

Optimizing the Distribution of Sub District Infrastructure Supporting Capacity on Economic Growth in West Halmahera District

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ABSTRACT

Basic fundamentals of economic development starting from the distribution of road infrastructure, clean water, electricity and telecommunications networks have an effect on economic growth in West Halmahera Regency. Does the distribution of infrastructure affect Economic Inequality in West Halmahera Regency. Another cause is the geographical condition of the districts in North Maluku, which are separated from islands. This requires a large amount of time and budget so that districts / cities can carry out road infrastructure development more optimally. the level of income inequality in districts in West Halmahera Regency in 2017 was 1.055. Based on the criteria that have been determined in the Williamson index analysis, it can be said that the inequality in West Halmahera Regency, Jailolo District in 2017 is relatively small. It can be seen in the table above that from 2017, the value of inequality has not changed, namely 1.055 is still relatively small.

Keywords: Optimizing, Carrying capacity, Basic infrastructure

INTRODUCTION

Optimizing the number of distributions of infrastructure networks is the most important part of development, the fundamentals of the regional economy can be measured if the infrastructure network is adequate in terms of road construction, clean water, telecommunications, and electricity. If all are fulfilled in this case, it will be able to facilitate development in terms of government services both in the regions and between provinces. The development of economic growth is an indicator measuring the success of economic development in a country. According to Sukirno (2000), economic development is a business process in increasing the income or income per capita of a country by processing economic potential into real forms. This is done through five important stages, namely investment, utilization of technology, increasing knowledge and skill management, as well as increasing organizational skills. By using these five stages, economic development can run and grow well. This per capita income is the average income of the population in an area.

West Halmahera Regency as an autonomous government continues to strive to mobilize various economic potentials in its region. This is done so that economic actors can participate and actively participate in driving the economy so that they can contribute to economic growth in West Halmahera Regency. Contributions in various economic sectors can be seen in the GRDP table in West Halmahera District as follows. The GRDP value of West Halmahera Regency in 2018 increased. This increase was influenced by

increased production in all business fields that were free from the effects of inflation. The GRDP value of West Halmahera Regency at constant prices in 2010 reached 2.02 billion rupiah. This figure is up from 21.66 billion rupiah in 2017. This shows that during 2018 there was an economic growth of 29.88 percent, higher than the economic growth in the previous year which reached 4.5 percent.

The highest economic growth was achieved by the construction business sector, amounting to 3.78 percent. One of the causes is the construction of construction, home industry, and road infrastructure. Of the 17 existing economic business fields, all experienced positive growth. Nine business fields experienced positive growth of six to twelve percent. Meanwhile, seven other business fields recorded positive growth but at a lower rate, namely less than six percent.

The nine business fields that experienced a positive growth of six to twelve percent were, among others: the business field of Providing Accommodation and Food and Drinking 3.10 percent, the wholesale and retail business fields; Repair of Cars and Motorbikes by 1.25 percent, Mining and Excavation business fields by 1.01 percent, Transportation and Warehousing business fields 1.67 percent, Electricity and Water Supply business fields by 1.19 percent, financial services and insurance business fields 0.05 percent, the Education Services business field was 0.50 percent, the Government Administration, Defense and Social Security business field was 0.49 percent, and the Corporate Service business field was 0.24 percent. Meanwhile, the seven business fields that experienced positive growth of less than 6 (six) percent were the Health Services and Social Activities business field of 2.72 percent, the Real Estate business field was 0.51 percent, the Other Services business field was 0.33 percent, Information and Communication was recorded at 3.28 percent, the Agriculture, Forestry and Fisheries business field was 2.42 percent, the Water Supply business field, Waste Management, Waste and Recycling was 0.15 percent, and the Processing Industry business field was 1.04 percent .

Transportation infrastructure, especially roads, is a very important indicator for investors to invest in an area. In accordance with the function of infrastructure as a stimulus for economic growth, investors will evaluate the existence of transportation infrastructure from two sides, namely: Investors will be interested in investing if adequate transportation infrastructure is available (*investment follows the ship*); and Investors will be interested in increasing their investment if transportation infrastructure development continues to be developed in line with economic developments (*ship follows the investment*) and infrastructure limitations cause existing companies to be discouraged from expanding and new investors are also not interested in investing which in turn will affect the product. Gross Domestic Product (PDRB) / *Gross Regional Domestic Product* which will affect economic growth.

The electricity produced in West Halmahera Regency always increases every year. In 2015, electricity production was 11.33 million kWh. The electricity product has almost doubled compared to the electricity production in 2012, 6.31 million kWh. In 2016, electricity has been operating 24 hours in the district capital, namely Maba District. Other sub-districts still have limited access to electricity, generally electricity only operates for 12 hours.

