THE INFLUENCE OF LIFE EXPECTANCY, AVERAGE LENGTH OF SCHOOL AND EXPECTATION OF LENGTH OF SCHOOL ON HUMAN DEVELOPMENT INDEX IN BINJAI CITY

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ABSTRACT

This research aims to analyze the influence of life expectancy, average length of schooling, and expected length of schooling on the Human Development Index (HDI) in Binjai City, Indonesia. Using a quantitative approach and secondary data from the Central Statistics Agency (BPS) for the period 2010 to 2023, regression analysis shows that these three variables have a significant influence on HDI, with an Adjusted R Square of 0.995, which means 99.5% of the variation in HDI can be explained by these variables. the. The F test results showed a significant regression model (F = 865.744, Sig. = 0.000), while the t test confirmed that life expectancy (t = 6,139), average years of schooling (t = 8,478), and expected years of schooling (t = 6,254) contributes positively to HDI. These findings emphasize the importance of health and education in improving people's quality of life. This research recommends increasing access to education and health services as a strategic step to increase HDI and community welfare in Binjai City. It is hoped that the research results can become a reference for policy makers in designing effective programs for human development in the region

Keywords: Life Expectancy, Human Development Index (HDI)

INTRODUCTION

The Human Development Index (HDI) is an important indicator used to measure the level of development success in an area. HDI includes three main dimensions, namely health which is represented by life expectancy, education which is measured by the average number of years of schooling and expected years of schooling, and a decent standard of living which is assessed by per capita income. An increase in HDI reflects the government's success in improving the quality of life of its people, which has a direct impact on economic, social and cultural development in a region. HDI is often used as a reference in determining development policies, both at the local and national levels, because it provides a comprehensive picture of development achievements.

In Indonesia, the Human Development Index continues to be a major concern in various development agendas, both at the central and regional levels. Since it was first adopted by the Central Statistics Agency (BPS) in the 1990s, the HDI has become a key benchmark that helps the government map areas that require further policy intervention. Binjai City, as one of the developing cities in North Sumatra Province, has interesting development dynamics that need further research, especially regarding the factors that

influence the increase in HDI in this region. In the context of globalization and accelerated economic development, Binjai faces significant challenges in improving the quality of human resources (HR), which in turn will affect the city's competitiveness at the provincial and national levels.

One of the important dimensions in HDI is life expectancy, which reflects people's health conditions. Life expectancy shows the estimated average age of a person from birth based on health conditions, access to health facilities, and healthy lifestyle. A study conducted by Cutler, Deaton, and Lleras-Muney (2016) revealed that apart from medical advances, improvements in socio-economic conditions, such as education and income, also play an important role in extending life expectancy. Increasing life expectancy in an area can be an indicator that people in that area have better access to health services, adequate nutrition, and environmental conditions that support physical well-being. In Binjai City, with increasing public awareness of health, as well as government programs that focus on improving health facilities and services, it is hoped that it will be able to increase people's life expectancy.

Apart from the health aspect, education also plays a central role in increasing HDI. Education is one of the key factors in human development because with good education, people can improve their quality of life, improve their welfare, and participate more actively in economic development. According to Psacharopoulos & Patrinos (2018), quality education can increase an individual's ability to contribute actively to economic and social development. Education also plays an important role in building productive, innovative and competitive human resources. The two indicators used to measure the educational dimensions in the HDI are the average number of years of schooling and the expected number of years of schooling. Barro & Lee (2021) stated that expected years of schooling is an important predictor of the quality of human resources in the future. The high expected length of schooling in a region shows that the younger generation is expected to pursue a longer period of education, which will ultimately have a positive impact on improving the quality of life and the economy. Average years of schooling measures how long, on average, a person has had formal education, while expected years of schooling indicates how many years a person is expected to spend in education in the future. In Binjai City, even though education has become a development priority, there are still significant challenges in increasing the average number of years of schooling and expected years of schooling. Inequalities in access to education in several areas, especially remote ones, as well as problems with infrastructure and teaching quality are still the main obstacles.

