

Implications of Increasing Human Capital and Infrastructure Development on Economic Growth In The City of Palopo

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Abstract: *Economic growth is a key indicator in development, especially in developing countries like Indonesia. In Palopo City, the title of this study is Implications of increasing Human Capital and Infrastructure Development on Economic Growth in Palopo City. Using 2015-2024 time series data with Analysis Methods and multiple linear regression. The results of the study indicate that human capital and infrastructure development have a positive and significant effect, both partially and simultaneously, on economic growth. This finding emphasizes the importance of improving the quality of human resources and equitable distribution of infrastructure development as a strategy to encourage sustainable economic growth and improve the welfare of the people in Palopo City.*

Introduction

Economic growth is a key indicator of successful development in a region, including Palopo City, one of the growth centers in South Sulawesi Province. Palopo City has strategic potential for continued economic development. However, to achieve optimal and sustainable growth, it is necessary to identify the fundamental factors that are the main drivers of the economy Agustina Sairmaly et.al 2023).

Modern economic development, two crucial instruments that complement each other is improving the quality of human resources (*human capital*) and the availability of adequate infrastructure. *Human capital* , reflected in the level of education, skills, and health of the workforce, is the foundation for increased productivity and innovation (Adamu et.al 2025). On the other hand, infrastructure development such as transportation, energy, and telecommunications networks serves as a catalyst that facilitates the distribution of goods, services, and information and reduces economic costs, (Adamu et.al 2025) according to recent studies.

Palopo City has demonstrated a positive economic growth trend in recent years. However, amidst the dynamics of the national and global economy, fundamental questions

arise regarding the extent of the contribution of these two main factors. The local government has certainly allocated resources for programs to improve human resource quality (for example, through job training and educational assistance) and physical infrastructure development (such as improving the quality of roads, bridges, and public facilities). Unfortunately, studies or analyses that specifically measure the implications or direct impact of these two variables on economic growth in Palopo City are still very limited. (Agbolosoo et.al2025)

Without a comprehensive understanding of this causal relationship, it is feared that budget allocations and development programs will be misdirected or not have a maximum impact on economic achievement. For example, is infrastructure improvement alone sufficient without being balanced by a skilled workforce capable of utilizing it? Conversely, will improving human resource quality be optimal if hampered by inadequate infrastructure? Therefore, this research is important and relevant to conduct. This study aims to analyze in depth the implications of increasing *human capital* and infrastructure development on economic growth in Palopo City.

Human resources are a strategic aspect that drives an organization to achieve its goals by producing output. Therefore, the quality of the output produced is largely determined by the quality of its human resources. From a modern perspective, human resources are no longer viewed solely as a factor of production, but rather as a strategic asset that plays a role in creating added value and competitive advantage for an organization (Khan et.al2025).

The economy in Palopo City in the first quarter of 2025, measured by the gross regional domestic product (GRDP) at current prices, reached Rp 2.66 trillion and at 2010 prices, reached Rp 1.59 trillion. The economy in Palopo City in the second quarter of 2025 experienced growth of 4.34 percent. In terms of production, the primary sector experienced the highest growth of 7.52 percent. Finally, the household final consumption component (PK-RT) experienced the highest growth of 4.31 percent.

The primary objective of this research is to analyze the influence of human capital and infrastructure development on economic growth in Palopo City. Theoretically, this research is expected to contribute to the development of development economics, particularly regarding the role of human resource quality and infrastructure in driving regional economic growth.

Practically, the results of this study are expected to be a consideration for the Palopo City regional government in formulating appropriate policies to improve the quality of human capital and sustainable infrastructure development to encourage growth. more optimal economy.