Table 1. Number of Generating Units, Installed Power, Capability and Electricity Production in West Halmahera Regency, 2011–2018.

Years	Units	Number of Installed Power (Kw)	Capable Power (Kw)	Generated (Kwh)	Used by Alone (Kwh)	Delivered (Kwh)
2011	19	4170	2496	-	-	-
2012	21	-	-	6310 682	55378	6225304
2013	22	5920	3221	7656 239	-	7656239
2014	22	7960	3826	158349	9915705	9757358
2015	22	6180	3990	11331458	11266444	65014
2016	22	6198	3990	11331458	11266220	65014
2017	23	6190	3120	11331458	12266433	65214
2018	24	6101	3140	11331458	13355581	68714

Source: BPS West Halmahera, 2019

Infrastructure electricity is an energy that is paramount in the development of human life modern, electricity is used for various activities both in big cities and in rural areas. The need for electricity from time to time increases along with the social growth of society. This category includes the generation, delivery and distribution of electricity to consumers, whether organized by the State Electricity Company or by private companies (Non-PLN), such as electricity generation by companies owned by the Regional Government, and electricity operated by the private sector (individuals or companies) with the aim of being sold. Electricity generated or produced includes electricity that is sold, used alone, lost in transmission and distribution.

Clean water in West Halmahera district is very important in order to improve the economy of the people in a region. Infrastructure is not only used by households but also by the private sector, even the government. Therefore, the importance of economic infrastructure is expected to bring prosperity and accelerate economic growth so that economic activities can run more efficiently.

Ample infrastructure, such as access to roads, electricity, and clean water is needed to facilitate economic activities which in turn will affect economic growth in the region. Areas that have adequate infrastructure are able to attract investors to invest in their regions and are able to develop rapidly compared to areas that have minimal infrastructure (Wahyuni, 2009).

Inequality in infrastructure must be carried out on a massive scale and must be aligned with the economic progress that has been achieved and which is to be realized in the future. From the description above, the authors are interested in doing research on "Dosebran by district infrastructure development and inequality correlates to the acceleration of growth in West Halmahera Economist".

From the description of the background above, the authors formulate the following main problems: Does the distribution of road infrastructure and distribution of infrastructure affect economic growth and economic inequality in West Halmahera Regency.

The Theory of Economic Growth

According to Tarigan (2012), economic growth is an increase in the overall income of the community that occurs in an area, the increase in opinion is an increase in all *value added* that occurs in that region. Regional income represents remuneration for production factors operating in the area (land, capital, labor, and technology), this means that it can describe the prosperity of the area. The prosperity of a region is not only determined by the amount of added value created in the region, but also by how *Transfer Payment*, namely the share of income that flows out of the region or receives funds from outside the region.

Economic growth is also often defined as a process of increasing production capacity in an economy continuously or continuously over time so as to produce a higher level of national income and output (Todaro and Smith, 2006). According to Amalia (2007), there are three main components in determining economic growth in each country, namely:

- a. Capital Accumulation.
- b. Population Growth
- c. Technological Progress

Technological advances are caused by new ways of doing traditional jobs. There are three classifications of technological progress, namely:

1. Neutral technological progress, occurs when the level of output achieved is higher at the same quantity and input combinations.
2. Technological advances that are *labor saving* or *capital saving*, that is, a higher level of output can be achieved with the same amount of labor or capital input.
3. Technological advances that increase capital occur when the use of technology

Neoclassical Growth Theory

Neoclassical growth theory developed by Robert M. Solow and TW Swan (1956) and is a refinement of the previous classical theory. Neoclassical growth theory is better known as the Solow growth model (*Solow growth model*). This model uses elements of population growth, capital accumulation, technological progress, and the amount of *output* interacting (Tarigan, 2014). This view is based on classical analysis, that the economy will continue to experience *full* employment and capital equipment capacity will be fully utilized at all times.

In addition, Robert M. Solow (1987) developed a production function model that allows for a substitution between capital (K) and labor (L). The production function has *constant returns to scale*, that is, if there is an increase in the same percentage in all production factors, it will cause an increase in output at the same percentage. This means that if there is an increase in capital and labor by 10 percent, the output will increase by 10 percent (Mankiw, 2007).

New Growth Theory New Growth Theory

This theory provides a theoretical framework for analyzing endogenous growth, economic growth is the result of the economic system. According to Romer (1994) in Todaro (2004), this theory assumes that economic growth is determined more by the production system, not from outside the system. Technological progress is endogenous, growth is part of the decisions of economic actors to invest in knowledge. The role of capital is bigger than just a share of income if the growing capital is not only physical capital but also human capital. In endogenous growth theory, the role of investment in

physical capital and human capital also determines long-term economic growth. Savings and investment can promote sustainable economic growth (Mankiw, 2000).