Length of schooling is still below the national average. This shows that despite progress, much remains to be done to ensure that all citizens have equal access to quality education and health services. In the midst of global economic changes and the acceleration of technology, education must also be able to prepare students to face future challenges with the skills needed in the industrial era 4.0. Therefore, improving educational indicators, both the average length of schooling and the expected length of schooling, is a key factor in encouraging sustainable development in Binjai City.

Based on previous research conducted by Irvana and Siti (2019), it shows that life expectancy, expected length of schooling and average length of schooling significantly contribute to the human development index. However, research conducted by Arif et al (2023) stated that the expected length of schooling and the average length of schooling did not significantly influence the Human Development Index.

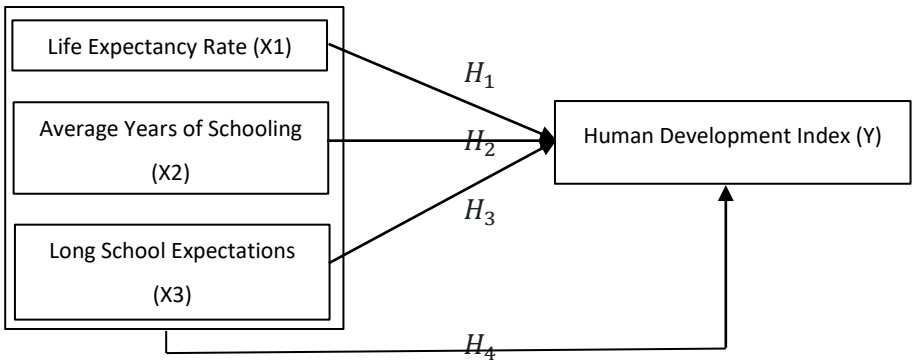
This research aims to dig deeper into how these three variables interact with each other and contribute to increasing HDI in Binjai City. By understanding the influence of each factor, it is hoped that more effective strategies can be formulated in improving people's quality of life. In addition, it is hoped that the results of this research will provide insight for policy makers to design programs that are more oriented towards improving the welfare of society as a whole.

RESEARCH METHOD

This research uses a quantitative approach by utilizing secondary data sourced from the Central Statistics Agency (BPS) regarding life expectancy, expected length of schooling, average length of schooling, and the Human Development Index (HDI) in Binjai City during the 2010-2023 period. Secondary data was chosen because it can provide broad and in-depth information regarding the variables studied without the need to collect primary data which requires more time and costs. According to Sugiyono (2019), the use of secondary data allows researchers to carry out more efficient and effective analysis in the context of social research.

After data collection, analysis was carried out using the multiple regression analysis method. Multiple regression analysis was chosen because it allows to identify the simultaneous influence of several independent variables (life expectancy, expected length of schooling, and average length of schooling) on the dependent variable (HDI). This analysis was carried out using SPSS software as a statistical tool that makes it possible to obtain accurate and reliable results. According to Ghozali (2021), SPSS is an excellent tool for quantitative data analysis and is widely used in various social and economic research.

Figure 1. Thinking Framework



Hypothesis

H1: Life expectancy has a significant effect on the human development index in Binjai City

H2: Average length of schooling has a significant effect on the human development index in Binjai City

H3: The expected length of schooling has a significant effect on the human development index in Binjai City

H4: Life expectancy, average years of schooling, and expected years of schooling have a significant effect on the human development index in Binjai City

RESULT AND DISCUSSION

Table 1. Multicollinearity Test

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-7.162	6.606		-1.084	.304		
	Harapan Hidup (X1)	.664	.108	.228	6.139	.000	.278	3.602
	Rata Lama Sekolah (X2)	1.986	.234	.514	8.478	.000	.104	9.573
	Harapan Lama Sekolah (X3)	.979	.157	.304	6.254	.000	.163	6.152

a. Dependent Variable: Ipm (Y)

Coefficientsa

(Source: SPSS data processed, 2024)

Multicollinearity Test: Based on the Coefficients table, we see the VIF (Variance Inflation Factor) value for each independent variable: Life Expectancy (X1): VIF = 3,602, Average Years of Schooling (X2): VIF = 9,573, Expected Years of Schooling (X3) : VIF = 6.152. Generally, a VIF > 10 indicates serious multicollinearity. In this case, all VIF values were < 10, indicating that multicollinearity was not a serious problem in this model. However, the VIF value for Average Years of Schooling (X2) is close to 10, which indicates a moderate correlation with other independent variables.

