East Kalimantan Economic Growth In 2019-2023

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ABSTRACT

The purpose of this study was to determine the influence of road infrastructure, electricity, education, and health on economic growth between districts and cities in East Kalimantan Province in 2019-2023. This research method uses a descriptive quantitative analysis approach, the data used is sourced from secondary data with the type of panel data for 5 years obtained from the Central Statistics Agency of East Kalimantan and the Directorate General of Financial Balance. The population in this study is Regencies and Cities in East Kalimantan Province. The sampling technique was carried out using saturated sampling so that the number of samples in this study was obtained 50 observation data. The results of this study found that road infrastructure has a significant positive effect on economic growth. Electricity infrastructure has a significant positive effect on economic growth. Educational infrastructure has a positive effect on economic growth.

Keywords: Economic Growth, Infrastructure, Data Panel.

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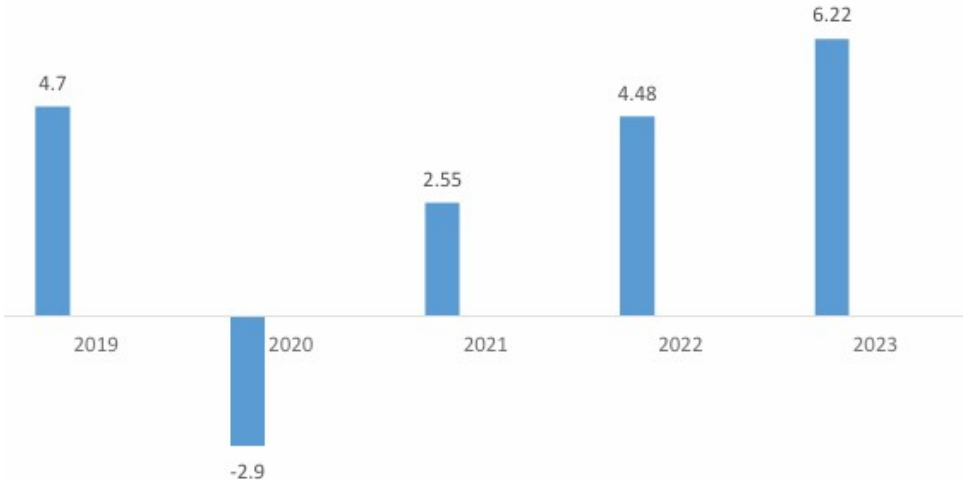
INTRODUCTION

Gross Regional Domestic Product (GDP) is a very important indicator and is always considered to find out the economic condition of a region in a period of time. GDP shows the level of regional ability of a region to manage, utilize, and maximize the resources it has. A high GDP indicates that an area has a large production capacity, which means that many goods and services are available to meet the needs of the community (Shafarilla, 2019). The Ministry of Finance of the Republic of Indonesia is in accordance with the vision of Indonesia 2045, namely a developed Indonesia, the Indonesian economy will be in the top 5 in the world by 2045. Therefore, transformation is needed to achieve Indonesia's vision 2045. Transformation is supported by industrial downstreaming by utilizing human resources and infrastructure starting from 2020-2024. Therefore, the Capital City of the Archipelago (IKN) is needed to encourage this economic transformation. The IKN in East Kalimantan is expected to create new economic growth centers and maximize natural resources. The relocation of the National Capital in East Kalimantan has great potential to level economic development throughout Indonesia. This opportunity can be exploited through improving connectivity between regions, improving the investment climate, and reducing unemployment rates (Simanjuntak et al., 2024).

East Kalimantan is one of the provinces that has the largest area in Indonesia. East Kalimantan Province has great natural resource potential, especially in the mining and forestry sectors with abundant reserves of coal, petroleum and natural gas. The mining and oil and gas sector makes a significant contribution to economic growth in East Kalimantan Province (Wahidah et. al, 2024).



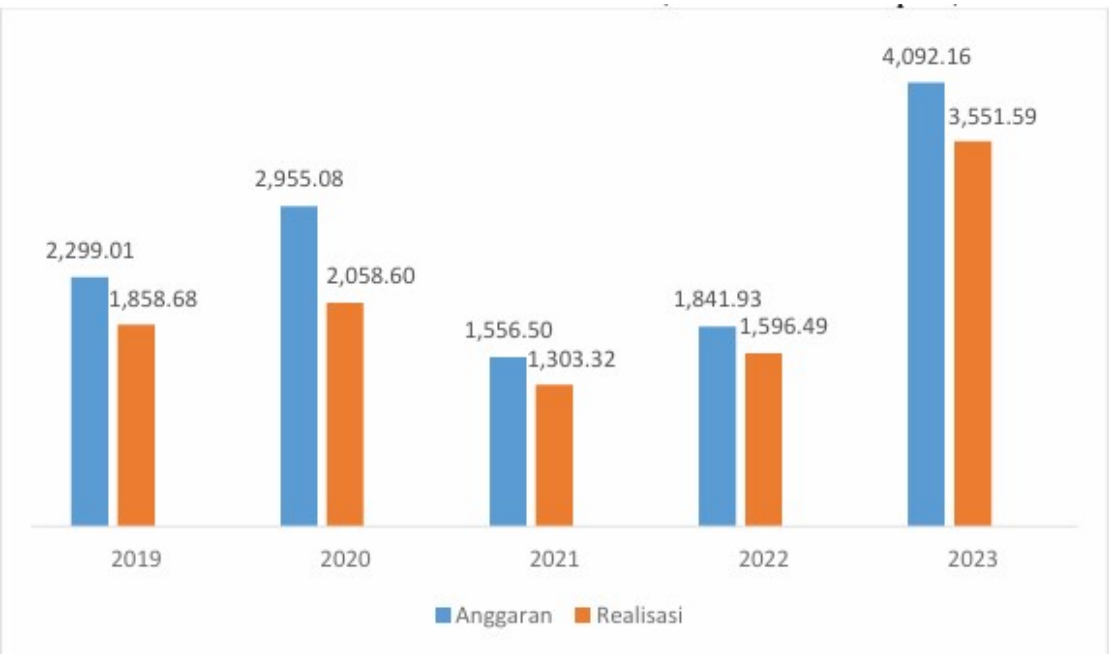
Source: Central Statistics Agency of East Kalimantan Province (2024)

