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THE ROLE OF SOCIO-ECONOMIC AND TECHNOLOGICAL DIMENSIONS IN IMPROVING ENVIRONMENTAL QUALITY

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ABSTRACT

Environmental quality is one of the cornerstones in realizing sustainable development. The shift in economic sectors that Indonesia has experienced has resulted in environmental degradation that poses a severe threat to the quality of life of people and biodiversity, affecting economic sustainability. The economic transformation that is carried out changes human activities to affect the happiness and ease of access that people get and the existence of technology transfer activities. In addition, changes in the economic sector can increase regional income due to increased productivity. This increase in income can cause inequality between communities that can affect environmental quality. This study aims to analyze environmental determinants, including socioeconomic dimensions and technology use in the community. The method used is quantitative with multiple linear regression analysis through the Ordinary Least Square (OLS) technique. The data used is secondary data that is a cross-section of 34 Indonesian provinces in 2021 because it adjusts to the availability of data. The results showed that happiness and the use of technology have a positive but insignificant influence on environmental quality. In addition, income inequality, Human Development Index, and Gross Regional Domestic Product negatively influence on environmental quality.

Keywords: Environmental Quality, Happiness, Human Development Index, Income Inequality, Technology.

ABSTRAK

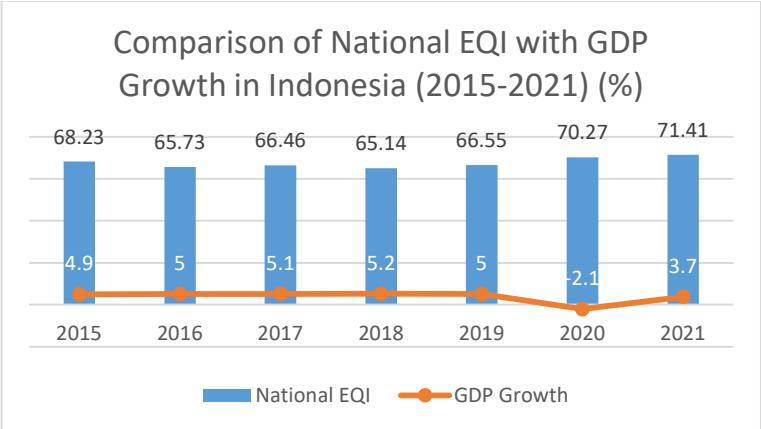
Kualitas lingkungan hidup menjadi salah satu landasan dalam mewujudkan pembangunan yang berkelanjutan. Adanya pergeseran sektor ekonomi yang telah dialami oleh Indonesia mengakibatkan adanya degradasi lingkungan hidup yang menjadi ancaman serius bagi kualitas hidup masyarakat dan keanekaragaman hayati sehingga mempengaruhi keberlanjutan perekonomian. Transformasi ekonomi yang dilakukan mengubah aktivitas manusia sehingga dapat mempengaruhi kebahagiaan dan kemudahan akses yang didapatkan masyarakat serta adanya aktivitas transfer teknologi. Selain itu, perubahan sektor ekonomi dapat meningkatkan pendapatan regional akibat adanya peningkatan produktivitas. Adanya peningkatan pendapatan ini, dapat menyebabkan ketimpangan antar masyarakat yang dapat mempengaruhi kualitas lingkunan. Penelitian ini bertujuan untuk menganalisis determinan lingkungan hidup yang terdiri dari dimensi sosial ekonomi dan

penggunaan teknologi di lingkungan masyarakat. Metode yang digunakan adalah metode analisis kuantitatif dengan analisis regresi linear berganda melalui teknik Ordinary Least Square (OLS). Data yang digunakan adalah data sekunder bersifat cross section pada 34 provinsi Indonesia di tahun 2021 karena menyesuaikan dengan ketersediaan data. Hasil penelitian menunjukkan bahwa kebahagiaan dan penggunaan teknologi memiliki pengaruh positif dan tidak signifikan terhadap kualitas lingkungan hidup. Selain itu, ketimpangan pendapatan, Indeks Pembangunan Manusia dan Produk Domestik Regional Bruto memiliki pengaruh negatif terhadap kualitas lingkungan hidup.
Kata kunci: *Indeks Pembangunan Manusia, Kebahagiaan, Ketimpangan Pendapatan, Kualitas Lingkungan Hidup, Teknologi*

A. INTRODUCTION

The environment is everything closest to humans, consisting of living things and other abiotic components (Umniati, 2015). It is a unified system that is mutually interconnected. Various factors strongly influence the quality of the environment, and the most significant cause is human activity. Some problems include global warming due to fossil fuels, poor governance, plastic pollution, deforestation, and air pollution (KLHK, 2021). These problems cause environmental degradation that results in a climate crisis and endangers humanity. The problems caused mean humans still depend on natural resources to fulfill their needs (Adelia & Suryanto, 2022).