Rostow's Economic Growth Theory

According to Rostow in Todaro (2004), it links the development stages model with government spending, so that it is then distinguished between the initial stage, the intermediate stage, and the advanced stage. In the early stages of economic development, the amount of investment issued by the government for development is very dominant and in large numbers, this is because at this stage the government must provide infrastructure, Todaro (2004) said that in economic development, government activities shift from providing facilities and infrastructure to expenses of a social nature such as, old age welfare programs, community service programs and so on.

Road Infrastructure

According to Law No.38 of 2004 concerning Roads, roads are land transportation infrastructure covering all parts of the road, including the construction of accessories and equipment intended for traffic, which are on the ground and or water and above the water surface, except for roads. trains, lorries, and cable roads. Road infrastructure is the infrastructure that is needed for land transportation. The function of the road is to connect one area to another. Roads are the infrastructure that plays the most important role in the national economy. The amount of economic mobility in 2002 through the national and provincial road networks averagely reached around 201 million vehicles-kilometers per day (Bappenas, 2003). This does not include economic mobility using the district road network of 240 thousand kilometers and the village road network. This means that road infrastructure contributes significantly to the national economy.

Electricity Infrastructure

Electricity infrastructure is something that is not commonly heard in the ears of the general public, in every region they must use electricity for household activities, companies and other activities, all people in the world are very dependent and always use electricity. Maqin (2011) states that electricity infrastructure has a significant effect on economic growth and shows that the use of electricity infrastructure, especially in the industrial sector, is very important in increasing economic growth, because electricity is needed as a major factor in supporting production process activities in the manufacturing sector. The increase in the consumption of electric energy is inseparable from the continued improvement in economic growth and the increasing population.

Clean Water Infrastructure

Water is a basic human need whose existence is guaranteed by the constitution, namely article 33 of the 1945 Constitution paragraph 3, which reads "Earth, water and natural resources contained therein are controlled by the state and used maximally for the prosperity of the people". In article 5, which states "The state guarantees the right of every person to get water for basic daily needs to meet their healthy, clean and productive needs". The content of the verse explicitly shows that to be able to get clean water is the right of everyone, a citizen of a country. No exception for Indonesian citizens. This perspective of water as a basic human need is emphasized again at the global level. November 2002, the United Nations Committee on Economic, Social and Cultural Rights declared that access to water is a *fundamental right*. There it states that water is a social and cultural object, not only an economic commodity. This committee also emphasized that 145 countries

Telecommunication Network Infrastructure

Increasing the number of telecommunication subscribers and tele density must of course be supported by adequate infrastructure. Telecommunications infrastructure investment made by telecommunications operators can be seen from the financial side (*Capital Expenditure / Capex*) of each telecommunications operator as well as from the physical side of the infrastructure itself. However, at present, especially for cellular networks, Capex no longer reflects the total magnitude of telecommunications infrastructure provided by operators.

The Effect of Road Infrastructure on Economic Growth

Transportation infrastructure, especially roads, is a very important indicator for investors to invest in an area. In accordance with the function of infrastructure as a stimulus for economic growth, investors will evaluate the existence of transportation infrastructure from two sides, namely: Investors will be interested in investing if adequate transportation infrastructure is available (*investment follows the ship*); and Investors will be interested in increasing their investment if transportation infrastructure development continues to be developed in line with economic developments (*ship follows the investment*). Road infrastructure is the infrastructure that is needed for land transportation. The function of the road is to connect one area to another. Roads are the infrastructure that plays the most important role in the national economy. The amount of economic mobility in 2002 through the national and provincial road networks averagely reached around 201 million vehicles-kilometers per day (Bappenas, 2003).

The Effect of Electricity Infrastructure on Economic Growth

Maqin (2011) says that electricity infrastructure has a significant effect on economic growth and shows that the use of electricity infrastructure, especially in the industrial sector, is very important in increasing economic growth, because electricity is needed as the main factor in supporting process activities. production in the manufacturing sector. Electricity infrastructure is something that is not commonly heard in the ears of the general public. Every region must use electricity for household activities, companies and other activities, all people in the world are very dependent and always use electricity. Just imagine if in the midst of society there is no electricity, it will hinder the activities of every community both activities inside the home and outside the home, as we know in this modern era all depend on electricity why not to cook rice, iron clothes, charge cellphones, laptops and the like, the majority are dependent on electricity.