Figure 1. Economic Growth in East Kalimantan in 2019-2023 (In Percent)

East Kalimantan Province's economic growth contracted sharply in 2020, falling from 4.7% in 2019 to -2.90%. This decline is closely related to the COVID-19 pandemic which caused global and

domestic supply chain disruptions, difficulties in obtaining raw materials, and decreased production in various sectors. As a result, many workers lost their jobs or experienced a decrease in income, so people's purchasing power decreased and deepened economic pressures (Alma, 2024). In addition, East Kalimantan also faces significant economic inequality between regions. The average Theil entropy index during the 2017–2021 period was recorded at 1.19, reflecting the imbalance in development between regions. This inequality is influenced by differences in the availability of natural resources and weak connectivity between regions. Therefore, strengthening infrastructure is an urgent need to improve regional economic integration (Alma, 2024).

Along with the relocation of the National Capital City (IKN) to East Kalimantan, the government began to restore economic growth with massive investments in basic infrastructure sectors such as toll roads, airports, and industrial estates. This national strategic project is expected to be a catalyst for economic growth, create jobs, and reduce the development gap between provinces (RI, 2022). Equitable infrastructure development is also the key to creating social justice and community welfare. Infrastructure not only supports economic activity, but also increases poor people's access to basic services such as education and health. (Gaal et al., 2017) shows that road construction in rural areas is able to significantly increase production and economic participation. Therefore, targeted infrastructure development is very important to support sustainable economic growth in East Kalimantan and the realization of a golden Indonesia in 2045 (Hermawan et. al, 2019).



Source: Central Statistics Agency of East Kalimantan Province (2024)

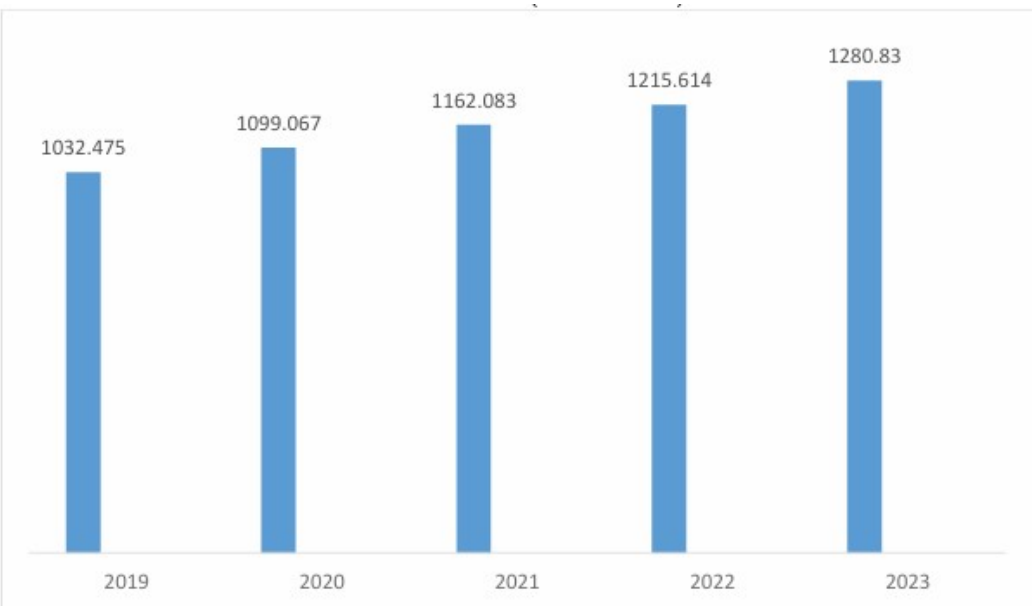
Figure 2. Budget Data and Realization of the Ministry of PUPR in East Kalimantan Province in 2019-2023 (in Billion Rupiah)

Based on Figure 1.2, the budget of the Ministry of PUPR is higher every year than its realization. The average budget realization from 2019 to 2023 only reached 65.37% of the planned total. In fact, in the East Kalimantan Regional Medium-Term Development Plan (RPJMD) 2019–2023, infrastructure and spatial development are the top priorities to strengthen connectivity and encourage equitable economic growth (Alma, 2024).

