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Analysis of the Effects of Infrastructure and Human Capital on the Economic Growth in North Sumatera Province

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ABSTRACT

The objective of the research was to examine and analyze effects of road infrastructure, health infrastructure, Human Development Index (HDI) and labor force on the economic growth in North Sumatera Province. In model equation, economic growth was regarded as dependent variable while roads, health infrastructure, HDI and labor force are independent variables. The scope of this research was the statistical data of North Sumatera Province in 1992-2021. The technique analysis in this research used partial and simultaneous test with SPSS 26. The result of this research indicates that roads, health infrastructure, HDI, labor force had significant and simultaneous effect on the economic growth. Partially, it was indicated that road infrastructure, had positive and significant effects on the economic growth. Health infrastructure had positive and significant effects on the economic growth. HDI had positive and significant effects on the economic growth, labor force had positive and significant effects on the economic growth in North Sumatera Province.

Keywords: *Human Capital, HDI, Road Infrastructure, Health Infrastructure, Economic Growth, Labor Force.*

INTRODUCTION

Development is an activity that is carried out continuously to improve the quality of people's lives. In the book Economic Development (Michael P. Todaro, Stepen C. Smith, 2008) development should be viewed as a multi-dimensional process that includes a variety of fundamental changes in social structure.

The objectives to be achieved in economic development are realized in various policies, in general, it can be concluded as follows: 1.Achieve high economic growth and rapid national production. 2.Achieve a level of price stability dam control inflation in the economy. 3.Address the problem of unemployment and the expansion of employment opportunities for the entire labor force. 4.A fair distribution of income is also equitable.

One of the benchmarks of the success of the development process is reflected in the Gross Regional Domestic Product (GRDP) in a particular region. The higher the economic growth of a region signifies the better economic activity is obtained from the GDP growth rate on the basis of constant prices (Todaro and Smith, 2008).

The role of the government as a driver of development, is very strategic in supporting the improvement of public welfare and economic growth of the country.

Economic growth is also an indicator to see the results of development that has been done and is also useful to determine the direction of development in the future.

Development in the field of economics is placed on top priority in the framework of economic development. Economic development is related to efforts to equalize the results of equitable development throughout the region, as an effort to increase community income.

Regional economic development is a process by which local governments and all components of society manage existing resources to form a partnership pattern to create new jobs and stimulate the development of economic activities in the region (Arsyad,1999 : 108). In addition to GDP, the benchmark for the success of regional development can be seen from economic growth, economic structure and the smaller income inequality between residents, between regions and between sectors.

Positive economic growth indicates an increase in the economy, while negative economic growth indicates a decrease. The government in carrying out development throughout the territory of Indonesia makes policies to ease the burden on the business world or business.

Development is actually done to reduce and even eliminate poverty, inequality and unemployment in the context of economic growth. To assess the increase in economic development, in Sirojulzilam (2015) can be seen from the level of increase in Gross Domestic Product (GDP) for the national level and Gross Regional Domestic Product (GDP) for the regional or regional level.

GRDP Data is a macro, aggregative and sectoral data. In Sirojulzilam in Regional Economic Development (2015) economic development is seen as an increase in per capita income and the pace of economic development is aimed at with an increase in Gross Domestic Product (GDP) to the national level. As for the regional and regional refer to GDP data.

GDP increases in terms of economy is a reflection of rising incomes and as for the non-economic sector, there is also an increase in aspects of education, health, housing, environment and others.

GDP growth that continues to increase every year must also be supported by an increase in adequate human resources to increase the amount of output is great. This creates new opportunities for workers. Kuznetz in Jhingan (2008) defines economic growth, as a long-term increase in the ability of a country to provide more and more types of economic goods to the population.

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North Sumatra as one of the largest provinces in Indonesia has an increase in GDP every year. North Sumatra has a variety of resources that can be maximized to achieve economic growth.

However, in 2021, economic growth experienced minus 1.07 percent due to economic stagnation due to the covid-19 pandemic.

Table 1 GDP Growth Rate At Constant Prices (Percent) In 1992-2021

Year	Speed PDRB	Year	Speed PDRB	Year	Speed PDRB
1992	10,94	2002	4,07	2012	6,22
1993	14,51	2003	4,48	2013	6,01
1994	11,97	2004	5,74	2014	5,23
1995	3,91	2005	5,48	2015	5,10
1996	5,24	2006	6,20	2016	5,18
1997	11,46	2007	6,90	2017	5,12
1998	-7,99	2008	6,39	2018	5,18
1999	-0,13	2009	5,07	2019	5,22
2000	7,5	2010	6,35	2020	-1,07
2001	3,98	2011	6,58	2021	2,61

Source: BPS (processed)

The cause of the progress of GDP increased one of them is infrastructure. The rate of economic growth of a country is closely related to the growth of infrastructure, which is fundamental for economic progress today. The government of the Republic of Indonesia is currently intensively developing infrastructure for connectivity between regions.