The Influence of Clean Water Infrastructure on Economic Growth

Water is a basic human need whose existence is guaranteed by the constitution, namely article 33 of the 1945 Constitution paragraph 3, which reads "Earth, water and natural resources contained therein are controlled by the state and are used maximally for the prosperity of the people". This Constitution clearly demonstrates and constitutes a social contract between the Government and its citizens. The guarantee of the constitution is further emphasized in Article 5 of the Law on Water Resources, which states "The State guarantees the right of everyone to get water for basic daily needs to meet their healthy, clean and productive needs". The content of the verse explicitly shows that to be able to get clean water is the right of everyone, a citizen of a country.

Rostow connects the development stages model with government spending, so that then distinguishes between the initial stage, the intermediate stage, and the advanced stage. In the early stages of economic development, the amount of investment issued by the government for development is very dominant and in large amounts, this is because at

this stage the government must provide infrastructure, such as education, health, transportation infrastructure, and so on. In the second stage, the role of government spending in development has begun to be shifted due to investments made by the private sector, however at this stage the government still has a fairly large role in development, this is because if the role of the private sector is allowed to dominate development it will have an impact on the emergence of power. monopoly and market failure, causing the government to provide public goods and services in larger quantities.

The results of Winanda (2016) study state that the variable that has the greatest influence on economic growth is electrical energy infrastructure. Clean water infrastructure has a second major influence after electricity and lastly is road length infrastructure which has an influence on economic growth, this is in line with Harry's research (2015) which states that water infrastructure has a positive effect on increasing economic growth, meaning that the positive variable has a positive effect on economic growth. meaning that the higher the value of the water variable, it will be followed by an increase in the rate of economic growth. whereas this is not in line with Nanda's research (2015), which states that water infrastructure does not have a significant effect but has a positive effect on economic growth but this makes local governments increasingly provide clean water to increase economic growth in the area, based on this explanation, Hypothesis formulated by

H₃: Clean water infrastructure affects Economic Growth.

The Influence of Telecommunication Network Infrastructure on Economic Growth

The theory of new growth, Rostow explained that countries that are developing or which are still underdeveloped, are generally still in the traditional society stage or the second stage, namely the stage of preparing the basic take-off framework. Soon, it remains only to formulate a series of development rules to take off, they will immediately move towards a process of rapid and sustainable economic growth.

Telecommunication Network Infrastructure today is something that cannot be separated from everyday life, it has even become a necessity. The telecommunication *services Telecommunications* benefits of have been greatly felt by many parties, including businesspeople, housewives, even children have become an inseparable need from the life of every individual, especially in the era of information and technology that is rapidly developing at this time. this.

The results of Danny's (2012) study state that infrastructure such as telephones also has a positive and significant effect on GDP per capita. If there is an addition to each telephone infrastructure, it will increase the GRDP per capita with the Ceteris Paribus assumption. This is in line with the research conducted by Datta and Agarwal (2004) which empirically examined the role of telecommunications infrastructure on economic growth.

RESEARCH METHOD

Research Sites

This research was conducted in West Halmahera. This location is used as a research location because West Halmahera Regency is an area that has abundant natural resource potential to support the economy, this can be seen from the economic growth data in 2018 which reached 6.38 which is supported by agriculture, forestry and

quarrying / mining. sand and other sectors. Therefore, adequate infrastructure is needed so that it can accelerate economic growth.

Types and Sources of Data

The data used in this study are secondary data taken from the Central Statistics Agency (BPS) of West Halmahera Regency and other literature related to this study, while the data used is the economic growth data of West Halmahera Regency on the basis of constant prices from 2005-2017, data on the number of road lengths, the amount of electricity consumption, the amount of clean water distributed and the telecommunication network in West Halmahera Regency from 2014-2018.

Multicollinearity Test

Test aims to test whether the regression model found a correlation between independent variables (independent). A good regression model should not have a correlation between the independent variables. To detect multicollinearity by making a hypothesis: Tolerance value < 0.10 or $VIF > 10$, multicollinearity occurs. Meanwhile, Tolerance value > 0.10 or $VIF < 10$, multicollinearity did not occur (Ghozali, 2016).

Heteroscedasticity Test

The heteroscedasticity test aims to test whether there is an inequality of variance from one residual observation to another. If prob significant abilities each independent variable > 0.05 , it can be concluded not occur heteroscedasticity in the regression model (Ghozali, 2016). This test is carried out by regressing the independent variable to its residual absolute value.

Autocorrelation Test

This test aims to test whether in the linear regression model there is a correlation between confounding error in period t and confounding error in period $t-1$ (previous). If there is a correlation, it is called an autocorrelation problem. Autocorrelation occurs because successive observations over time are related to one another. A good regression model is a regression that is free from autocorrelation. The autocorrelation test in this study uses the Durbin Watson Test (Ghozali, 2016).