Human Capital Theory

Human capital theory, as stated by *Ehrenberg*, states that employees have a set of skills that can be "rented" to their organization. Meanwhile, according to *Scarborough* and *Elias*, who said that the concept of human capital is very... useful and is seen as a bridging concept. In building a system, Human capital strategy has at least three most important components, namely the effectiveness of the executive team, leaders who deliver results, and excellence is a key position that cannot be negotiated. The concept of *human capital* should be seen as a bridge, namely defining the relationship between practice management HR with business performance. They show that human capital has a dynamic, implicit, non-standard, and contextual definition. These characteristics make human capital difficult to evaluate. *Human capital* is a characteristic of human resources determined by knowledge. owned And used To create value for the organization, value creation efforts are carried out through building

capabilities, strengthening business strategy direction, and prioritizing special opportunities to realize organizational competitive advantage. (Islahul Amri, & Misbahul Munir, 2020)

Human capital is the competency, knowledge, skills, and personality possessed by employees to carry out useful activities that generate economic value for the company. If human capital can be properly managed and utilized, it will become a key company resource. *Human capital* is a crucial factor in the production process because human resources are a vital asset in a company to improve company performance. *Human capital* is defined as the human being itself, which is. Personnel are lent to a company through their individual capabilities, commitment, knowledge, and personal experience. According to Malhotra and Bontis (in Abdullah), *human capital* is a combination of a person's knowledge, skills, innovation, and ability to perform their duties, thereby creating value and achieving goals. (Misna Ariani, et.al 2022).

Human capital is an added value for the company in the company every day, through motivation, commitment, competence, and teamwork effectiveness, the added value that can be contributed by workers in the form of developing the competencies owned by the company, transfer knowledge from worker to the company and changes in management culture. *Human capital* is a long-term investment long in development human resources to increase company productivity. (Islahul Amri, & Misbahul Munir, 2020).

H₁: There is a significant influence of human capital on economic growth in Palopo City.
Infrastructure Development Theory

Infrastructure development is a key element in driving economic growth and regional development. In the study of Development Economics, infrastructure is understood as physical facilities such as roads, bridges, electricity, clean water, and telecommunications that support economic and social activities. Adequate infrastructure improves connectivity, distribution efficiency, and facilitates the flow of goods and services, thus increasing economic productivity.

Theoretically, the role of infrastructure in development is explained by *Paul Rosenstein-Rodan through the Big Push theory*, which states that economic development requires large simultaneous investments, especially in the infrastructure sector, to overcome structural barriers in developing countries. *Rosenstein-Rodan* (1943) emphasized that without adequate infrastructure support, investment in other sectors will not run optimally due to high costs and low efficiency.

Albert O. Hirschman, in his *Unbalanced Growth theory*, argues that development should not be carried out evenly, but rather should be focused on strategic sectors such as infrastructure, which have forward and backward linkage effects. Hirschman (1958) stated that investment in infrastructure can stimulate the growth of other sectors through the resulting chain effect.

From the perspective of neoclassical growth theory proposed by *Robert M. Solow*, infrastructure is seen as part of capital accumulation that contributes to increased economic output and productivity. Solow (1956) explained that increasing the capital stock, including infrastructure, will drive long-term economic growth by increasing production efficiency.

David Aschauer emphasized the importance of infrastructure as a form of public capital that significantly influences private sector productivity. Aschauer (1989) stated that government investment in infrastructure such as transportation and public utilities can increase work efficiency, lower production costs, and accelerate economic growth.

Infrastructure Development

Definition of Infrastructure, according to the American *Public Works Association* (Stone, 1974 in Kodoatie, RJ, 2005) infrastructure is the physical facilities developed or needed by public agencies for government functions in the provision of water, electricity, waste disposal, transportation and similar services to facilitate social and economic goals. Based on the definition of infrastructure, infrastructure is a physical system needed to meet basic human needs in the social and economic sphere. Technically, the definition of infrastructure is explained as a physical asset designed in a system so as to provide important public services.