Improving physical infrastructure can increase the rate of economic growth and improve other areas such as education and Health and community connectivity (www.kemenkeu.go.id)

Road infrastructure is very important for connectivity between regions in North Sumatra given the vast area of North Sumatra. The contribution of transportation to GDP in North Sumatra, as in table 1, the highest in 2004 was 13.49 percent. While reaching the lowest point in 2020 as much as minus 3 percent more. This is due to the covid-19 pandemic which caused the government to cut part of its budget to refocusing on more important budgets.

The main priority of the current government is to increase the development of infrastructure projects throughout Indonesia to overcome the wave of unemployment such as roads, bridges, ports, docks, energy generation, transportation and public housing. In addition to absorbing Labor, infrastructure projects also make economic projects move. For this reason, the infrastructure budget will be prioritized in allocating it in the state budget (APBN) and regional budget (APBD). By doing so, unemployment can be overcome so that the poverty rate decreases, and economic infrastructure to improve the real sector can be improved better.

The government in implementing development in all regions of Indonesia issued a number of policies to ease the burden on the business world and business. The development priorities of the Indonesian government since five years ago have focused on building roads, basic infrastructure such as bridges, ports, docks to housing.

Infrastructure budget prioritized allocation in the state budget and budget. Stone in Kodoatie (2003) defines infrastructure as physical facilities developed or needed by public agencies for government functions in water supply, electric power, waste disposal, transportation to achieve economic and social goals.

Grigg in Kodoatie (2003) states the infrastructure system in defined as facilities or basic structures, equipment, installations that function for the social and economic system of society.

The World Bank divides infrastructure into 3, namely:

1. Economic infrastructure, is the physical infrastructure needed to support economic activity. Includes water, telecommunications, sanitation, gas or public utilities, roads, dams, canals, drainage, irrigation or public Works and transport sectors such as ports, rail and airports.
2. Social infrastructure, including educational, health, housing, and recreational facilities.
3. Administrative infrastructure, including law enforcement agencies, administrative control centers and coordination.

J'afar M. (2007) States infrastructure has a positive role on economic growth. Infrastructure in the short term creates jobs and construction, medium and long term will create increased efficiency and productivity of related sectors.

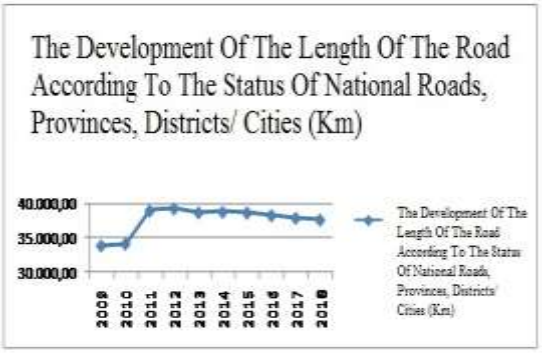
Infrastructure is a locomotive to drive economic development not only in urban areas, but also in rural areas. Through projects, the infrastructure sector can create jobs that absorb a lot of Labor. Infrastructure is the pillar that determines the smooth flow of goods, services, people, money and information from one zone to another.

These conditions allow the price of goods and services will be cheaper. Thus, the turnover of goods, services, people, money and information also determine price movements in markets. In other words, Road infrastructure, neutralize the prices of goods and services between cities and villages.

Some of the results of research on new growth theory (new growth theory) try to explain the importance of infrastructure in driving the economy. This theory includes infrastructure as an input that affects

aggregates and increases the boundaries of technological progress that gives rise to externalities (Hulten and Schwab, 1991).

Figure 1 The Development Of Roads In North Sumatra Province



Source: Central Bureau of Statistics, various editions

In Figure 1, the increase in road sections in North Sumatra province occurred a significant increase in 2012 along 39,240.91 km, while in 2009 the length of the road 33,874. 129 km. At the end of 2018, the length of the road became 37,624.09 km.
The development of the road is allegedly on the road with national status and Regency/city status because there is regional expansion in some areas such as the Nias Islands. Meanwhile, provincial road sections tend to remain from year to year.