Multiple Linear Regression Analysis

Multiple linear regression method to analyze the effect of the independent variable on the dependent variable. Multiple regression analysis is intended to examine the effect of several independent variables on one dependent variable. To test the first hypothesis, namely to determine the effect of infrastructure on economic growth. With multiple linear regression equation model (Gujarat, 1995). and using the Williamson Index in the regional approach to see the proximity interaction of basic infrastructure changes.

Hypothesis

Test The coefficient of determination (R^2)

The coefficient of determination (R^2) is a test to measure how far the model's ability to explain variations in the dependent variable. The coefficient of determination is between zero and one R value² small means showing the ability of independent variables in explaining the variation is very limited dependent variables. (Ghozali, 2016).

F Test

To determine the extent to which the independent variables (Road Infrastructure, Clean Water, Electricity and Telecommunication Networks) are used to be able to explain together the dependent variable (Economic Growth). This test uses the F-count distribution test. Hypothesis testing is carried out in the following way (Ghozali, 2016):

- a. $H_0: \beta = 0$, then there is no simultaneous influence between the independent variable (X) on the dependent variable (Y).
- b. $H_1: \beta \neq 0$, then there is a simultaneous influence between the independent variable (X) on the dependent variable (Y).
- c. *The level of significant (α) is 5%.*
- d. The conditions used are:
 1. If the level of significance is > 0.05 , then H_a is rejected and H_0 is accepted.
 2. If the level of significance < 0.05 , then H_a is accepted and H_0 is rejected.

T test

The t test basically shows how far the influence of one independent variable individually explains the variation in the dependent variable. Partial regression testing is intended to determine whether the independent variable individually has an influence on the dependent variable assuming the other variables are constant. Hypothesis testing is carried out in the following way (Ghozali, 2016):

- a. $H_0: \beta = 0$, then there is no partial influence between the independent variable (X) on the dependent variable (Y).
- b. $H_1: \beta \neq 0$, then there is a partial influence between the independent variable (X) on the dependent variable (Y).
- c. *The level of significant (α) is 5%.*
- d. The conditions used are:
 1. If the level of significance is > 0.05 , then H_a is rejected and H_0 is accepted.
 2. If the level of significance < 0.05 , then H_a is accepted and H_0 is rejected.

RESULTS AND DISCUSSION

General Overview of the Region

West Halmahera Regency is a district that was formed after the issuance of Law no. 1 of 2003 - 25 February 2003 concerning the establishment of North Halmahera, South Halmahera, Sula Islands, East Halmahera, and Tidore Islands in North Maluku Province. The region of West Halmahera Regency originates from the North Maluku Regency which has been divided into 7 new districts.

Table 2. The area of districts and the capital district in West Halmahera District

No	District	Size Territory of	Capital
1	Jailolo	22 550	Gufasa
2	South Jailolo	28 219	Sidangoli
3	Jailolo East	14,625	Akelamo
4	Sahu	12 397	Susupu
5	East Sahu	27 058	Akelamo
6	Capital	10 961	Tangute Sungi
7	Mrs. North	37 125	Duano
8	South Ibu	21,950	Talaga

9	Loloda	60,894	Kedi
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Source: BPS, 2019

Explanation in table 2 that the area of West Halmahera Regency is very large with a very large geographical location, so the area boundaries can be seen in this table where the area of the sub-district is very large, namely the sub-district Kedi, followed by the southern jailolo district of the court of law with an area of 28,219 km² followed by the area of the North Mother district of 37,125 km², then the smallest sub-district in West Halmahera district, namely the sub-district of the mother with the capital city of Tangute sungi of 10,261.

The explanation above can explain the value GRDP constant prices in the primary sector have increased average above 5% with a total recorded in 2014 of 1472.00 billion and in 2015 it was recorded at 1610.4 billion, this will continue to increase in 2018 recorded at, 1.502.70 billion. Meanwhile, the secondary sector increases by an average of 6% per year and the tertiary sector will also increase by 3% per year. This economic strength that grows very well is a regional gift that needs to be improved again in the cohesiveness of all stakeholders.

