
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Chi-Square probability 0.000 < 0.05, then the selected model is **Fixed Effects Model (FEM)**.

Table 2. Hausman Test

Cross-section random	105.203016	5	0.0000
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Cross-section random probability 0.000 < 0.05, then the selected model is **Fixed Effects Model (FEM)**.

Table 3. Lagrange Multiplier (LM) Test

—	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	575.6501 (0.0000)	93.72155 (0.0000)	669.3717 (0.0000)

Cross-section Breusch-Pagan 0.000 < 0.05, it can be concluded that the best model chosen is the **Fixed Effects Model (FEM)**.

Furthermore, after conducting the best model selection test, namely interpreting the panel data regression equation. The regression equation in this study is $HDI = 63.18 - 3.20*DBH + 6.71*DAU + 6.98*DAK - 2.70*PAD + 1.79*DCOV + [CX=F]$. The equation shows that the constant value of 63.18 means that without the independent variables DBH, DAU, DAK, PAD, DCOV, the HDI variable will increase by 6318%. The beta coefficient value of the DBH variable is 3.20, if the value of other variables is constant and the DBH variable increases by 1%, the HDI variable will increase by 320%. The beta coefficient value of the DAU variable is 6.71, if the value of other variables is constant and the DAU variable has increased by 1%, the HDI variable has increased by 671%. The beta coefficient value of the DAK variable is 6.98, if the value of other variables is constant and the DAK variable has increased by 1%, the HDI variable has increased by 698%. The beta coefficient value of the PAD variable is -2.70, if the value of other variables is constant and the DBH variable has increased by 1%, the HDI variable has decreased by 270%. The beta coefficient value of the DCOV variable is 1.79, if the value of other variables is constant and the DCOV variable has increased by 1%, the HDI variable has increased by 179%.

Next is significance testing by conducting t, f and r squared tests. The t test is used to see the significance of each independent variable on the dependent variable. While the F test is used to see the significance of the independent variable on

Determinants of Human Development Index (HDI) in City Districts of Central Java Province

the dependent variable simultaneously. The R test² is used to see the percentage of independent variables in influencing the dependent variable.

Table 4. The t-test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	63.17407	1.081579	58.40911	0.0000
DBH	-3.20E-12	2.42E-12	-1.319483	0.1883
DAU	6.71E-12	1.05E-12	6.411608	0.0000
DAK	6.98E-12	6.93E-13	10.07232	0.0000
PAD	-2.70E-13	3.50E-13	-0.770555	0.4417
DCOV	1.796479	0.103715	17.32136	0.0000

Based on the results of the t test, it can be seen that the DBH variable obtained a t-statistic value of $-1.319483 < t\text{-table } 1.650434$ and a sig value of $0.1883 > 0.05$, then DBH has no effect on HDI. The DAU variable obtained a t-statistic value of $6.411608 > 1.650434$ and a sig value of $0.0000 < 0.05$, then DAU has an effect on HDI. The DAK variable obtained a t-statistic value of $10.07232 > 1.650434$ and a sig value of $0.0000 < 0.05$, then DAK has an effect on HDI. The PAD variable obtained a t-statistic value of $-0.770555 < 1.650434$ and a sig value of $0.4417 > 0.05$, then PAD has no effect on HDI. DCOV variable obtained t-statistic value $17.32136 > 11.650434$ and sig value $0.000 < 0.05$, then DCOV has an effect on HDI.

The DCOV variable, when viewed through the coefficient, has a value of 1.796479 and a coefficient of 63.17407. The covid dummy variable before covid starting in 2016-2019 is presented using the value 0, so that the period before covid, covid has no effect on HDI. Meanwhile, the period after covid starting in 2020-2023 is presented with the number 1, so that covid has an influence on HDI of 64.970549.

Table 5. F test

F-statistic	470.5631
Prob(F-statistic)	0.000000

Based on the results of the F test, it can be seen that the F-statistic value $470.4085 > F\text{-table } 2.25$ and sig value $0.000000 < 0.05$, it can be concluded that DBH, DAU, DAK, PAD and DCOV simultaneously have a significant effect on HDI.

Table 6. R test²

R-squared	0.987304
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The adjusted R-squared value is 0.987304 or 98.7304%. The coefficient of determination shows that the independent variables consisting of DBH, DAU, DAK, PAD, DCOV are able to explain the HDI variable by 98.7304%, while the remaining 1.2696% is explained by other variables outside this research model.

5. CONCLUSION

Based on the results of panel data regression analysis, this study concludes that DBH has no significant effect on HDI. PAD has no significant effect on HDI. While the DAK, DAU and Covid 19 variables have a significant effect on HDI. Based on the F test, it is concluded that DBH, DAU, DAK, PAD and Covid 19 simultaneously have a significant effect on the HDI of Central Java Province in 2016-2023. The covid dummy variable before covid 19 starting in 2016-2019 is presented using the value 0, so that the period before covid, covid has no effect on HDI. Meanwhile, the period after covid starting in 2020-2023 is presented with the number 1, so that covid has an influence on HDI of 64.970549.

6. SUGGESTION

The suggestions in this study are aimed at the Regional Government of the City District of Central Java Province. The increase in HDI can be seen from the increase in Human Resources. If the quality of human resources is high, the HDI will also increase. Improving the quality of human resources can be through education, health where the funds to support come from the Balance Fund. Optimizing PAD and Balance Funds is expected to improve the quality of human resources and HDI.

Suggestions for future researchers are to add variables that have not been included in this study. The addition of GDP or GRDP variables is needed to see the growth of HDI in each city district of Central Java Province.

Determinants of Human Development Index (HDI) in City Districts of Central Java Province

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Determinants of Human Development Index (HDI) in City Districts of Central Java Province

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