One of the main obstacles in East Kalimantan is the limited means of transportation, especially in inland areas such as Mahakam Ulu. The main access of the community still relies on the Mahakam River due to the condition of damaged roads and the lack of connecting bridges between regions. This limited infrastructure makes it difficult for people to access health services, education, and other economic activities (Imran, 2024; Kirana et al., 2019).

The government has made the development of transportation infrastructure a priority, including the construction of toll roads, bridges, and supporting facilities for the Capital City of the Archipelago (IKN). Road infrastructure is considered very important to support the distribution of goods, reduce logistics costs, and accelerate economic growth, especially in areas rich in natural resources such as East Kalimantan (Sitorus et al., 2016; Suripto & Eva, 2019; Wahidah et al., 2024).

In addition to roads, electricity infrastructure also plays an important role in boosting industrial productivity, attracting investment, and creating jobs. The designation of East Kalimantan as the location of the IKN will increase energy needs, in line with the growth of government, education, and other service sector activities. Therefore, the government needs to prepare policies that support the provision of reliable electrical energy to support future economic growth (Lianna, 2020; Setiawan et al., 2022).

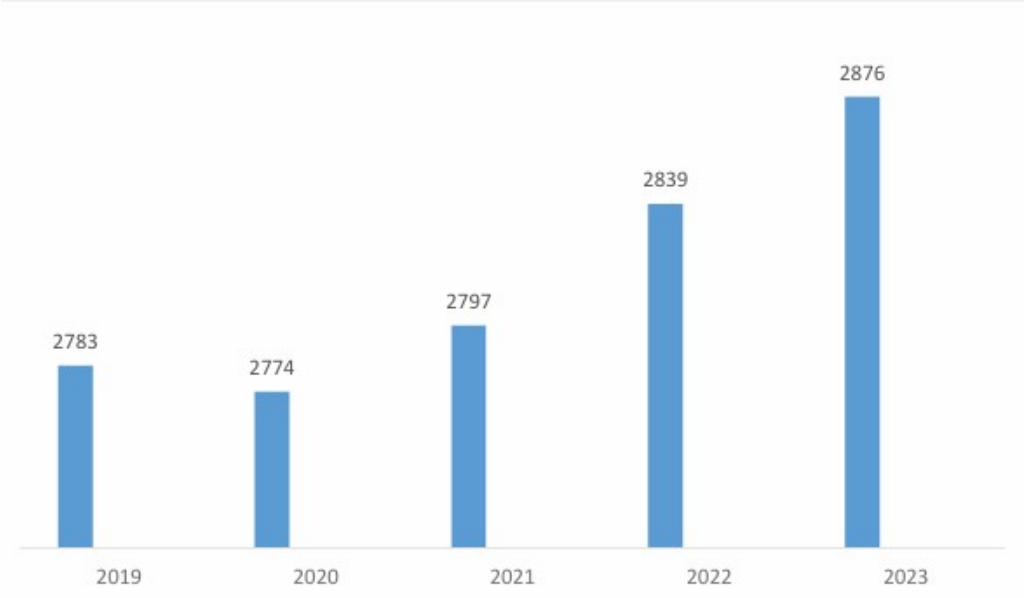


Source: Central Statistics Agency of East Kalimantan Province (2024)

Figure 3. Number of Electricity Customers in East Kalimantan Province in 2019-2023 (In Units)

The number of electricity customers in East Kalimantan Province has increased significantly in 2019–2023, with an average increase of 1,158 units per year. Nevertheless, there are still major challenges in the equitable distribution of electricity. Data from the Energy and Mineral Resources Office of East Kalimantan Province shows that as of September 2023, there are still 169 villages that have not been connected to PLN's electricity, especially in the East Kutai, KutaiKartanegara, Paser, West Kutai, and Mahakam Ulu areas (Rohmah, 2023). In Laham District, for example, electricity is only available from 6 pm to 12 pm, while many other residents still rely on private generators due to the unavailability of electricity from PLN. This condition occurs due to the limitations of basic infrastructure and obstacles in submitting the budget to the local government (Kirana, H., 2019).

In addition to electricity, education infrastructure is also an important problem in East Kalimantan. Inadequate educational facilities, especially in remote areas, have an impact on the quality of human resources. Some schools in Samarinda are even still hitchhiking, in a damaged condition, or difficult to access because of their remote location. In fact, quality education plays an important role in creating a skilled and competitive workforce, especially in the construction and mining sectors (Teguh, 2021). The inequality of access to secondary education between urban and rural areas is also still high, so the government needs to expand school construction and improve transportation access.