Table 3. Per capita income in Jailolo subdistrict, West Halmahera regency

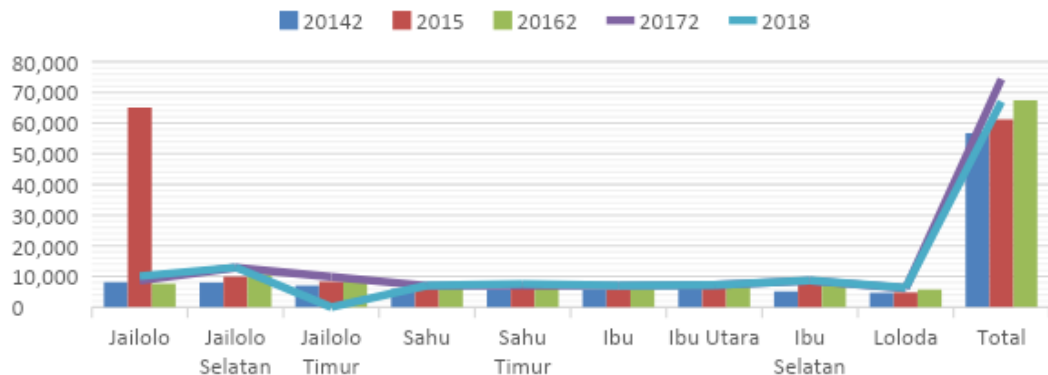
no	year	district per capita income (PDRB)	Total population	Capita income for subdistrict	Growth
1	2017	21,620,000.	105,110	2,056,892.8	43.99
2	2018	29,880,000.	114,080	2,619,214.5	56.01
Total		-	-	4,676,106,3	100

Source: Analysis result

The income per capita of the Jailolo sub-district community is very small if it is conditioned by the actual real conditions in the field that the regional minimum wage will also not be proportional to the per capita income of the jailolo sub-district, from the results of the data analysis above that the comparison of the Jailolo sub-district's GRDP with the population, the results in 2017 are Rp. 2,056,892 shows that the income is very small, as well as in 2018 the income increased by Rp. 2,619,140. with a growth of 56.10 percent.

The highest road length in West Halmahera Regency per district was in South Jailolo District in 2014, namely 87.01 km, while the lowest road length was in Loloda sub-district in 2014, namely 18.80 km, East Jailolo District. In 2014 the length of the highest road in East Jailolo Subdistrict in 2014, amounting to 86.33 km and in 2018 as much as 95.12 km and was followed by other sub-districts in West Halmahera Regency.

infrastruktur listrik



Development of Electricity Infrastructure

The consumption of electricity or electricity sold per capita in each District with the highest value is owned by Jailolo south 11,962 while the lowest was Loloda Subdistrict, 6,324 in 2018. For 2014 the districts with the highest scores were Jailolo and Jailolo Selatan Districts from electricity consumption. This usage can be seen from the density of houses owned by each sub-district in West Halmahera Regency.

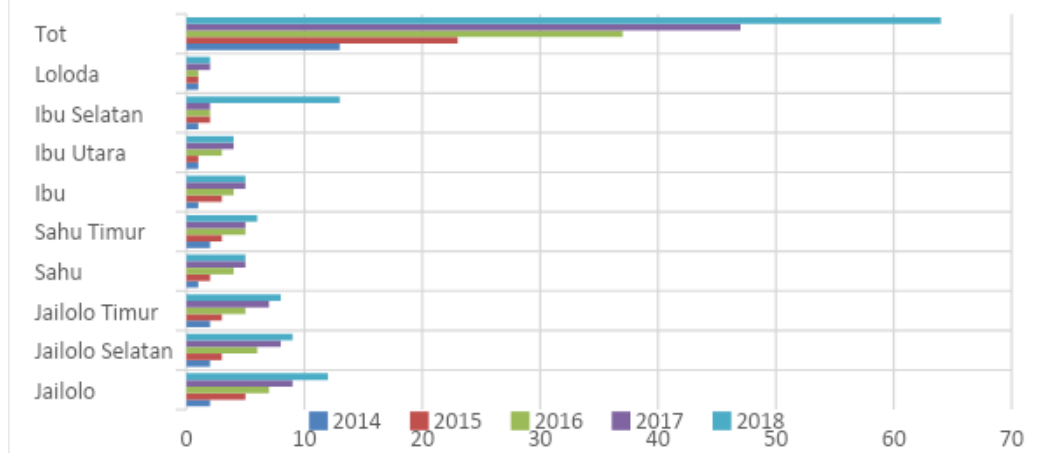
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Clean Water Infrastructure Development

Clean water contained in the data is still relatively small in each new District, namely in West Halmahera Regency and the use of clean water in districts with high clean water use in East Jailolo District in 2018 is with a total use value of 11,762 whereas the lowest use of clean water is in Loloda District with a total value of 5,324. In 2018, the highest use of clean water in each sub-district in West Halmahera is Sotuh Jailolo and East Jailolo Districts, while the lowest is in Loloda District.

Infrastruktur Telekomunikasi



Telecommunication infrastructure development

The role of telecommunication contained in the data is still relatively small in each new district, namely in West Halmahera Regency and Tower Utilization in sub-districts with the use of high communication towers in East Jailolo District in 2018 with a total usage value of 08, while The lowest tower installation is Loloda District with a total value of 02, unit In 2018 the highest tower installation in each sub-district in West Halmahera Regency is Jailolo Selatan and east Jailolo Subdistricts, while the lowest is in Loloda District.