Table 2 Road Length Development By Status National, Provincial, District And City Road

Year	Road Length (KM)	Year	Road Length (KM)
1992	22934,44	2007	36966,47
1993	21693,52	2008	34575,49
1994	24738,64	2009	33874,19
1995	17349,01	2010	34158,42
1996	21761,96	2011	38957,81
1997	23267,47	2012	39240,91
1998	22484,00	2013	38681,80
1999	26536,00	2014	38751,40
2000	28063,44	2015	38647,88
2001	31280,43	2016	38825,43
2002	32575,18	2017	37882,71
2003	32894,43	2018	40369,43
2004	33561,78	2019	40737,14
2005	33963,18	2020	40739,05
2006	33963,18	2021	40737,18

Source: Central Bureau Of Statistics (Processed)

The road is part of public capital to provide intermediate services directly or indirectly increase production in the private sector. Infrastructure externalities affect production activities with the influence of accessibility and make production activities more productive. causing the role of the public sector to be one of the inputs in the factors of production, the role of the productive public sector creates a positive link between government and economic growth.
In addition to road infrastructure, health infrastructure is also very important. Health infrastructure is closely related to improving the quality of life of individuals. In addition to health insurance provided by the government, the existence of hospitals, health centers and the availability of medicines also greatly affect. Meanwhile, in the health sector, the formation of human capital is also seen in the development of the health facilities and infrastructure sector. Improving the quality of life of the community is reflected in the number of facilities and infrastructure available.

Table 3 Growth Rate And Number Of Health Facilities And Infrastructure In North Sumatra In 2009-2018

Year	Government General Hospital	Private General Hospital	Puskesmas	Puskesmas Assistant	Posyandu	Pharmacy
1992	20	67	329	1427	15296	300
1993	20	67	335	1353	15299	307
1994	21	86	369	1513	16304	309
1995	48	71	380	1706	15918	342
1996	46	75	385	1741	19302	360
1997	46	79	379	1740	15386	390

Table 3 To Be Continued…						
1998	22	75	402	1807	17141	361
1999	22	75	407	1808	17140	382
2000	26	83	409	1856	16162	481
2001	30	141	408	1789	17243	506
2002	30	141	408	1789	17243	506
2003	34	149	428	1689	16852	540
2004	34	93	437	1808	14640	687
2005	28	119	437	1808	12611	696
2006	29	102	449	1937	13001	544
2007	57	112	459	1797	14533	767
2008	62	128	493	1933	14593	820
2009	59	141	501	1941	14961	820
2010	44	148	526	1803	15242	977
2011	44	148	545	1917	14644	977
2012	61	142	569	2085	15495	977
2013	61	146	570	1910	15594	977
2014	60	146	570	1927	15618	1511
2015	63	151	571	1846	15592	1271
2016	63	140	571	2030	15618	983
2017	53	151	571	2030	15578	1373
2018	49	164	661	1887	15579	740
2019	56	149	624	1822	15543	640
2020	67	159	628	1874	15888	705
2021	71	162	618	1799	15628	709

Source: Central Bureau of Statistics (processed)

In Table 1.4, it can be seen that the number of health facilities and pre-health facilities in North Sumatra tends to fluctuate. The number of public and private hospitals, health centers, posyandu and pharmacies has increased every year.

In 2009 the number of health facilities and infrastructure amounted to 18,423 and experienced a significant increase over the next three years to 19,329 units. And at the end of 2018 health facilities and pre-facilities were monitored 19,080 units.

The proportion of private public hospitals that are twice as many as government public hospitals has implications for the uneven access to health can be enjoyed by many audiences. Considering that not all levels of society are able to get access to private hospitals compared to government hospitals. The increase in GDP in each sector indicates good growth in the province. This situation must be supported by a good increase in human resources, with these qualities will be able to meet the demand in the labor market.

Therefore, the increase in human resources is the main factor to carry out technology transfer, and is able to become a driving factor for changes in the economic structure in North Sumatra.