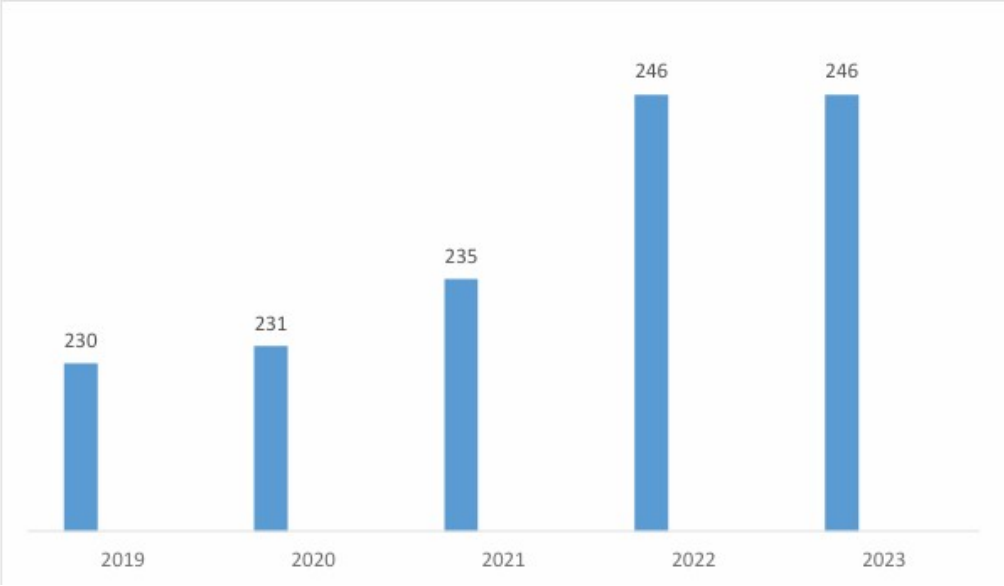


Source: BPS East Kalimantan Province (2024)

Figure 4. Number of schools (elementary, junior high, high school) in East Kalimantan province in 2019-2023 (In units)

Based on figure 4, the number of schools in East Kalimantan Province tends to be stable with slight fluctuations, where in 2020 it had decreased by 9 units, but increased again in 2021–2023 with an average of 2,821.5 units, showing that education development continues to be pursued to support regional

economic growth; However, in 2023 there was an increase in out-of-school children at the junior high school level by 3.62% and high school by 11.91%, which was caused by various factors such as the economy, accessibility, health, and education policies (Aldona, 2021; Jouanka & Kurniasih, 2020), meanwhile, the health sector that supports the quality of human resources also still faces challenges, because only 52.46% of health facilities are able to provide good services.



Source: BPS East Kalimantan Province (2024)

Figure 5. Number of Health Facilities in East Kalimantan Province in 2019-2023 (In units)

The number of health facilities such as hospitals and health centers in East Kalimantan has increased significantly every year, with an average of an additional 237.6 units per year between 2019 and 2023. This increase in the number of health facilities has the potential to improve people's quality of life and work productivity, which in turn can support the regional economy. However, despite progress in the construction of health facilities, some areas such as Tarakan City still face a shortage of medical personnel, especially specialist doctors and administrative personnel (Priandana et al., 2017). In addition, public accessibility to health facilities, as happened in Paser Regency, is also an obstacle, where less than 50% of the population has adequate access

East Kalimantan, which is rich in natural resources such as coal and oil, still faces the negative impact of dependence on the sector. Less than optimal management of natural resources has led to environmental damage and a significant increase in carbon emissions, exacerbating the problem of climate change (Subagiyo, 2016). Meanwhile, people living around forests or resource-rich areas have not fully benefited from such exploitation, creating socio-economic inequality between resource-rich and disadvantaged areas (Nababan et al., 2014). This gap is exacerbated by limited basic facilities and infrastructure, including transportation, which limits accessibility to more remote areas.

Infrastructure development in East Kalimantan, such as roads, electricity, education, and health, plays an important role in driving economic growth. Studies show that infrastructure investment can improve the quality of life, support labor productivity, and reduce disparities between regions(Sarifah et al., 2020; Sukirno, 2015). The relocation of the National Capital City (IKN) to East Kalimantan is expected to accelerate equitable development and increase economic growth, both in the buffer area and in the IKN area itself (Wahidah et al., 2024). This study aims to analyze the influence of infrastructure on economic growth by using panel data in East Kalimantan Regencies and Cities, to provide a more comprehensive picture regarding the potential development of this region towards a Golden Indonesia 2045.

LITERATURE REVIEW

Neo-Classical Growth Theory

According to the neoclassical growth theory developed by Abramovits and Solow, the economic growth rate of a country is significantly influenced by changes in the quantity and quality of factors of production, such as labor, physical capital, and human capital (Sukirno, 2015). According to Solow, sustainable economic growth requires a balance between capital accumulation and technological development. In addition to investment in physical and human resources, the discovery of new innovations and their widespread deployment also play a role in driving economic growth (Amalia, 2016). The Neoclassical theory of growth, developed by Solow and Swan, sees economic growth as dependent on the development of factors of production, including the growth rate of capital, population, and technology. The capital in question includes capital goods and investments.

Capital accumulation is obtained from a portion of the income received today and reinvested to increase output and income in the future. The procurement of factories, machinery and equipment can increase capital stock to increase the output to be achieved. These investments must be supported by supporting investments such as investment in social and economic infrastructure which includes road construction, provision of electrical energy, construction of educational facilities and the construction of health facilities are needed to support economic activities in a country (Warsilan & Akhmad, 2015).

Economic Growth

Economic growth reflects the development of the production of goods and services that occurs in a country, which is measured through an increase in the number of production, the development of infrastructure, and the increase in the number of schools. This economic growth can be defined as an increase in the output of goods and services in a period, usually compared to the previous year (Nadila, 2023). As an indicator of development outcomes, economic growth functions as a tool to determine the direction of development in the future. At the regional level, economic growth indicates an increase in

community income or an increase in added value generated in the area (Ariantika & Ikhsan, 2016). Generally, economic growth is measured using Gross Domestic Product (GDP) at the national level, while for regions it is used Gross Regional Domestic Product (GDP), which can measure the total value of goods and services produced in the region in a given period (Fitriandini, 2023).