Classic Assumption Test

Multicollinearity Test

Test is conducted to see whether there is a perfect linear correlation or relationship between variables in the model. Determination of the correlation between the independent variables in the model if in the test there is a value that exceeds > 0.10 , then the VIF value between the independent variables, it is certain that there is no multicollinearity or perfect linear relationship. This multicollinearity test is carried out by means of the test *multi-collinearity's follows*. The results of this test can be seen in Table 4 below.

Table 4. Results Multicollinearity

Model	Colleneariti Statistic		Description
	Tolerance	VIF	
X1,	004	241.082	There Influence multicollinearity
X2,	063	15.950	There Influence multicollinearity
X3,	007	148.424	There Influence multicollinearity
X4,	017	58.662	There Influence multicollinearity

Results multicollinearity test showed that the value of each independent variable no excess of > 10 thus it can be said that there is an imperfect linear relationship between the independent variables in this model. Multicollinearity problems according to Insukindro, et al. 2001, one of the methods used to solve the collinearity problem between independent variables is by combining data across sectors (*cross section*).

Heteroscedasticity Test

Heteroscedasticity means that there are variants of variables in the same regression model (constant). Heteroscedasticity problems often occur in research using data *Cross Section* (Suliyato, 2011: 95). Because this study uses a combination of data *cross section* and *time series*, the heteroscedasticity test that no dependent variable can affect the independent.

Simultaneous Significance Test (F-test)

The *F-test* is used to test the effect of all independent variables on the dependent variable collectively without considering the level of influence of each independent variable individually. The hypothesis based on the *output of the F-test* is as follows:

H_0 : All independent variables *jointly significant* affect the dependent variable.

H_a : All independent variables *jointly insignificant* affect the dependent variable.

Based on the results of the F test or the simultaneous test, it is known that the F test results in a *prob> chi2 value* of 0.0000. The value *prob> chi2 < α* is 0.05 or statistically significant. This shows that the independent variables, namely road infrastructure, electricity infrastructure, and clean water infrastructure, together or simultaneously have a significant effect on the dependent variable, namely economic growth.

Partial Significance Test (T test or Z test)

The T test or Z test is a partial test to see whether the independent variables have an effect on economic growth in this study. The hypothesis used in the t test or z test is as follows:

H_0 : Each independent variable has no significant effect on the dependent variable.

H_a : Each independent variable has a significant effect on the dependent variable.

The null hypothesis (H_0) is rejected if $P > |z| > \alpha$ or *z-stat value* > critical *z-table value*. The results of the T test or Z test can be seen in Table 5 below.

The influence of road infrastructure on economic growth.

The coefficient value of the road infrastructure variable is -9.521 with $P > |Z|$ of 0.411 (greater than α), so that statistically the road infrastructure variable has a positive and insignificant effect on the economic growth variable. Thus, it can be concluded that this hypothesis accepts the null hypothesis (H_0) and rejects the alternative hypothesis (H_a).

1. The effect of electricity infrastructure on economic growth.

The coefficient value of the electricity infrastructure variable is -20,450 with $P > |Z|$ equal to 0.000 (less than α), so that statistically the electricity infrastructure variable has a positive and significant effect on the economic growth variable. Thus, it can be concluded that this hypothesis rejects the null hypothesis (H_0) and accepts the alternative hypothesis (H_a).

2. The influence of clean water infrastructure on economic growth.

The coefficient value of the clean water infrastructure variable is 82,421 with $P > |Z|$ of 0.10 (greater than α), so that statistically the clean water infrastructure variable has a positive and insignificant effect on the economic growth variable.

Thus, it can be concluded that this hypothesis accepts the null hypothesis (H_0) and rejects the alternative hypothesis (H_a).

3. Influence of telecommunication infrastructure on economic growth.

The coefficient value of the clean water infrastructure variable is 24005.585 with $P > |Z|$ equal to 0, (greater than α), so that statistically the Telecommunication infrastructure variable has a significant positive effect on the economic growth variable. Thus, it can be concluded that this hypothesis accepts the null hypothesis (H_0) and rejects the alternative hypothesis (H_a).