Environmental quality is influenced by humans based on several components that form and influence the ecological situation in a community environment. These components have a relationship with human welfare in the form of objective and subjective welfare. Objective well-being relates to how people get access to improve their quality of life by getting education, health, and a decent standard of living from their work. Subjective well-being comes from satisfaction in getting the meaning of the meaning of life with feelings that express the human soul itself in the form of happiness (BPS, 2021).



Source: Ministry of Environment and Forestry and World Bank, 2024

Figure 1. Comparison of National EQI with GDP Growth in Indonesia in 2015-2021

Based on the EQI data from the Ministry of Environment and Forestry, it was noted that there were fluctuations in the EQI value from 2015 to 2021. A decrease in the EQI value

means that the quality of the environment is getting worse, such as in 2016 and 2018, when there was an increase in the GDP growth rate, which indicates economic activity requiring increased resources to meet aggregate demand (Hermawan & Santoso, 2019). However, there was an increase in the value of EQI in 2020 due to the social distancing policy, which caused economic activity to stop for a moment, so the energy used for the productivity process was reduced, and environmental quality increased. In addition, the increase in the value of EQI starting in 2020 is due to changes in the weight in the calculation of EQI, the addition of index components in the form of the Sea Water Quality Index (IKAL) and the Peat Ecosystem Quality Index (IKEG), and many provinces in Indonesia getting EQI values above the specified target (KLHK, 2021).

The existence of environmental quality is influenced by humans based on several components that form and influence the ecological state in a community environment. These components have a relationship with human welfare in the form of objective and subjective welfare. Objective well-being relates to how people gain access to improving their quality of life by getting education, health, and a decent standard of living from the work they get. Subjective well-being comes from satisfaction in getting the meaning of life with feelings that express the human soul in the form of happiness (BPS, 2021).

To achieve welfare-oriented happiness, increasing access to health, education, and a decent living standard is necessary, as represented in the Human Development Index (HDI). HDI is one of the indicators in economic development related to human resources (Ramadhantie et al., 2021). In addition, the economic development component can be represented by the value of goods and services produced by a region regionally in a certain period, referred to as the Gross Regional Domestic Product (GRDP), which provides an overview of the economic aspects produced by a region with the productivity carried out. Economic activity by adjusting market laws (demand and supply) allows humans to provide and consume according to their needs. In fulfilling this, it is necessary to have income owned by the community, which depends on economic activity. The portion of income earned by the community is different. This causes income inequality between communities (Rohman & Suryanto, 2023). In addition, the globalization era creates a new life for society through unlimited innovation and creativity. This gives people more modern thinking and information and communication technology skills that can help humans increase their productivity (Hutahaya et al., 2023).

Based on the above statement, it can be seen that there is a research gap between the previous research and the current research. Happiness can positively influence environmental quality because the beauty of the environment can positively impact people's comfort (Rusyda & Siagian, 2023). Other findings show that happiness is a component of the trade-off between environmental quality and the quality of people's happiness (Kahfi, 2014). This means that happiness is an indicator that all people can be happy if they have everything in their lives, so something needs to be sacrificed, namely the quality of the environment. Income inequality can significantly impact environmental quality, where high-income people spend more energy to fulfill their daily lives. In contrast,

low-income people can only save energy daily (Rohman & Suryanto, 2023). Previous findings found different results where income inequality does not significantly affect environmental quality because income inequality increases the number of low-income people, most of whom will live with energy savings to reduce CO2 carbon emissions (He et al., 2020).