Therefore, infrastructure is a component in the form of facilities and infrastructure (networks) that are inseparable from each other and defined in a system. Definition of Infrastructure, according to *Grigg* (1988) infrastructure is a physical system that provides transportation, irrigation, drainage, buildings and other public facilities, which are needed to meet basic human needs, both social and economic needs. (Fradya Randa, Lastri Anggi Fani. 2023)

Infrastructure is the physical facilities that support a community's economic and social activities. This includes roads, transportation, electricity, clean water, telecommunications, and other public facilities. According to economic development theory, infrastructure plays a role in reducing transportation costs, increasing distribution efficiency, encouraging investment, and improving regional connectivity. (Fradya Randa & Lastri Anggi Fani. 2023)

H₂ : There is a significant influence of infrastructure development on economic growth in Palopo City .

Theory Growth Economy

The theory of economic growth can be defined as an explanation of what factors determine the increase in per capita output in the long term, and an explanation of how these factors interact with each other, so that a growth process occurs (Abidin & Faisal. 2023) .

Economics does not have just one theory growth, but there are many theory growth. Economists have varying views or perceptions regarding the growth process of an economy .

Theory Economy Neo- Classical

According to the views of neo-classical economists, there is factors that influence economic growth, namely: population , investment, education and health, and the level of technology used. In neoclassical growth theory, it is assumed that land area and natural resources remain constant and the level of technology does not change.

But the experts economy classic on generally only focuses on the influence of population growth on economic growth. (Sari & Meylika Juwita . 2025).

Theory Robert-Solow

Robert Solow's theory of economic growth , also known as the Solow-Swan model, states that growth Economic growth stems from three main factors: capital accumulation, labor force growth, and technological progress. This theory argues that economic growth cannot be sustainable without there is progress technology, which considered as an exogenous factor. Population growth can be seen from health figures, if their health figures are good then the quality workforce will also increased. (Sari & Meylika Juwita)

Economic growth is the process of increasing per capita *output* that continues over the long term. Economic growth is also defined as an increase term long ability something country in increasing the availability of economic goods for its population. The geographical

conditions and natural resource differences of regions create conditions where some regions are more prosperous and advanced than others. Therefore, development policies are implemented to achieve high economic growth by utilizing existing potential and resources according to the different conditions of each region. This process is carried out to ensure development is implemented more equitably. Economic growth is a condition that allows for the growth of a country's or region's gross domestic product. Economic growth is said to increase if the percentage increase in gross domestic product gross (GDP) on a period more big from the previous period. This increase in GDP is not accompanied by a percentage calculation of the population growth rate. Therefore, economic growth is a condition where a country's GDP increases, regardless of whether the increase is greater or less than the population growth rate. (Lili Wulandari etc. 2023)

Economic growth is the process of continuously changing a country's economic conditions towards a better state over a certain period. Economic growth can be defined as: Also as process increase capacity The production of an economy, manifested in the form of increased national income. Economic growth is an indication of successful economic development. A country's economic progress is always measured by its economic growth. This applies to developing countries like Indonesia, where economic growth will always be a focus. To achieve sustainable economic growth, tall However still stable so That it's not easy if not followed by the ability of macroeconomic variables to address each problem. (Islahul Amri & Misbahul Munir , 2020)

H3 : There is a significant influence of increasing human capital and infrastructure development on economic growth in Palopo City.