The coefficient of determination (R-Squared)

The coefficient of determination is the amount of the contribution of the independent variable to the dependent variable. The higher the coefficient of determination, the higher the independent variable in explaining the variation of changes in the dependent variable. *Adjusted R-Squared* (R^2) obtained from the estimation results of the model is *Random Effect* 1, or 0 percent. It can be concluded that the independent variables, namely road infrastructure, electricity infrastructure, and clean water infrastructure are able to explain the economic growth variable. At model estimation *Random Effect* known R^2 by 1 percent, and the remainder is 0, percent is explained by other variables outside the model. The panel data regression equation presented in Table 5 can be transformed into an equation:

$$Y = 819066.03 - 45,212 \text{ Infjln}_{it} - 20,450 \text{ Inflist}_{it} + 82,422 \text{ Infab}_{it} + 24004.46 \text{ InfrTel}_{it}$$

Where:

Infjln	= road infrastructure
Inflist	= electricity infrastructure
Infab	= clean water infrastructure
ε_{it}	= disturbance variable

The regression results show that road infrastructure does not have a significant effect on economic growth at the 5 percent level, but has a regression coefficient direction that is Negative Value 45.212, so it is increasingly The low value of the infrastructure variable will be followed by a decrease in the rate of economic growth and vice versa, it can be interpreted by considering other factors constant (*ceteris paribus*). The insignificance of the infrastructure in West Halmahera Regency is because in taking the road infrastructure variable the researcher only uses the district / city road infrastructure and does not use the entire road. For example, national roads and provincial roads so the value obtained is small and then insignificant.

Another cause is the geographical condition of the districts in North Maluku, which are separated from islands. This requires a large amount of time and budget so that districts / cities can carry out road infrastructure development more optimally. Road infrastructure is expected to play a major role in stimulating economic growth, because the availability of roads will minimize capital so that the production, distribution and service processes will be more effective and efficient. The results of this study are in line with Atmaja research results. H. K and Mahalli. K (2015), where road infrastructure has an insignificant positive impact on economic growth in Sibolga City - North Sumatra Province. However, it is not in line with I Ketut Sumadiasa, Ni Made Tisnawati, and I GAP Wirathi (2016) which show that road infrastructure has a positive and significant effect on economic growth in Bali Province.

The regression results show that electricity infrastructure has a negative and significant effect. This means that an increase in electricity infrastructure will decrease economic growth. The coefficient value of 20,450 can be interpreted by considering other factors constant (*ceteris paribus*). a decline in electricity infrastructure by one percent will cause a decline in economic growth by 20.450 percent and vice versa. If the electricity infrastructure decreases by one percent, the economic growth will decrease by 20.45 percent. The negative effect on economic growth is due to the fact that electricity is a source of lighting for life and one of the main sources of production factors. Although electricity often experiences rotating blackouts in some areas. However, electricity has a big influence on economic growth because electricity is closely related to work productivity.

The regression results show that clean water infrastructure has a positive and insignificant effect on economic growth in West Halmahera Regency. This means that the increase in clean water infrastructure will increase economic growth. The coefficient value of 82.442 can be interpreted by considering other factors constant (*ceteris paribus*). An increase in clean water infrastructure by one percent causes an increase in economic growth of 82.44 percent and vice versa. If infrastructure decreases by one percent, economic growth will decrease by 82.44. This is because there are still many areas that use well and river water which are not recorded here. Besides, the amount of clean water every year always decreases because the population in each district / city is more while the amount of clean water capacity is limited. This data is obtained from the Central Statistics Agency (BPS) of West Halmahera Regency which is produced annually.

The regression results show that the Telecommunication Tower infrastructure has a significant positive effect on economic growth in West Halmahera Regency. This means that the increase in Tower infrastructure will increase economic growth. The coefficient value of 24004.46 can be interpreted by considering other factors constant (*ceteris paribus*). The 1 percent increase in the Communication Tower infrastructure led to an increase in economic growth of 24.04 percent and vice versa. If infrastructure decreases by one percent, the economic growth will decrease by 24.04. This is because there are still many regions that use Tower Mini. This data is obtained from the Central Statistics Agency.

Regional Inequality with the use of Williamson Index

Table 5. Williamson Index West Halmahera Jailolo District 2017-2018

Year	Index Results
2017	1.0558
2018	1.0134
Average	1.0436

Source: Processed Results

From the calculation results in the table above, the level of inequality District income in West Halmahera Regency in 2017 was 1,055. Based on the criteria that have been determined in the Williamson index analysis, it can be said that the inequality in West Halmahera Regency, Jailolo District in 2017 is relatively small. It can be seen in the

table above that from 2017, the value of inequality has not changed, namely 1.055 is still relatively small.

CONCLUSIONS

In the following years, from 2018 to 2019, the value increased not significantly, namely 1.0134 and was still categorized as relatively small. The relatively small value of inequality is due to equitable development in each region. Even though in this analysis there are several villages in Jailolo sub-district that are relatively left behind, efforts to equalize government development in each region continue. The results of the Williamson Index analysis above, in West Halmahera district, Jailolo sub-district in 2017-2018 the level of inequality is relatively small. The following is the result of the calculation of the Williamson Index in Jailolo District in West Halmahera Regency with an average level of: 1.04357.

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