Economic growth through increasing GRDP also has a significant impact on environmental quality. With the exploitation to realize high GRDP, the government will provide various policies to extract resources to meet aggregate demand and supply, which can result in environmental degradation (Halkos et al., 2014). However, previous findings provide different results where economic growth has a positive influence on environmental quality because the success of increasing people's income obtained from development will give people the ability to manage good environmental quality (Yuda & Idris, 2022). Similar to happiness, human development is one of the indicators of realizing community welfare. Increased human development will positively impact the community, which provides awareness of the importance of protecting the environment so that environmental damage can be prevented (Haris et al., 2023). Other findings provide different results, such as increased human development hurting environmental quality. This is because human development requires the sacrifice of resource exploitation to provide access that can improve the community's quality of life, which results in environmental degradation (Santra & Swarup, 2014).

Information and communication technology also has a diverse impact in creating various externalities, both positive and negative. The positive impact of technology is efficiency and effectiveness in realizing productivity (Lucya & Anis, 2019). This makes a country enact efforts to reduce economic and social problems between community environments, one of which provides innovation in information and communication technology. Other findings provide different results, where the use of technology that has become rampant among the community hurts the environment, one of which is the excessive use of non-renewable energy, which causes pollution to increase and contributes to the climate crisis in the world (Rofik & Mokhtar, 2021).

This problem makes a country hesitant to choose between preserving the environment or utilizing natural resources for society. Some developing countries prefer to exploit natural resources to realize economic aspects for the community. This makes a country less concerned about the quality of the environment. In addition, there needs to be more public awareness from an ecological and social perspective due to the lack of access to public understanding in preserving the environment. Based on the problems mentioned in the description above, the question in this study is how the influence of components that support environmental quality in the form of community happiness, human development in gaining access, regional income from the results of the number of goods and services produced in a region, income inequality that occurs in the community and the use of information and communication technology in the community environment. This research wants to prove that social awareness through happiness, human

development, and the use of technology can improve environmental quality, and the economic dimension through GRDP and income inequality can have an impact that causes environmental degradation due to overexploitation.

Happiness Index

The happiness index measures conditions that provide a good and meaningful life, measured by life satisfaction, feelings, and meaning (BPS, 2021). Policymakers make development planning and evaluations in various countries based on welfare indicators, with a portion more capable of describing the condition of community welfare than macroeconomic indicators (OECD, 2020). The level of welfare of the population is described beyond material issues, which not only tells about the amount of national income but also looks at personal factors that affect people's lives and welfare (Vanoli, 2010). In this case, welfare can be measured by happiness, which is shown to significantly affect the success of development and social development in society (Forgeard et al., 2011). The happiness obtained by people in their environment encourages individuals to strive optimally to achieve their life goals, improving the community's quality of life.

In measuring the happiness index, several indicator frameworks can form welfare in society, one of which is related to economic and environmental conditions (BPS, 2021). The existence of happiness that is satisfied with environmental quality means that when people have happiness to improve their quality of life, the quality of the environment that is trying to be maintained and preserved is getting bigger. A significant increase in the quality of the environment will positively impact people's daily lives so that welfare can be realized (Su et al., 2022). Environmental preservation, which results in a beautiful and healthy environment, significantly impacts people's happiness (Wu & Cao, 2023). Improving people's quality of life through happiness will design people to make green construction to preserve the environment and create a high-quality living environment (Kang et al., 2021). The decline in the quality of society will affect the changes in the quality of the living environment caused by environmental degradation (Tiwari, 2011).

H1: Happiness has a positive impact on the Quality of the Environment.

Inequality Income

Income inequality is a structural and inherent problem in every country. This problem makes people feel unfair, and the lack of welfare is generated in economic activity. The relationship between income inequality and environmental quality is complex, with income inequality affecting environmental quality through the impact of environmental degradation. People with high incomes tend to have excessive consumption patterns and produce a lot of waste and greenhouse gas emissions. In contrast, people with low incomes tend to use energy sources by saving according to the availability of income (Rohman & Suryanto, 2023). The existence of this income inequality has a significant influence on the quality of the community's environment. The difference in income owned by the community contributes heavily to environmental quality based on the source of energy used to meet daily needs.

In addition, income differences are not only for the upper and lower classes based on income differences, but income inequality between residents in villages and cities also significantly affects environmental quality (Ridena, 2020). This is also influenced by residents in urban areas who exploit more resources in the environment, thus worsening environmental quality. In addition, most urban residents work in the secondary economic sector, which requires more technology that can damage the environment due to pollution. Meanwhile, residents in villages focus more on the primary sector, which is more energy efficient and has less impact on environmental damage (Adelia & Suryanto, 2022).