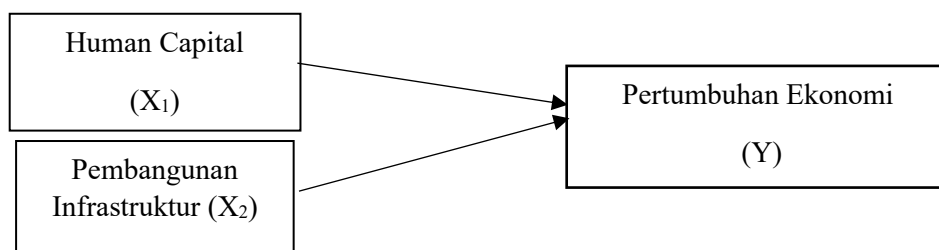


Figure 1. Conceptual Framework

Research Methods

Study This use approach quantitative with analysis panel data regression that combines time series and cross-sectional dimensions , as well as designed cross -sectionally because done in One period without existence action carry on (*follow up*), with objective For know the influence of human capital and development infrastructure to growth economy in Palopo City Good in a way partial and simultaneous . Approach model the subject used is *case control* , which emphasizes measurement variables independent and dependent in same time . Research This held in Palopo City with period observation 2015 to 2024 , which is assessed Enough representative For describe connection between variables . Population in study This covers all over There are 12 sub- districts in Palopo City , with technique taking sample use method census , so that all over population made into sample research . The data used is secondary data obtained from the Central Statistics Agency (BPS) of Palopo City , reports and publications government area , as well as document supporters others , with technique data collection through documentation and validity testing is carried out through triangulation source .

Data analysis using multiple linear regression For test influence variables independent to variables dependent , which is equipped with assumption test classic includes normality tests , multicollinearity , heteroscedasticity , and autocorrelation use ensure the model meets necessary assumptions . In addition that , testing was also carried out hypothesis through partial tests (t-test) and simultaneous tests (F-test), as well as measurement coefficient determination (R^2) for know to what extent the variables independent capable explain variations in variables dependent, so that results analysis obtained can interpreted validly and comprehensively.

Results and Discussion

A normality test was conducted to determine whether the data in this study, particularly the residuals from the regression model, were normally distributed. This test is a prerequisite for linear regression analysis, where a good model is one with a normal residual data distribution.

Table 1. Normality Test

Variables	Statistics	Sig.	Information
Residual	0.086	0.200	Normal

Source: data processed by SPSS 26

The normality test results show a significance value of 0.200, which is greater than 0.05. This indicates that the residual data in the regression model is normally distributed. Therefore, the normality assumption has been met, and the regression model is suitable for further analysis.

Multicollinearity Test

A multicollinearity test is performed to determine whether there is a strong linear relationship between the independent variables in a regression model. A good regression model should not have a strong correlation between the independent variables, as this can affect the accuracy of the analysis results.

Table 2. Multicollinearity Test

Variables	Tolerance	VIF	Information
Human Capital	0.684	1,462	No happen multicollinearity
Infrastructure Development	0.786	1,547	No happen multicollinearity

Source: data processed by SPSS 26

Based on the tolerance value for both independent variables is greater than 0.10 and the VIF value is less than 10. This indicates that there is no high linear relationship between the independent variables. Thus, the regression model is free from multicollinearity problems.

Heteroscedasticity Test

The heteroscedasticity test is performed to determine whether there is inequality in the residual variances in the regression model. A good regression model should not experience heteroscedasticity, or in other words, have a constant residual variance (homoscedasticity).

Table 3. Heteroscedasticity Test

Variables	Sig.	Information
Human Capital	0.317	No happen heteroscedasticity
Infrastructure Development	0.428	No happen heteroscedasticity

Source: data processed by SPSS 26

Based on the significance value of each variable, it is greater than 0.05, indicating that there is no heteroscedasticity in the regression model. This indicates that the residual variance is constant (homoscedasticity), making the model suitable for use.

Autocorrelation Test

An autocorrelation test is performed to determine whether there is a correlation between residuals from a specific time period and the previous period in a regression model. Autocorrelation is common in time series data, so this test is important to ensure that the regression model used is free from this problem.

Table 4. Autocorrelation Test

Model	Durbin-Watson	Information
1	1,978	No happen autocorrelation

Source: data processed by SPSS 26

Durbin-Watson value of 1.978, it falls within the range of 1.5 to 2.5. This indicates no autocorrelation in the regression model. Therefore, residuals between time periods are uncorrelated.

Multiple Linear Regression Analysis

Multiple linear regression analysis was used in this study to determine the influence of independent variables, namely Human Capital (X_1) and Infrastructure Development (X_2), on the dependent variable, namely Economic Growth (Y).