Table 2. Normality Test (Kolmogrov Smirnov)

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		14
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.14611087
Most Extreme Differences	Absolute	.265
	Positive	.265
	Negative	-.160
Test Statistic		.265
Asymp. Sig. (2-tailed)		.009[c]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

(Source: SPSS data processed, 2024)

Normality Test (Kolmogorov-Smirnov): The significance value of the Kolmogorov-Smirnov test is 0.009. A significance value < 0.05 indicates that the residuals are not normally distributed. This could be a concern and may require data transformation or use of more robust regression methods.

Table 3. Hteroscedasticity Test (Park Test)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-36.892	109.536		-.337	.743

	Harapan Hidup (X1)	.602	1.793	.183	.335	.744
	Rata Lama Sekolah (X2)	-5.016	3.884	-1.150	-1.292	.226
	Harapan Lama Sekolah (X3)	2.999	2.596	.824	1.155	.275

a. Dependent Variable: LN_RES

(Source: SPSS data processed, 2024)

Heteroskedasticity Test (Park Test): From the coefficients table for the Park test, we see the significance value for each variable: Life Expectancy (X1): Sig. = 0.744, Average Years of Schooling (X2): Sig. = 0.226, Expected Years of Schooling (X3): Sig. = 0.275. All significance values are > 0.05, which indicates there is no significant heteroscedasticity in the model. The residual variance tends to be constant for all values of the independent variable.

Table 4. Autocorrelation Test (Durbin Watson)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.998[a]	.997	.996	.16979	2.131

a. Predictors: (Constant), LAG_X3, LAG_X1, LAG_X2
b. Dependent Variable: LAG_Y

(Source: SPSS data processed, 2024)

It is known that Watson's durbin value is 2,131. This value is greater than du (1,600) and smaller than 4-du (2,400)

DU<DW<4-DU+1,600<2,131<2,400

There is no autocorrelation

Table 5. Coefficient of Determination

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.998[a]	.996	.995	.16659

a. Predictors: (Constant), Harapan Lama Sekolah (X3), Harapan Hidup (X1), Rata Lama Sekolah (X2)

(Source: SPSS data processed, 2024)

It is known that the Adjusted R Square value is 0.995, which means that the expected length of schooling, life expectancy and average length of schooling variables have an influence of 99.5% on the human development index variable and the remaining 5% is influenced by other variables.

Table 6. F test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	72.081	3	24.027	865.744	.000[b]
	Residual	.278	10	.028		
	Total	72.358	13			

a. Dependent Variable: Ipm (Y)
b. Predictors: (Constant), Harapan Lama Sekolah (X3), Harapan Hidup (X1), Rata Lama Sekolah (X2)

(Source: SPSS data processed, 2024)

F Test:

F = 865.744, Sig. = 0.000

A significance value < 0.05 indicates that the overall model is significant. At least one independent variable has a significant influence on HDI.

Table 7. (T test)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-7.162	6.606		-1.084	.304
	Harapan Hidup (X1)	.664	.108	.228	6.139	.000
	Rata Lama Sekolah (X2)	1.986	.234	.514	8.478	.000
	Harapan Lama Sekolah (X3)	.979	.157	.304	6.254	.000

a. Dependent Variable: Ipm (Y)

(Source: SPSS data processed, 2024)

t test (Hypothesis Test): Life Expectancy (X1): t = 6.139, Sig. = 0.000, Average Years of Schooling (X2): t = 8.478, Sig. = 0.000, Expected Years of Schooling (X3): t = 6.254, Sig. = 0.000. All independent variables have a significance value of <0.05, which indicates that each variable has a significant influence on HDI.