GDP is divided into two main categories, namely based on constant prices and prevailing prices. GDP based on prices calculates the value of production and costs of value-added components and expenses each year, while GDP based on constant prices refers to the value of the base year (Shafarilla, 2019). This study uses the GDP on a Constant Price (ADHK) indicator to see a more precise rate of economic growth, without being influenced by inflation. With a formula developed by Sukirno in (Sihite, 2022), economic growth can be calculated to describe real changes in the goods and services produced. Measurement using ADHK GDP allows for a more accurate analysis of the real economic growth of a region, providing a clear picture of quantitative changes in production and consumption without the disruption of price changes (Pusmahasib, 2023). This study aims to analyze the impact of infrastructure on sustainable economic growth, using ADHK GDP data as the main indicator.

Road infrastructure

Road infrastructure is a vital element in economic activities to encourage economic growth (Aldona, Dayuningtyas & Saputra, 2021). Good and well-maintained roads can improve the efficiency of the production and distribution of goods and services, reduce transportation costs and travel time, and speed up the delivery of goods to consumers. The existence of adequate roads can also attract investors to invest as they see greater market potential and lower operational costs (Nasikhah & Dwi, 2024). The development of road infrastructure not only creates jobs in the short term, but also increases economic efficiency and productivity in the long term. Adequate road infrastructure helps connect cities and villages, facilitates the distribution of goods, and increases the competitiveness of products in domestic and international markets (Mu'min, 2023).

The repair and construction of new access roads in rural areas have a significant impact on increasing employment opportunities during the construction phase and smoothing economic activities (Hasibuan, 2020). Good road infrastructure also greatly affects the smooth flow of economic transactions in a region. Road damage can hinder the delivery of goods and cause an economic decline (Tambun, N., 2023). Well-connected highways, bridges, and ports facilitate the distribution of goods, thus supporting overall economic growth (Mahalli, 2015). Solow's neo-classical theory states that sustainable economic growth requires a balance between capital accumulation and technological development. Road infrastructure, as a form of physical capital, increases productivity and production efficiency that supports economic growth (Murni, 2016). Adequate road infrastructure, in accordance with this theory, can

increase GDP and reduce disparities between regions, as well as provide services in product distribution and other economic activities (Hutauruk, 2021).

Electrical Infrastructure

Electricity is one of the basic needs that are very important in daily life, both for household and industrial activities. With the increasing installation of electricity, economic activities can run more efficiently, which in turn can increase production levels (Mu'min, 2023). Electricity, as a form of energy generated through chemical processes, allows the use of machines for various activities, such as the production of goods and lighting. Electricity infrastructure, which includes power generation, distribution, and other electrical facilities, is the main supporting factor in the economic development of a region (Afriyana, 2023). Without adequate electricity infrastructure, industrial and household activities will be hampered, considering that electricity is a very important source of energy in the production process and daily life.

Electrical infrastructure also plays a very important role in driving economic growth, especially in the industrial sector. The existence of stable and affordable electricity supports the manufacturing sector to improve production efficiency and competitiveness, which will attract more investment. In addition, Solow's neo-classical theory explains that sustainable economic growth requires a balance between capital accumulation and technological development, where electricity infrastructure functions as physical capital that increases productivity and efficiency in the production process (Murni, 2016). Therefore, with adequate electricity infrastructure, the company's productivity can increase, resulting in significant economic growth, especially in East Kalimantan Province, which uses the indicator of the number of electricity customers to measure access and efficiency of electricity infrastructure in the region (Aarakit, Z., 2024).

Education Infrastructure

Educational infrastructure is a very important means to support a quality education process. Education provides the skills needed in the world of work and encourages the emergence of ideas and innovations that can increase economic growth (Chapman, E., 2021). Adequate educational infrastructure is a long-term investment, as educated human resources will be more productive in the future. The better the education level of a region, the more likely it is to increase economic growth, as well as improve the quality of life, such as increased labor productivity and job availability (Aldona, Dayuningtyas & Saputra, 2021). Poor or inadequate education can hinder a country's ability to compete at the global level (Aldillah, 2021).

The government allocates education funds through the State Budget and Regional Budget to support the implementation of education at various levels, including primary, secondary, and higher education (Fauji, 2017). Government spending on the education sector, both for human resource

development and physical infrastructure, can accelerate economic growth, depending on the extent to which such spending can increase productivity. Solow's neo-classical theory explains that sustainable economic growth requires a balance between capital accumulation and technological development, where education plays an important role in improving employability and productivity (Hanifah, N., 2021). In this study, the education infrastructure indicator is measured by the amount of realization of government spending in the education sector in East Kalimantan, which is expected to improve the quality of human resources and contribute to the economic growth of the region.

Health Infrastructure

Health is a condition that allows individuals to live productively both socially and economically. Health maintenance includes efforts to prevent or avoid health problems that require medical care (Purba, 2016). Good health is very important, because without optimal health, a person cannot perform daily activities to the maximum. Healthy human resources are a valuable asset for the country because good health will increase people's productivity, which in turn will drive economic growth. Conversely, if public health is poor, this can hamper the potential of human resources and negatively impact economic growth (Aldona, 2021). Therefore, the development of health infrastructure is an important component of national development which aims to ensure that public health is well maintained and improves welfare in general.