H2: Income inequality has a negative impact on the quality of the environment.

Gross Regional Domestic Product

Gross Regional Domestic Product (GRDP) is one of the indicators used to measure economic growth. This indicator represents the total value of goods and services produced during the country's production process. The existence of an increasing GRDP means that an economy can run well and produce prosperity for its people. Increased income can increase aggregate demand so that the productivity of goods and services and people can improve their quality of life (Hermawan, 2021). The existence of economic development makes it difficult to continue to erode resources or preserve the environment because development often needs to pay more attention to aspects of environmental management. Based on Kuznets' theory, development without paying attention to preserving nature and the environment will only create environmental damage because the increase in economic growth achieved steams the quality of the environment caused by human actions (Gupito, 2012).

A country's efforts to realize economic growth through increased income in GRDP is one form that only considers the economic aspect. Some developed countries still depend on nature to increase productivity, which causes this effort to reduce the quality of the environment. The transformation of the economy from the primary sector to the secondary sector, which has many environmental problems, bears witness to the negative externalities generated due to overexploitation based only on economic aspects (Prasurya, 2016). Therefore, an increase in GRDP has a negative and significant effect on environmental quality, which aligns with (Pranoto & Halim, 2016). In addition, environmental degradation is caused by changes in government income and expenditure to realize economic development (Halkos et al., 2014).

H3: Gross Regional Domestic Product has a negative impact on the Quality of the Environment

Human Development Index

This indicator, which covers people's quality of life, influences the environment in realizing sustainable development. The Human Development Index (HDI) is a component of human resources that measures the achievement of the basic capabilities of the population in gaining access to health, education, and a decent standard of living. HDI represents a society's ability to think about improving the best goals for its life. A high HDI means that people will be healthier, more intelligent, and have enough income to meet

their basic needs; this means that a high HDI will make people think that environmental conservation is needed with a fair and ecological perspective (Ramadhantie et al., 2021).

The development and improvement of the quality of life of the community, as indicated by a high HDI, means that the majority of people can get education and information about the importance of protecting the environment. This education, coupled with the power of innovation, can inspire and empower individuals to increase their awareness and concern for environmental issues. In addition, the gap between rural and urban communities, each with different HDIs, means that communities with low HDIs often have access to utilize natural resources without making improvements due to a lack of science and technology to overcome this (Ridena, 2020). Therefore, there is an implication that the higher the level of education, the more innovations in overcoming environmental problems that can improve environmental understanding and community behaviour in environmental conservation so that environmental quality can be maintained (Haris et al., 2023).

H4: Human Development Index has a positive impact on the Quality of the Environment

Use of Information and Communication Technology

Technology is an innovation from the era of globalization that was created to facilitate human life. In this case, technology can increase productivity in economic activity (Lucya & Anis, 2019). In addition to globalization, economic transformation provides technology transfer activities that can create an era of industrialization to increase economic growth (Umniati, 2015). The existence of technology makes it easier for people to carry out economic activities because the time used will be faster, and the energy spent will be lighter to achieve productivity through the use of technology. However, the existence of people who create technology means that the results of this community effort have various impacts on the environment (Hutahaya et al., 2023).

The existence of technology allows people to have a more practical and broader life to add insight into developing their personality. In this case, it will be easy for the community to advance and strive for environmental sustainability due to the ease of information and communication technology (Hutahaya et al., 2023). Based on the theory of diffusion of innovation, the development of the population's mindset over time will create innovations to realize unlimited creativity, such as digital literacy through technology (Mailin et al., 2022). This can make humans think more and more about creating more environmentally friendly and sustainable technology so that the quality of the environment can be maintained ecologically and relatively (OECD et al., 2018).