Table 4 Population Aged 15 Years And Above Who Work According To The Highest Education Completed By The Province Of North Sumatra

Highest Education Terminated	Year									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SD down	45,92	43,41	43,41	41,96	37,89	10,47	40,66	38,14	36,31	35,83
SMP	23,02	24,36	24,36	26,42	23,80	31,00	23,70	23,25	24,13	24,32
SMA	25,98	27,73	27,73	26,49	32,90	28,94	29,27	31,99	32,26	32,52
Diploma I,11 dan III, University	5,08	4,49	4,49	5,14	5,40	29,59	6,37	6,62	7,32	7,33
Total	100	100	100	100	100	100	100	100	100	100

Highest Education Terminated	Year									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
SD down	34,91	32,79	33,05	29,52	31,12	29,21	27,62	20,00	27,00	26,00
SMP	23,97	24,49	22,20	21,87	21,22	20,66	20,78	29,00	21,00	20,00
SMA	32,73	34,16	35,48	37,59	36,28	37,70	38,95	38,00	40,00	41,00
Diploma I/II/III dan University	8,40	8,56	9,27	11,02	11,38	12,53	12,64	13,00	12,00	13,00
Total	100	100	100	100	100	100	100	100	100	100

Source: Central Bureau Of Statistics (Processed)

From the table above, it can be seen that the increase in the human resources sector in North Sumatra province continues to increase every year. It can be seen that the workforce with university graduates has increased annually by an average of 0.7 percent in the period 2002 to 2021. Nevertheless, the labor force with the status of elementary school graduates and below still looks high in North Sumatra province, although it continues to decline every year. Efforts need to be made to increase the number of educated labor force, considering the productivity of the educated labor force is able to increase economic growth significantly.

Table 5 Percentage Of North Sumatra Labor Growth 1992-2021

Year	Rise	Year	Rise	Year	Rise
1992	-13,3	2002	-1,0	2012	=2,7
1993	2,3	2003	-1,9	2013	2,6
1994	3,0	2004	-1,6	2014	-0,3
1995	4,0	2005	8,6	2015	1,4
1996	1,8	2006	=5,9	2016	11,7
1997	1,5	2007	4,6	2017	0,1
1998	-2,4	2008	9,0	2018	5,7
1999	11,2	2009	4,1	2019	-0,01
2000	-1,8	2010	6,2	2020	2,4
2001	0,6	2011	-3,5	2021	2,2

Source: BPS (processed)

Son (2007, 1) states that there is a positive relationship between education, income, and productivity of a person in the world of work. It is generally found that the higher the education of a person then he will have a higher employment-rate. Workers who are better educated, have better human capital can be more competitive in the job market.

Meanwhile, human capital is also an important variable in economic development. In Mailendra (2009) "social development is economic development" quality human capital is believed to be better economic performance.

The performance of development progress is seen from how well a country raises the Human Development Index (HDI). HDI reflects development progress in the Economic, Education and health sectors.

Table 6 Human Development Index Of North Sumatra (1992 – 2021)

Year	IPM	Year	IPM
1992	68,70	2007	72,78
1993	70,30	2008	73,29
1994	69,20	2009	73,80
1995	70,23	2010	67,09
1996	70,50	2011	67, 34
1997	70,51	2012	67,74
1998	70,53	2013	68,36
1999	66,60	2014	68,87
2000	66,42	2015	69,51
2001	80,50	2016	70,00
2002	68,80	2017	70,57
2003	69,80	2018	71,18
2004	71,40	2019	71,74
2005	72,00	2020	71,77
2006	72,50	2021	72,00

Source: www.bps.go.id various editions (processed)

From the data above, it can be seen that the HDI data is increasing every year. The calculation of HDI is by two methods, namely the old method in 1992 to 2009 and the new method in 2010 to 2021.

Meanwhile, human capital also has a strategic role in economic development the accumulation of human capital is expected to be a source of sustainable development.

According to Mincer (1996), the interrelationship between economic growth and human capital growth becomes an important aspect for sustainable economic growth. According to Becker (2002) human capital is defined as the knowledge, information, ideas, expertise and health of an individual.

Meanwhile, Acemoglu & Autor (2005) defines human capital as something related to the provision of knowledge or characteristics of workers owned.

Theoretically the initial approach to analyzing economic growth according to neo classical economic growth theory by (Slow, 1956) and (Swan,1956), is interpreted as with the function as labor,physical capital and the existence of exogenous factors of technology. The role of human capital in the economic growth of a country or region in a country is a development of modern economic theory, namely the endogenous growth model.

Further research that provides analysis of the influence of human capital on the development of economic growth was conducted by (Mankiw et al,1992) using

Augmented Solow Growth Model with human capital as an additional factor of production.

Based on previous research, conducted by P. Eko Prasetyo (2008), suggested that to get a significant effect of economic growth, it is necessary to invest in human capital, social capital, infrastructure and Information Technology. Similarly, with Abdullah (2014), that re-structuring is needed in the allocation of fiscal policy so that later human capital, fiscal allocation and economic growth become a continuous flow for the achievement of people's welfare.