Health infrastructure plays an important role in improving the quality of life and productivity of the workforce. The construction of adequate health facilities can improve public health, which in turn has an impact on increasing productivity and economic growth. Solow's neo-classical theory states that sustainable economic growth requires a balance between capital accumulation and technological development, where health infrastructure is a form of physical capital that supports labor productivity (Mandey, J., 2022). In this case, investment in health infrastructure will improve people's welfare, thereby increasing income and encouraging economic growth. The government allocates a budget for the health sector, both through the State Budget and the Regional Budget, with the aim of achieving optimal health for the community (Fauji, 2017). In this study, health infrastructure indicators are measured based on the realization of government spending in the health sector in East Kalimantan Province, which is expected to improve the quality of life and encourage economic growth in the area.

Hypothesis

The research focuses on road infrastructure, electricity, education and health. This infrastructure improvement can have an influence on the economic growth of districts and cities in East Kalimantan Province. Increasing economic growth can increase production activities from various sectors. This research has strong policy implications, especially related to planning and infrastructure development in East Kalimantan Province with the existence of national

strategic projects such as IKN. This research can test whether the development of the IKN triggers a positive effect on the surrounding area. The framework of thought in this study can be seen in the following image:

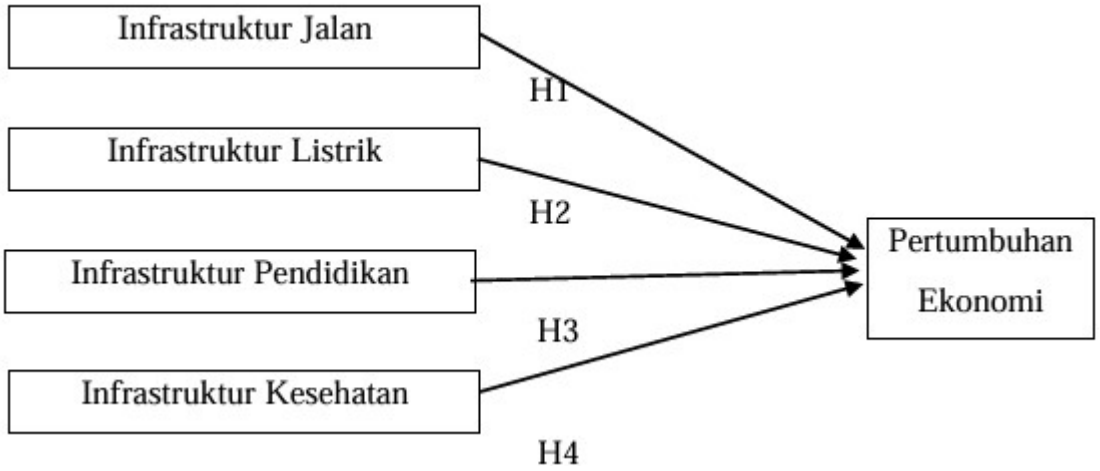


Figure 6. Conceptual Framework

Here is the hypothesis for each of the points that have been described:

H_1: The Influence of Road Infrastructure on Economic GrowthH1: Road infrastructure has a significant positive effect on economic growth.

H_2: The Influence of Electricity Infrastructure on Economic GrowthH2: Electricity infrastructure has a significant positive effect on economic growth.

H_3: The Influence of Education Infrastructure on Economic GrowthH3: Education infrastructure has a significant positive effect on economic growth.

H_4: The Influence of Health Infrastructure on Economic GrowthH4: Health infrastructure has a significant positive effect on economic growth.

RESEARCH METHODS

This study uses quantitative research. This research was conducted with the aim of examining the influence of infrastructure on economic growth in East Kalimantan Province. This study uses secondary data sourced from data published by the Central Statistics Agency (BPS). This study uses panel data in the form of 10 districts or cities in East Kalimantan Province in the 2019-2023 period with case studies in Indonesia. This study uses eviews 12 and MS analysis tools. Excel 2010. The variables used in this study are road infrastructure, electricity, education and health on the economic growth of districts and cities in East Kalimantan Province in 2019-2023 using panel data regression. The panel data regression model is

Common Effect Model, Fixed Effect Model, Random Effect Model. The regression equation of panel data in this study is as follows:

$$Y_{it} = \alpha + \beta 1 X 1_{it} + \beta 2 X 2_{it} + \beta 3 X 3_{it} + \beta 4 X 4_{it} + \varepsilon_{it}$$

RESULTS

Determination of Panel Data Regression Model

The purpose of testing the selection of the panel data regression model is so that we can determine the best model to be used, whether it is a common effect model, a fixed effect mondel or a random effect model. In determining the panel data regression model, 3 tests were carried out, namely:

Table 1. Determination of Panel Data Regression Model

Effect Test	Prob	Sign	Information
Chow Test	0.0000	0.05	Fixed Effect Model
Hausman Test	0.0000	0.05	Fixed effect model

Source: Data processed E-views 12 (2024)

Table 1. explains that in determining the regression model, the selected model panel is a fixed effect model, where the probability value is less than 0.05 or 0.0000 < 0.05.