H5: Information and Communication Technology has a positive impact on the Quality of the Environment

B. RESEARCH METHOD

This research uses a quantitative research method with a multiple linear regression approach. It used the Ordinary Least Square (OLS) analysis technique by gradually carrying

out the Classical Assumption Test to produce a BLUE model. This research uses Eviews 9.0 software. Data collection is done by obtaining data availability from the official website of the Central Bureau of Statistics (BPS), so the data used is secondary data. The data used in the cross-sectional data with sample data from 34 provinces in Indonesia in 2021. The research aims to observe the influence of several independent variables on the dependent variable in the research model. Some details of the data used are as follows:

Table 1. Detailed Details of Research Data

No.	Research Variable	Description	Variable Status	Unit
1.	Environmental Quality Index (EQI)	A value that represents the quality of the environment in an area at a certain period obtained from the quality aspects of water, air, land, and seawater.	Dependent Variable	Scale 0-100
2.	Happiness Index (HI)	Measures of development are subjective and are about people's perceptions of their daily lives.	Independent Variables	Scale 0-100
3.	Inequality Income (GINI)	A measure of the degree of inequality in income distribution within a population.		Scale 0-1
4.	Human Development Index (HDI)	Measures are used to gauge the community's progress in gaining access to education, health, and a decent standard of living.		Scale 0-100
5.	Gross Regional Domestic Product (GRDP)	Value added of goods and services produced in a region in a certain period.		Billion Rupiah
6.	Use of Information and Communication Technology (ICT)	The proportion of Youth and Adults 15-59 Years of Age with Information and Computer Technology Skills.		Percentage

Source: Data processed by researchers from BPS portal, 2024

The research design can be schematically described as follows:

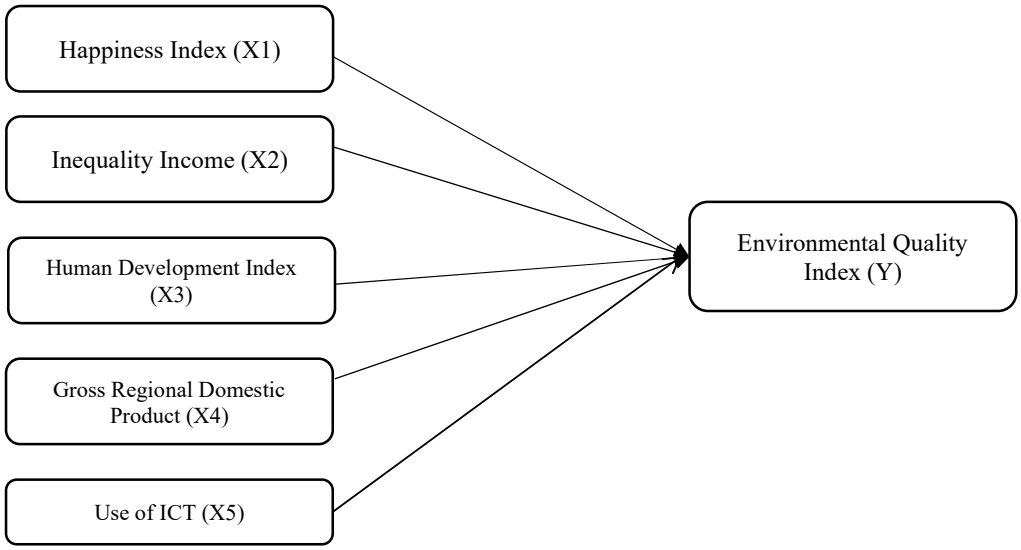


Figure 2. Scheme of Research Design

To describe the relationship between Environmental Quality as an independent variable and (1) the Happiness Index, (2) Income Inequality, (3) the Human Development Index (HDI), (4) Gross Regional Domestic Product (GRDP), and (5) Use of Technology as independent variables. Then, the variable relationship can be formulated as follows:

EQI = f (HI, GINI, HDI, GRDP, ICT)

Captions:
- EQI = Environmental Quality Index
- HI = Happiness Index
- GINI = Inequality Income
- HDI = Human Development Index
- GRDP = Gross Regional Domestic Product
- ICT = Use of Information and Communication Technology

The statistical technique to determine the relationship between independent and dependent variables in a linear regression model is the Ordinary Least Square (OLS) method. This approach uses the least squares technique to get the best regression line to explain the relationship between variables. The multiple linear regression analysis equation is explained to test the effect of one or more independent variables on one dependent variable. The following regression equation is reported in this study:

EQI = C0 + C1*HIi - C2*GINIi + C3*HDIi - C4*GRDPi + C5*ICTi + ei

Captions:
- C0 = Constant
- C1, C2, C3, C4, C5 = Coefficient
- e = error terms

Various classical assumption tests, such as data normality, autocorrelation, multicollinearity, and heteroscedasticity, are conducted to determine whether the model is a BLUE model. The relevance and connection between the research findings and the

previously proposed hypotheses will be examined using the F and T tests to see if the model has passed all traditional assumption tests. Then, it will also be displayed along with the R-squared value obtained.