Meanwhile, infrastructure according to Rindang M. Prasetyo and M. Firdaus (2009), argued that the role of infrastructure is able to provide a significant impact for economic growth, therefore government policy in the field of infrastructure is appropriate.

In the province of North Sumatra, the process of infrastructure development is carried out in various regions, in addition to improving the quality of human resources. Therefore, the author is interested in conducting scientific research, on the impact of infrastructure development and human capital on the economic growth of North Sumatra in the last 30 years.

LITERATURE REVIEW

Economic Growth

Economic growth is a process that describes an increase in the ability of an economy in a country to produce goods and services. The economy is said to grow or expand when there is growth in real output. Economic growth describes the rise in living standards measured by calculating the real output per person. In measuring economic growth it is common to use data on Gross Regional Domestic Product (GDP) the existence of economic growth is an indication of the success of economic development.

Gross Regional Domestic Product (GDP)

Gross Regional Domestic Product (GRDP) is the sum of all product values of goods and services produced by production units operating in a region within a certain period of time. Or when viewed in terms of income, it is the sum of the income received by the factors of production owned by the population in the region who participated in the production process within a certain period of time.

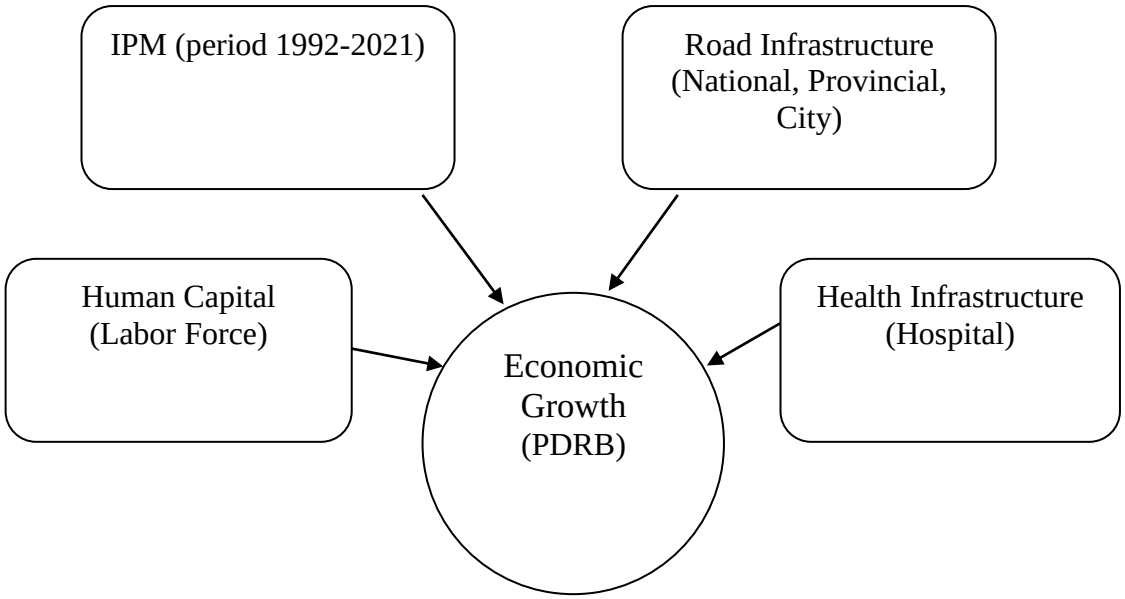


Figure 2. Conceptual Framework

Hypothesis

Based on the research background and the relationship between variables, the research hypothesis :

1. It is suspected that road physical infrastructure variables have a positive effect on the economic growth of North Sumatra region.
2. It is estimated that health infrastructure, namely the number of hospitals (government and private hospitals) has a positive influence on the economic growth of the North Sumatra region.
3. It is suspected that variables and HDI have a positive effect on the economic growth of North Sumatra region.
4. It is suspected that the human capital variable, namely the registered labor force, has a positive effect on the economic growth of the North Sumatra region.

MATERIAL AND METHODS

This research is a type of descriptive analysis research with quantitative approach that is processed and analyzed to draw conclusions. Research conducted with SPSS for 30 years of data in 1992-2021.

The type of data used in this thesis is secondary data in the form of time series data. The data source was obtained from the Central Statistics Agency of North Sumatra 1992– 2021 as well as various sites related to the study.

Methods and techniques of data collection in this study using library research methods (library research) is research conducted through library materials in the form of books, scientific writings, journals, articles and Research reports that have to do with this research.