Table 8. Coefficient of Determination (R2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.998[a]	.996	.995	.16659

a. Predictors: (Constant), Harapan Lama Sekolah (X3), Harapan Hidup (X1), Rata Lama Sekolah (X2)

(Source: SPSS data processed, 2024)

The results of the regression analysis show a model with a value of R = 0.996 and R Square = 0.995. This means the regression model can explain 99.5% of the variation in HDI, which shows that the model is very good at predicting HDI values based on independent variables.

Table 9. Multiple Linear Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-7.162	6.606		-1.084	.304
	Harapan Hidup (X1)	.664	.108	.228	6.139	.000
	Rata Lama Sekolah (X2)	1.986	.234	.514	8.478	.000
	Harapan Lama Sekolah (X3)	.979	.157	.304	6.254	.000

a. Dependent Variable: Ipm (Y)

(Source: SPSS data processed, 2024)

• Life Expectancy This shows that better health is closely related to improved quality of life.

• Average Years of Schooling This shows the importance of education in improving the quality of life.

• Expected Years of Schooling Increasing educational expectations in the future has a positive impact on human development.

Discussion

Based on the results of the first hypothesis test, it was found that life expectancy partially has a significant effect on the Human Development Index (HDI) in Binjai City. This is proven by the tcount value of 0.664 with a significance value of 0.000, which is smaller than

the significance level used (0.05). This means that H1 is accepted because there is a significant positive relationship between increasing life expectancy and increasing HDI in Binjai City. In other words, the higher the life expectancy in an area, the better the quality of life reflected in the HDI. This finding is important for policy makers, because it emphasizes the need to focus on improving health services and community welfare to encourage better development in Binjai City. Therefore, strategies aimed at increasing life expectancy, such as increasing access to health services, education and social programs, can be an effective step in improving the overall quality of life in the region.

The results of the second hypothesis test show a t value of 1.986 with a significance value of 0.000, which is smaller than the significance level used (0.05). This means that, H2 is accepted because the average length of schooling has a positive relationship and has a significant effect on the human development index in Binjai City. Acceptance of hypothesis H2 confirms that education, specifically the number of years spent by individuals in school, plays an important role in improving people's quality of life. Better education allows individuals to acquire skills and knowledge that can enhance their abilities in various aspects of life, which in turn contributes positively to overall human development.

The third hypothesis test shows that the t value is 0.979 with a significance value of 0.000, which is smaller than the significance level used (0.05). This means that H3 is accepted because the expected length of schooling has a positive relationship and has a significant influence on the human development index in Binjai City. The higher the expected length of schooling, the higher the potential for human development in the region. Acceptance of this hypothesis underscores the importance of continued access to education in the future, where individuals who have higher educational expectations tend to have a better chance of achieving a higher quality of life.

Based on tests that have been carried out previously, simultaneously the variables life expectancy, average years of schooling and expected years of schooling have a significant influence on the human development index in Binjai City. This means that these three variables, both individually and together, make an important contribution to improving the quality of human development in the region. Higher life expectancy reflects better quality of public health, which is an important component of human well-being. On the other hand, education, which is measured through average years of schooling and expected years of schooling, is the main basis for equipping society with the knowledge and skills needed to face economic and social challenges.

CONCLUSION

Based on the results of the analysis carried out in this research, it can be concluded that there is a significant influence of the variables life expectancy, average length of school, and expected length of school on the Human Development Index (HDI) in Binjai City. With an Adjusted R Square of 0.995, this research shows that 99.5% of the variation in HDI can be explained by these three variables. The F test and t test confirm that all independent variables contribute positively and significantly to HDI, which reflects the importance of health and education in improving people's quality of life.

Increased life expectancy reflects better health conditions, while average years of schooling and expected years of schooling demonstrate the crucial role of education in increasing economic participation and quality of life. Therefore, this research emphasizes the need to increase access to education and health services as a strategic step to increase HDI and community welfare in Binjai City. It is hoped that the results of this research can

become a reference for policy makers in designing effective programs to improve human development in the region.

SUGGESTION

It is hoped that further research will provide variables that are indicators in the human development index and conduct other research over a different time span.

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