C. RESULTS AND DISCUSSION

Result

The findings in this study were obtained from the results of multiple linear regression analysis on 34 Indonesian provinces in 2021, and the data were collected using Eviews 9.0. The estimation results provide the effect of regression and classical assumptions with a significance level of 5% and 10% to make decisions regarding the results of the proposed hypothesis. The multiple linear regression results show the trend in each independent variable on the dependent variable. The findings provide the following estimation results:

Table 2. Results of Statistical Analysis on the Research Model

Independent Variables	Theory	Dependent Variable: Environmental Quality (EQI)			
		Coefficient	Std. Error	T-Statistic	P-value (1 Tail)
Constant		98.57147	31.07777	3.171767	0.000185
HI	+	0.000388	0.000388	0.001243	0.4995**
GINI	-	-35.54857	15.12086	-2.350961	0.013*
HDI	+	-0.518885	0.341514	-1.519367	0.06995**
GRDP	-	-2.10E-06	1.52E-06	-1.387216	0.08815**
ICT	+	0.068104	0.120086	0.567125	0.28755**
Goodness of Fit					
R-squared		0.451437			
Adjusted R-squared		0.353480			
F-statistic		4.608495			
Prob(F-statistic)		0.003418*			
Classical Assumption Tests					
Autocorrelation	**Multicollinearity**	**Heteroscedasticity**	**Error Normality**		
Passed Prob > 0.05 (Prob. = 0.1055)	Passed VIF < 10	Passed Prob > 0.05 (Prob. = 0.1343)	Normal Prob > 0.05 (0.195432)		
Significance Level					
***)** 5%					
****)** 10%					

Source: Data processed by researchers by Eviews 9.0, 2024

In addition, the data was subjected to the Classical Assumption Test to realise a BLUE model with the following results:

Normality Test

In this study, the normality test was conducted using Jarque-Bera with an alpha level of 0.05. The analysis revealed a Jarque-Bera probability value of 0.195432. Importantly, this value is significant as it exceeds the 0.05 threshold, confirming the normal distribution of the data.

Multicollinearity Test

A multicollinearity test is conducted to test whether there is a correlation between independent variables. If the correlation coefficient between independent variables is greater than 10, it is concluded that the model has a multicollinearity problem. Conversely, if the correlation coefficient between independent variables is smaller than 10, it is concluded that the model does not experience multicollinearity problems. Based on the analysis results in the table above, all correlation coefficient values between independent variables are less than 10. Then, the model is free from multicollinearity problems.

Autocorrelation Test

The autocorrelation test was executed to determine the presence of strong positive or negative relationships between the research variables. The Breusch-Godfrey Serial Correlation LM Test model revealed an Obs*R-squared value above 0.05, indicating that the data has passed the autocorrelation test.

Heteroscedasticity Test

The heteroscedasticity test is carried out to determine whether the error variance should be homogeneous or heterogeneous. In this study, the heteroscedasticity test was carried out using the White model, and the result was that the Obs*R-squared value was above 0.05. The hypothesis of this heteroscedasticity test can be seen from the Prob. The chi-square value of the model is more significant than 0.05, so it is concluded that this research data does not have heteroscedasticity.

After various classical assumption tests have been carried out and all classical assumption tests have passed, the model is considered BLUE. Then, the coefficient of determination, F-test, and T-test will be carried out to check whether the previously proposed hypothesis follows the test results.

The test results yield the regression equations for the following two models, providing a practical understanding of their behavior:

EQI = 98.57147 + 0.00038*HI - 35.54857*GINI - 2.10E-06*GRDP - 0.518885*HDI + 0.068104*ICT + e

F Test (Global Test) and Coefficient of Determination (Adj R^2)

Based on the results of the F test, the Prob (F-statistic) value of 0.003418 is smaller than the alpha value of 0.05, so it is concluded that at least one or several independent variables in the form of Happiness Index, Income Inequality, HDI, GRDP and Technology Use have a significant influence on the quality of the environment in 34 provinces in Indonesia in 2021. The coefficient of determination in this model shows an Adjusted R-squared value of 0.353480, meaning that the ability of the variation of all independent variables to explain the behavior of the dependent variable is 35.34% and 64.66% is influenced by variations in

other variables outside this model such as infrastructure (Febriana et al., 2019), foreign investment (Tang, 2017), exports (Putriani et al., 2018), population (Umniati, 2015), and poverty (Prawesti, 2021).