The method of analysis used in this study is a quantitative method. Analysis of the data used by testing the variables collected. Econometric Model is also used to determine the influence of infrastructure and human capital on economic growth in North Sumatra.

RESULTS

Classical Assumption Test Results

Normality Test

Normality can be tested with histogram charts, and probability plots. Data is called normal when it spreads around the diagonal of the histogram chart. On a probability plot, the data is called normal when it forms a diagonal line.

The test results of the Histogram chart can be seen in the following figure:

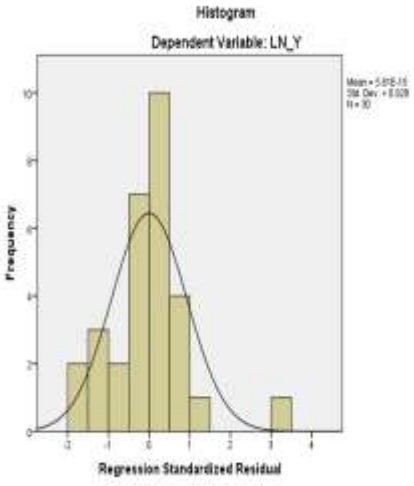


Figure 3 Histogram Chart

The analysis of the chart shows that the data spreads around the diagonal axis of the chart and follows the direction of the histogram chart. It can be concluded that the data is normally distributed.

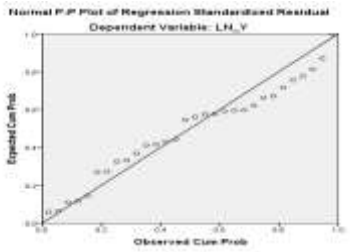


Figure 4 Probability Plot

On the P-Plot chart analysis above shows the dots spreading around the diagonal line and approaching the diagonal line. This shows that the model does not violate the normality assumption.

Multicollinearity Test

Multicollinearity is done to determine whether there is a strong relationship or intercorrelation between independent variables. A good regression Model is that there is no correlation between independent variables, or it can be said that there is no multicollinearity.

To find out then seen the results of tolerance and variance inflation factor (VIF). If the tolerance value is greater than 0.10, it can be said that there is no multicollinearity, while the VIF value <10.00 can be said that there is no multicollinearity.

Table 7 Multicollinearity Test Results Collinearity Statistics

Model	Tolerance	VIF	Description
Road	.283	3.533	Free Multicollinearity
Health	.175	5.699	Free Multicollinearity
IPM	.960	1.042	Free Multicollinearity
Labor Force	.178	5.605	Free Multicollinearity

Source: SPSS 22 (processed)

Based on the table above, it can be concluded that all independent variables have tolerance values >0.10 and VIF < 10.0 so that it can be concluded that there is no multicollinearity.

Heteroscedasticity Test

Heteroskedasticity is done to test whether the regression model occurs inequality variance of residual other observations. A good regression Model is a model that does not occur heteroskedasticity. Heteroskedasticity which causes a model less accurate. To see if the model occurs heteroskedasticity can be done by using Glejser test by looking at the value of Sig < 0.05 then heteroskedasticity occurs.

Table 8 Heteroscedasticity Test with Glejser Test

	Unstandardized Coefficients		***Standardized Coefficients***		
Model	**B**	**Std Error**	**Beta**	**t**	**Sig**
Road	.105	.264	.120	.397	.695
Health	-1.952	.674	-1.116	-2897	.058
IPM	.006	.877	-001	-007	.995
Labor Force	.176	.120	.558	1.461	.156

Source: SPSS 22 (processed)

Table 8 shows Glejser test results obtained Sig values of variables Road, health, HDI and labor force obtain sig values > of 0.005, it can be concluded that heteroskedasticity does not occur.

Autocorrelation Test

Autocorrelation to find the correlation between a series of observations sorted by time or space the test method is used, to see if there is a correlation between the disturbing variable in period t with the disturbing variable in the previous period.

Table 9 Autocorrelation Results

Change Statistics					**Durbin-Watson**
R Square Change	**F Change**	**df1**	**df2**	**Sig. F Change**	
.447	5.061	4	25	.004	1.758
a. Predictors: (Constant), LNX4, LNX3, LNX1, LNX2					
b. Dependent Variable: LN_Y					

Basic decision making autocorrelation is if the value of d<dl or d>4-dl then Ho rejected or autocorrelation occurs. If du <d <4-du then Ho is accepted, no autocorrelation occurs.