Table 5. Regression Test Multiple

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2,314	0.842	–	2,748	0.028
X1 (Human Capital)	0.628	0.126	0.512	4,985	0.002
X2 (Infrastructure Development)	0.547	0.125	0.468	4,372	0.004

Source: data processed by SPSS 26

The multiple regression equation is as follows:

$$Y = 2.314 + 0.628X_1 + 0.547X_2$$

a. The constant value (a) is 2.314, meaning that if the Human Capital (X_1) and Infrastructure Development (X_2) variables are considered constant or have a value of zero, then the value of the Economic Growth (Y) variable is 2.314 percent.

b. The regression coefficient value of Human Capital (X_1) is 0.628, which means it describes the direction of a positive relationship between the independent variable (Human Capital)

and the dependent variable (Economic Growth). Every 1 percent increase in Human Capital will increase Economic Growth by 0.628 percent.

c. The regression coefficient value of Infrastructure Development (X_2) is 0.547, which means it shows a positive relationship between the independent variable (Infrastructure Development) and the dependent variable (Economic Growth). Every 1 percent increase in Infrastructure Development will increase Economic Growth by 0.547 percent.

T-test

A t-test was conducted to determine the partial effect of each independent variable on the dependent variable in the regression model. This test aimed to determine whether the individual variables of Human Capital and infrastructure development had a significant influence on economic growth.

Table 6. T-Test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2,314	0.842	—	2,748	0.028
X_1 (Human Capital)	0.628	0.126	0.512	4,985	0.002
X_2 (Infrastructure Development)	0.547	0.125	0.468	4,372	0.004

Source: data processed by SPSS 26

Partial regression testing (t-test) was conducted to determine the partial influence between the independent variables, namely Human Capital (X_1) and Infrastructure Development (X_2) on the dependent variable, namely Economic Growth (Y). The significance level used was 0.05. The t-test was conducted by comparing the calculated t-value with the t-table and looking at the significance value.

Based on the analysis results, the calculated t value for the Human Capital variable (X_1) was 4.985 with a significance value of 0.002. Because the calculated t value is greater than the t table ($4.985 > 1.812$) and the significance value is smaller than 0.05 ($0.002 < 0.05$), it can be concluded that Human Capital (X_1) has a positive and significant effect on Economic Growth (Y).

Furthermore, the calculated t value for the Infrastructure Development variable (X_2) is 4.372 with a significance value of 0.004. Because the calculated t value is greater than the t table ($4.372 > 1.812$) and the significance value is smaller than 0.05 ($0.004 < 0.05$), it can be concluded that Infrastructure Development (X_2) has a positive and significant effect on Economic Growth (Y). Thus, the results of the partial test (t-test) show that both independent variables, namely Human Capital and Infrastructure Development, individually have a significant effect on Economic Growth.

F test

The F-test is conducted to determine the simultaneous influence of independent variables on the dependent variable in a regression model. This test aims to determine whether the human capital and infrastructure development variables together have a significant influence on economic growth.

Table 7. F Test

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	285,472	2	142,736	36,752	0.000 ^b
Residual	27,156	7	3,879		
Total	312,628	9			

Source: data processed by SPSS 26

Based on the table above, the calculated F value is **36.752** with a significance level of 0.000 . Because the significance value is less than 0.05 ($0.000 < 0.05$), it can be concluded that simultaneously the Human Capital (X1) and Infrastructure Development (X2) variables have a significant effect on Economic Growth (Y).

This shows that the regression model used in this study is appropriate and able to explain the relationship between the independent variables and the dependent variables together.

Coefficient of Determination Test

The coefficient of determination test is conducted to determine the extent to which the independent variables explain the dependent variable in the regression model. The coefficient of determination indicates the contribution of the Human Capital and infrastructure development variables to economic growth.

Table 8. Determination Coefficient Test

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.657 ^a	0.913	0.769	1.28452

Source: data processed by SPSS 26

Based on the R Square value of 0.657 shows that the ability of the Human Capital (X1) and Infrastructure Development (X2) variables to explain the Economic Growth (Y) variable is 65.7% . Meanwhile, the Adjusted R Square value is 0.769. shows that after adjustment, the contribution of the two independent variables to economic growth is 76.9% , while the remaining 23.1% is influenced by other variables outside the research model.