T Test (Partial Test)

In the statistical results table, a partial test is generated according to the statistical results table as follows:

a) The Happiness Index variable has a coefficient value (C1) of 0.000388 in this model, with a t-test probability value of 0.4995. This probability value is larger than the alpha threshold of 0.1. Furthermore, it has been discovered that the Happiness Index has a positive but statistically negligible impact on Environmental Quality in Indonesia, leading to the rejection of hypothesis H1.

b) The coefficient value (C2) for the Income Inequality variable in this model is -35.54857, with a t-test probability value of 0.013. This probability value is less than the alpha threshold of 0.05. Furthermore, it has been shown that there is a clear and substantial correlation between Income Inequality and Environmental Quality in Indonesia, confirming the acceptance of hypothesis H2.

c) In this model, the Human Development Index (HDI) variable has a coefficient value (C3) of -0.518885 and a t-test probability value of 0.06995, less than the alpha level of 0.1. According to this model, it has been discovered that the Human Development Index (HDI) has a significant and adverse impact on Environmental Quality in Indonesia, leading to the rejection of hypothesis H3.

d) In this model, the Gross Regional Domestic Product (GRDP) variable has a coefficient value (C4) of -2.10E-06, with a t-test probability value of 0.08815. This probability value is less than the alpha level of 0.1. Furthermore, it has been shown that Gross Regional Domestic Product (GRDP) has a noteworthy and adverse impact on Environmental Quality in Indonesia, therefore confirming the acceptance of hypothesis H4.

e) The Use of Technology variable's coefficient value (C5) is 0.068104, with a t-test probability value of 0.28755. This probability value is larger than the alpha level of 0.1. This model reveals that the use of technology has a favorable but negligible impact on environmental quality in Indonesia, leading to the rejection of hypothesis H5.

Discussion

The Effect of Happiness Index on Environmental Quality

Based on the analysis results in this study, it is explained that this model shows a positive coefficient direction with a probability value more significant than the 10% alpha level. In this case, the proposed hypothesis is accepted but insignificant. This shows that when there is an increase in the happiness index, the quality of the environment in Indonesia will improve. This is because the happiness felt by the community comes from the satisfaction of getting the meaning of life to enjoy the beauty of nature that is sourced in the environment. Feelings or affections generated in satisfaction with environmental conditions provide a form of self-development for the community in creating happiness. Happiness indicators are measured by several components, one of which is the state of the

environment. The better the environmental conditions created, the higher the level of happiness realized (BPS, 2021). Happiness indicators are related to social, economic, or structural aspects and include culture, environment, and individual interests (Jesus et al., 2015). The existence of a high level of happiness provides awareness for the community to preserve the environment because one of the conditions for being happy is the state of the environment, which provides a large portion of the sustainability of life (Wu & Cao, 2023). Economic, social, and healthy environmental well-being provides a definition that the concept of happiness can lead to sustainable development and improve the quality of life so that the quality of the environment, which is one of the essential components, means that happiness is needed to create an increase in the quality of the environment (Corlatean, 2019). This cheerful and insignificant effect means that Indonesia still has challenges in achieving happiness among people related to the environment. This is because Indonesia's population's happiness level still tends to be influenced by the magnitude of its material living conditions, such as household income and work/business/main activity, so efforts made to preserve the environment are still low (BPS, 2021).