From the table above, then the value of n = 30, d = 1,758. While the value of dl = 1.426 yes and the value of du = 1.7386 = 2.2614 based on T table. Terms, HO accepted that du < d <4-du, then 1,7386 < 1,758 < (4 – 1,7386), so it can be concluded there is no autocorrelation.

Hypothesis Test

Test T

This test is used to determine how far the influence of the independent variable can partially affect the dependent variable. This test will compare the value of p value with. If p value < then H0 is subtracted and vice versa if p value > then H0 is accepted

Table 10 t-test results

Variable	Coefficient	Std.Error	t-statistic	Prob
C	122.92	38.179	3.221	0.034
Road (X1)	1740.000	0.008	23597	0.002
Health (X2)	614185	0.180	3404	0.018
IPM (X3)	2.611	20.974	23523.000	0.021
AK (X4)	199.200	81.402	2.447	0.004

Source: SPSS (processed)

From the table above, it can be concluded that the decision-making criteria in this study is if the value of significance < 0.05 means that each independent variable partially affects the GDP variable. Road (X1) has significance <0.05 so that partially has an influence on GDP. Then, Health (X2) has a significant, 0.008 < 0.005 so that it can be concluded that it has an influence on GDP. HDI has a significance value of less than 0.05, so it can be concluded partially affect economic growth. Meanwhile, the registered labor force (X4) has a significant < 0.05 means, has a partial influence on GDP.

Test F

Testing this hypothesis to see the simultaneous influence of independent variables on the influence of the dependent variable. If sig.f < 0.05 and F count > F table, then H0 is rejected and H1 is accepted, meaning that the independent variables have simultaneous influence on the dependent variable. Conversely, if sig. F > of 0.05 and F count < F table then H0 is accepted and H1 is rejected, the independent variable has no simultaneous influence on the dependent variable.

Table 11 Test F-Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.085	4	.521	5.061	.004[b]
	Residual	2.574	25	.103		
	Total	4.659	29			

a. Dependent Variable: LN_Y

b. Predictors: (Constant), LNX4, LNX3, LNX1, LNX2

Source: SPSS 24 (processed)

From the figure above, then df 1 = k – 1 where, k represents the number of variables and n is the number of data, so df 1= 4. Then, df 2 = n-k, where n = 30 and k = 5, means df 2 = 25. From the above calculation can be the value of F table = 2.76 and F count in the figure of 5.061.

Thus, F count is greater than F table, 5.061 > 2.76 with sig.F 0.004 < from 0.05, it can be concluded that, the variables of road, Health, HDI and labor force have a

simultaneous influence on economic growth variables.

Coefficient Of Determination

Coefficient of determination or called R Square, see how much influence roads, health, HDI and educated workforce to economic growth. From this test then we can see how much influence in the form of a percentage between the independent variables to the variable terika

Table 12 Coefficient Of Determination

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.669[a]	.547	.359	.32088	.547	5.061	4	25	.004	1.758
a. Predictors: (Constant), X4, LNX3, LNX1, X2										
b. Dependent Variable: Y										

Source: SPSS (processed)

Based on the figure above, the value of the R Square coefficient of economic growth (Y) has a value of 0.547 means that 55 percent of GDP variables can be explained by the variables of road infrastructure, health, HDI and labor force simultaneously. The remaining 55% is explained by other variables that are not included in this research model.

DISCUSSION

Influence Of Road Infrastructure On Economic Growth

The value obtained from the T-test of 0.002 < of < 0.05. This means that road infrastructure in the period 1992 – 2021 in North Sumatra has a positive influence and has a significant influence on the economic growth of North Sumatra.

The results of this study are in line with Ja'far M (2007) who stated that infrastructure has a positive role in economic growth. On a short-term basis, infrastructure increases the workforce but takes time in other sector improvements thus contributing significantly to economic growth. This is reflected in the highest infrastructure budget issued by the government, which in 2017 amounted to Rp 1.7 trillion and the increase in the educated workforce in the same year amounted to 1.2 million people.

Infrastructure development is a positive externality, where Ferry Prasetya (2013) in externality theory explained, positive extension is someone's action that provides benefits to others, but the benefits are not allocated to the market. That is, the costs incurred by the government for the infrastructure sector and generating positive benefits are not allocated in the market calculation. The party receiving the benefit does not determine the price and pay for the benefit, so the activity is not reflected in the market activity.

The results of this study are also in line with research conducted by Yanti MS (2018) on the effect of roads, electricity and water on GDP growth in Gowa regency, South Sulawesi. In that study, the road has a positive and significant influence on GDP growth.