Hypothesis Test Results

Based on the results of the T (Partial) test, it can be concluded as follows:

Table 2. Hypothesis Test Results

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	t tabel	*Prob.*
C	44537664	1035762.	42.99991	2,01410	0.0000
IJ (X_1)	3.256548	0.653181	4.985676	2,01410	0.0000
IL (X_2)	21.31185	10.06602	2.117207	2,01410	0.0412
IP (X_3)	0.000979	0.001998	0.489885	2,01410	0.6272
IK (X_4)	0.022744	0.003884	5.855859	2,01410	0.0000

Source: Data processed E-Views 12 (2024)

The road infrastructure variable (X_1) obtained a calculated t-value of 4.985676 > t-table 2.01410. The results of the significance test obtained a probability value of 0.0000 < 0.05, then H_1 was accepted, meaning that the road infrastructure variable had a significant positive effect on the economic growth of districts and cities in East Kalimantan Province.

The Electricity infrastructure variable (X_2) obtained a calculated t-value of 2.117207 > t-table 2.01410. The results of the significance test obtained a probability value of 0.0412 < 0.05, then H2 was

accepted, meaning that the electricity infrastructure variable had a significant positive effect on the economic growth of districts and cities in East Kalimantan Province.

The variable of educational infrastructure (X_3) obtained a calculated t-value of 0.489885 < t-table 2.01410. The results of the significance test obtained a probability value of 0.6272 > 0.05, then H3 was rejected, the reason is that the variables of education infrastructure have a positive and insignificant effect on the economic growth of districts and cities in East Kalimantan Province.

The health infrastructure variable (X_4) obtained a calculated t-value of 5.855859 > t-table 2.01410. The results of the significance test obtained a probability value of 0.0000 < 0.05, then H4 was accepted, meaning that the health infrastructure variable had a significant positive effect on the economic growth of districts and cities in East Kalimantan Province.

DISCUSSION

The Influence of Road Infrastructure on Economic Growth

Based on the results of the calculation with Fixed Effect Model regression, it shows that there is a positive and significant relationship between road infrastructure variables and economic growth in districts and cities in East Kalimantan Province. The results of the partial test obtained a t-count value of 4.985676 > t-table 2.01410 with a probability of 0.0000 < 0.05, so H_1 was accepted. This means that road infrastructure has a significant positive influence on economic growth. A coefficient value of 3.2565 indicates that every one unit increase in road infrastructure will increase economic growth by 3.2565 units, assuming other variables are constant. These findings reinforce the view that road infrastructure is an important component in driving the efficiency of the distribution of goods and services, reducing logistics costs, and accelerating the region's economic turnaround. Theoretically, this is in line with the neoclassical growth theory by Solow and Abramovitz which states that economic growth is influenced by an increase in the quality and quantity of physical capital, including road infrastructure.

Furthermore, the results of this study are also supported by previous research such as Atmaja & Kasyful; Kamilla & Hutajulu, All of which show that road infrastructure has a significant and positive effect on economic growth (Atmaja & Kasyful, 2015; Kamilla & Hutajulu, 2021). These studies conclude that road construction improves connectivity, streamlines distribution, lowers operational costs, and encourages the growth of other economic sectors. Thus, the development of road infrastructure in East Kalimantan, especially related to support for the Capital City of the Archipelago (IKN), is very strategic to realize equitable and sustainable economic growth. However, there are still gaps between regions such as in Mahakam Ulu Regency that require special attention, so it is necessary to allocate an equitable infrastructure budget to encourage inclusive economic growth throughout the East Kalimantan region.

The Influence of Electricity Infrastructure on Economic Growth

Based on the results of the test using Fixed Effect Model regression, it was found that there is a positive and significant relationship between electricity infrastructure and economic growth in districts and cities in East Kalimantan Province. The results of the partial test showed a t-calculated value of 2.117207 > t-table of 2.01410 and a probability of 0.0412 < 0.05, so H_2 was accepted. With a coefficient value of 21.311853367, it can be concluded that every increase in one unit of electrical infrastructure will increase economic growth by 21.3118 units, assuming that other variables remain constant. This shows that adequate electricity availability is very important in supporting economic activities, especially in the industrial and manufacturing sectors that rely heavily on electricity in their production processes. Electricity also supports the operational efficiency of companies and attracts investor interest because it is considered one of the vital elements in basic infrastructure. These findings are consistent with Solow's neoclassical theory of economic growth, where infrastructure such as electricity is seen as a form of physical capital that can increase the economic productivity of a region.

This research is strengthened by a number of previous studies such as Hutauruk, which also found that electricity infrastructure has a positive and significant influence on economic growth (Hutauruk, 2021). These findings show that access to wide, quality electricity not only improves economic efficiency but is also a key driver of increasing Gross Regional Domestic Product (GDP). However, there is still an inequality of access to electricity in several areas of East Kalimantan, where 169 villages have not been connected to PLN electricity as of September 2023. For this reason, government policies that focus more on the development of electricity infrastructure equally, especially in underdeveloped areas such as East Kutai, Paser, and Mahakam Ulu, are needed to ensure that all regions can contribute to encouraging inclusive and sustainable economic growth in East Kalimantan .