Discussion

Human Capital Development on Economic Growth

This study aims to determine the effect of *human capital* on economic growth. Based on the analysis, *human capital* has a positive and significant impact on economic growth. This indicates that improving the quality of human resources, such as education, skills, and health, can increase labor productivity, thereby increasing economic output.

The results of this study align with previous research from the past five years. Research conducted by Sari (2025) stated that *human capital* has a significant influence on economic growth because the quality of education and public health are key factors in increasing productivity. Furthermore, research by Islahul (2020) also found that increased investment in education and workforce training can drive sustainable economic growth.

Another study by Lili (2023) shows that *human capital* plays a crucial role in accelerating economic growth, especially in developing regions. This is reinforced by research by Pradnya (2020), which states that high-quality human resources will increase productivity and

efficiency in economic activities. Thus, *human capital* is a key factor in driving economic growth in a region.

Infrastructure for Economic Growth

This research also aims to determine the impact of infrastructure development on economic growth. Based on the analysis, it was found that infrastructure development has a positive and significant impact on economic growth. This indicates that the availability of adequate infrastructure, such as roads, transportation, and public facilities, can facilitate economic activity and increase the efficiency of the distribution of goods and services.

The results of this study align with previous research conducted over the past five years. Research by Fradya (2023) shows that infrastructure development significantly impacts economic growth by improving connectivity between regions. Furthermore, research by Lili (2023) states that good infrastructure can improve economic efficiency and regional competitiveness.

Research conducted by Patra (2022) shows that economic growth has no significant impact on development inequality in Palopo City. These results indicate that increased economic growth is not necessarily accompanied by equitable distribution of development outcomes across regions or community groups. In other words, despite increased economic activity, the distribution of benefits remains unequal, thus perpetuating inequality.

These findings align with a common phenomenon in developing regions, where economic growth tends to be concentrated in specific sectors or regions. This situation leads to differences in welfare levels between regions, so high growth does not automatically reduce the development gap. Therefore, more targeted policies are needed, focusing not only on increasing economic growth but also on equitable development through strengthening infrastructure, improving human resource quality, and more equitable investment distribution across Palopo City.

Another study by Sari (2025) also found that infrastructure development plays a crucial role in boosting economic growth through increased productivity. This finding is reinforced by research by Islahul Munir (2020), which states that investment, including infrastructure, has a long-term impact on economic activity. Therefore, infrastructure development is a crucial factor in driving sustainable economic growth.

The Relationship Between Human Capital, Infrastructure, and Economic Growth

Human capital and infrastructure have a complementary relationship in driving economic growth. Human capital increases labor productivity, while infrastructure supports the smooth running of economic activity. (Sriwijaya 2025)

Infrastructure development is certainly inseparable from the aspect of equitable development itself so that the results are felt towards improving the welfare of the community, equitable infrastructure development certainly has a very broad impact on the community and provides a sense of justice for the community itself. Equitable development is a means of meeting the needs of the community so as to provide a sense of sympathy for the government. The development process is a more advanced change, in this case infrastructure development is the development of economic improvement through public facilities, while these facilities are more focused on development in the city center, so that migrant communities feel far from the reach of development, the most prioritized development for migrant communities is the affordability of economic access to enter the

city limits with the concept of equitable infrastructure development, this can facilitate the flow of goods and services and influence the increase

Conclusion

Based on the study on the Implications of Increasing Human Capital and Infrastructure Development on Economic Growth in Palopo City through linear regression analysis, it can be concluded that:

Based on the research results, it can be concluded that the Human Capital variable has a positive and significant influence on economic growth. This indicates that improving the quality of human resources, including education, skills, and health, can increase labor productivity, thereby impacting economic output. Thus, Human Capital is a crucial factor in driving sustainable economic development.

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