On the calculation of the dominant variable, the road has the greatest influence of other independent variables, road infrastructure, health and HDI.

Effects Of Health Infrastructure On Economic Growth

Health infrastructure has a significant influence <0.05 IE 0.018. This means that health infrastructure variables have a positive and significant effect on the economic growth of North Sumatra. The number of health infrastructure in North Sumatra is also accompanied by Health Access guarantees obtained by the entire community. So that the increasing accessibility of society in the field of health, can improve the quality of life of

individuals, further increasing productivity. The high cost of Health is also in a sense can further affect the income of each individual.

In 2019-2020, the central and regional governments refocused on other budgets and increased spending in the health sector and handling the covid-19 pandemic. In this case the economy slowed, minus 1.07 percent in 2020.

This research is in line with research conducted by Aprillya Yudi Maharani (2019) in analyzing the effect of Infrastructure Development on economic growth in Central Java province where health infrastructure variables do not have an influence on economic growth.

Influence Of HDI On Economic Growth

The Human Development Index has a significant value of 0.021 < out of 0.05. So it can be concluded that the Human Development Index (HDI) in the period from 1992 to 2021 had a significant influence on economic growth. This is not consistent with the study (Priestnall et al., 2020) which shows the insignificant influence between HDI in influencing economic growth. Constantini V. dan M. Salcatore who explained that if Human Resource Development has increased, it will also affect the economic improvement.

Although in the existing social reality, economic growth has a dual cause relationship, the relationship of causality with HDI where each region has its own results. This is due to the difference in the composition of the three components of the HDI in influencing economic growth in the region.

The Influence Of The Educated Workforce On Economic Growth

In this variable, the significant value of 0.004 < of 0.05. It can be concluded that the educated workforce has a significant positive influence on the economic growth of North Sumatra. This is in line with the theory of Son (2007.1) states that there is a positive relationship between education, income, and productivity of a person in the world of work. It is generally found that the higher the education of a person then he will have a higher employment-rate. According to Becker (2002) human capital is defined as the knowledge, information, ideas, expertise and health of an individual. Whilemincer (1996), the interrelationship between economic growth and human capital growth becomes an important aspect for sustainable economic growth.

The role of the educated workforce turned out to have a significant impact on economic growth. That is, the government in addition to running infrastructure projects must be followed by improving the quality of human resources and technology transfer. This research is in line with Philip Ali Bachtiar (2013) with the title of analysis of the effect of educated labor, educated labor and realization of government capital expenditure on economic growth. In the study, explained that educated workers have a positive and significant influence on economic growth compared to uneducated workers on economic growth.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Based on the results of research and analysis described in the previous chapter, the following conclusions can be drawn:

1. Road infrastructure has a positive influence and a significant contribution to economic growth.
2. Positive health infrastructure also has a significant impact on the economic growth of North Sumatra.
3. The Human Development Index has a significant impact on the economic growth of North Sumatra.
4. The educated workforce has a positive and significant influence on the economic growth of North Sumatra.
5. The estimation results showed that the educated road variable became the dominant variable and made a positive contribution to the economic growth of North Sumatra.

RECOMMENDATIONS

The Suggestions of researchers from research that has been done are as follows:

1. From the above Research, road infrastructure contributes maximally to economic growth, so the government plays a major role in equitable development as well as the development of supporting infrastructure that can maximize the benefits of road infrastructure development. Strengthening the economic centers that have been built, and the establishment of economic growth centers in areas that are still lagging behind, is believed to be able to contribute greatly to the economic growth of North Sumatra.
2. New health infrastructure will have a positive impact on economic growth if it is supported by health insurance such as the comprehensive BPJS program and can cut health costs, especially among people who are considered underprivileged. So in the process, people's quality of life improves. Increasing government spending in the health sector can increase participation rates and work productivity.
3. Human Development Index (HDI) has a significant influence on the economic growth of North Sumatra. It is expected that the Government of North Sumatra province encourages the government in districts and cities in terms of improving the quality of life or human development index in the region to be able to improve the welfare of the people of North Sumatra in general.
4. The labor force is proven to have a positive and significant influence on economic growth. So it needs to be increased capacity and technology transfer, technical guidance programs, counseling, capacity building that has a positive effect on the workforce. The government is also encouraged to open new jobs, especially in sectors that contribute greatly to North Sumatra's original income.
5. The period of this study was conducted 30 years, with time series data, for further researchers need to conduct more in-depth research related to other variables that affect the economic growth of North Sumatra.

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