The Influence of Education Infrastructure on Economic Growth

Based on the results of the test using the Fixed Effect Model regression, it was found that the variable of education infrastructure had a positive but not significant relationship with the economic growth of districts and cities in East Kalimantan Province. The results of the partial test showed a t-count value of 0.489885 < t-table of 2.01410, and a probability value of 0.6272 > 0.05, so H_3 was rejected. The value of the coefficient of 0.000978687 shows that every increase in one unit of educational infrastructure only increases economic growth by 0.000978 units, which means that the effect is very small and statistically insignificant. Although education is a government priority with a state budget allocation of at least 20 percent, its realization has not had a real impact on economic growth during the 2019-2023 period. Education infrastructure does have the potential to support economic productivity through improving the quality of human resources, but the impact is long-term and has not been fully seen in this study period. The mismatch between the increase in the education

budget and GDP growth in several regions such as Berau Regency is also proof that the direct effect of education spending on the economy is still limited.

The research also states that education infrastructure has a positive but insignificant effect on economic growth. These findings reinforce the view in Solow's theory of economic growth, where education as a form of human capital takes a long time to have a significant impact on productivity and economic growth. Although its influence has not been statistically significant, education infrastructure still has strategic value for long-term development. Therefore, a policy is needed that not only focuses on the physical development of schools, but also on improving the quality of education and technical training in remote areas so that education graduates are better prepared to face the needs of the world of work. Improving workforce skills through training can reduce unemployment and increase local community participation in leading sectors such as mining and oil and gas, which are the backbone of East Kalimantan's economy.

The Influence of Health Infrastructure on Economic Growth

Based on the results of the test using the Fixed Effect Model regression, it is known that the health infrastructure variable has a positive and significant relationship with the economic growth of districts and cities in East Kalimantan Province. The results of the partial test showed a t-calculated value of 5.855859 > t-table of 2.01410 and a probability value of 0.0000 < 0.05, so H_4 was accepted. The value of the coefficient of 0.0227435176888 indicates that every increase in one unit of health infrastructure will increase economic growth by 0.022743 units, and conversely, a decrease of one unit will decrease economic growth by the same value. Health infrastructure is considered an important form of physical capital in supporting labor productivity. Access to adequate health services improves people's quality of life and productivity, thereby contributing to economic growth. During 2019–2023, a significant increase in the realization of the health sector budget demonstrates the government's serious efforts to expand the reach of health services, although there are still challenges such as limited medical personnel in Tarakan City and limited access in some border areas.

This research supports the results of previous studies, as done by Babatunde, Ritonga, & Sangaji, both concluded that health infrastructure has a positive and significant effect on economic growth (Babatunde, 2018; Ritonga, 2017; Sangaji, 2023). These findings are also in line with Solow's neo-classical theory of economic growth, which states that economic growth is influenced by the quality of human and physical capital. In this context, government spending on the construction and improvement of health facilities is a long-term strategic investment that can improve public health, increase life expectancy, and reduce the number of illnesses. Therefore, increasing budget allocation for the health sector, particularly in the provision of facilities, modern medical equipment, and medical

professionals, is essential in creating a healthier, more productive, and competitive society. This step will support inclusive and sustainable economic growth throughout the East Kalimantan region.

CONCLUSION

Based on the results of the Fixed Effect Model regression test, it can be concluded that road, electricity, and health infrastructure have a significant positive influence on the economic growth of districts and cities in East Kalimantan Province in 2019–2023, while education infrastructure has a positive but insignificant effect. Road infrastructure plays an important role in facilitating transactions and distribution of goods and services, thereby encouraging regional economic activities; electricity infrastructure supports production efficiency and attracts investment; health infrastructure improves people's quality of life and productivity; Meanwhile, educational infrastructure takes longer to produce real economic impacts because it is related to human resource development.

The implications of these findings show the importance of allocating larger and more equitable budgets for basic infrastructure, such as roads and electricity, to improve connectivity and efficiency of distribution and production of goods throughout the East Kalimantan region, including remote areas such as Mahakam Ulu. In addition, improving the quality and access to health infrastructure will reduce the number of illnesses, extend life expectancy, and increase the contribution of labor to the economy. Meanwhile, although education infrastructure has not shown a statistically significant influence, there is still a need for evaluation in the management and allocation of the education sector budget, especially in the form of technical and vocational training that is in accordance with employment needs such as in the mining sector.

SUGGESTION

The suggestion from the results of this study is for the government to accelerate the development of road infrastructure in underdeveloped areas such as Mahakam Ulu, expand the electricity network in 169 villages that have not been electrified in East Kutai, Kutai Kartanegara, Paser, West Kutai, and Mahakam Ulu, and develop technical training based on job skills according to local needs to improve the quality of education graduates.

In the health sector, it is necessary to increase the procurement of modern medical equipment and the construction of new affordable health facilities, especially in Tarakan City and border areas such as Paser Regency, to ensure equitable access to health services. All of these steps are necessary so that all regions in East Kalimantan can contribute optimally to inclusive and sustainable economic growth.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Joko Hadi Susilo: Conceptualization, Supervision, Data Curation, Formal Analysis, Project Administration, Writing-original Draft, and Writing-review Editing. **Shafira Niken Sari**:

Conceptualization, Resources, Software, Validation, Visualization, and Writing-review Editing. **Intan Firnanda Putri**: Funding Acquisition, Investigation, Writing-original Draft, and Writing-review Editing.

DECLARATION OF COMPETING INTEREST

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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DATA AVAILABILITY

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No patient-identifying parts in this paper were used or known to the authors. Therefore, no ethical approval was requested.

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