The Effect of Income Inequality on Enviromental Quality

From the analysis results, the direction of the coefficient of income inequality in this model is negative with a probability value below the alpha level of 0.05, so the proposed hypothesis is accepted. Income inequality is a situation where income is different between neighborhoods. This means that the difference in income owned by the community creates new social problems. One of them is the problem of neighborhoods. There is a reason why income inequality negatively and significantly influences environmental quality. This is because most people with high incomes will spend many energy resources in their daily lives; for example, they will use much electricity to light up their houses. Meanwhile, people with low income will save on energy resources for their daily lives; for example, they will use electricity according to their needs without excessive use because they prevent large expenditures on electricity and adjust to the income earned (Rohman & Suryanto, 2023). Other research also reinforces this finding that income inequality affects environmental degradation and public health. The negative impact of income inequality on the environment is due to air pollution indicators (CO_2 and SO_2) and water pollution indicators that can worsen the population's health. This explains that environmental quality is an important indicator that must be improved to prevent people from not getting proper access to improve their quality of life (Drabo, 2011). In addition, it is necessary to consider the linkages between inequality and the environment because economic inequality can affect environmental impacts, and environmental policies can also affect economic inequality. The linkages between inequality and the environment will become increasingly important as environmental degradation due to the climate crisis, and biodiversity loss will lead to increased economic inequality in society. Economic disparities caused by income elasticity affect environmental quality, and this income inequality can progressively increase aggregate emissions. Income elasticity in the demand for more goods causes more

significant pollution, affecting environmental quality (Drupp et al., 2021). The difference between rural and urban communities also affects environmental quality. Urban communities prioritize economic growth over environmental quality, while rural communities prioritize environmental quality over economic growth (He et al., 2020).

The Effect of Gross Regional Domestic Product on Enviromental Quality

Based on the analysis results obtained in this model, the direction of the coefficient on the GRDP variable obtained is negative, and the probability value is smaller than the alpha level of 0.1, where this finding accepts the proposed hypothesis. This is because a high GRDP will indicate the productivity of goods and services in a region to fulfill aggregate demand. This fulfilled aggregate demand creates environmental impacts for the community. An increase in aggregate demand makes aggregate supply adjust. It requires many resources, so many producers can produce pollution to fulfill economic activity (He et al., 2020). Based on the Kuznets Curve theory, the relationship between economic growth and environmental quality is illustrated by the increasing national income, the higher the environmental degradation due to the government making a trade-off between development and environmental preservation to improve people's welfare (Finanda & Gunarto, 2022). Increased economic growth influences environmental degradation, contributing to CO2 gas emissions caused by economic transformation from the primary sector to the secondary sector. Although economic transformation makes the GRDP more significant, negative externalities are caused by the quality of the environment (Gupito, 2012). Other findings explain that economic transformation is not the only reason environmental quality deteriorates. However, production in the primary sector that uses chemical fertilizers also pollutes water, which results in a decrease in water content and a decrease in the content of food produced in this sector. Indirectly, this can affect public health (Febriana et al., 2019). All economic activities carried out by humans, including the economic development process, always influence the environment. The rapid economic growth described in GRDP is also followed by environmental damage. High GRDP requires increased pollution due to the erosion of existing resources (Ramadhan, 2023).

The Effect of Human Development Index on Enviromental Quality

Based on the analysis results, this model has a negative coefficient direction with a probability value smaller than the alpha level of 0.1, which means that the proposed hypothesis is rejected. HDI is a composite component of three indicators from three critical dimensions of life. Some developing countries make various efforts to realize human development as human welfare but ignore other dimensions of life, namely environmental quality. The efforts to develop people's welfare create a trade-off between human development and environmental quality. The finding of this analysis is that the higher the desired human development, the lower the environmental quality. This means that the more effort the government puts into improving human development, the more polluted the environment becomes (Santra & Swarup, 2014). In addition, the components of improving HDI are related to the growth of urbanization, GDP, GDP per capita, and the portion of energy consumption by the community (Yumashev et al., 2020). This means that

human development requires excessive consumption for the welfare of society, so this affects the existence of sustainable development related to the environment. Excessive energy consumption hurts the environment, resulting in a decline in environmental quality. Increased utilization of resources used for human development with three essential components in education, health, and income to get a decent standard of living, causing environmental degradation in the aspects of land, water, energy, and air, which can reduce the value of environmental quality (Mukherjee et al., 2009). This finding is also reinforced by previous findings where human development requires resources to create good access for the community through the facilities and infrastructure built. However, developing these facilities and infrastructure leads to environmental degradation that worsens the environmental ecosystem (Tandira et al., 2021).

The Effect of Use of Information and Communication Technology on Enviromental Quality

Based on the analysis results, the use of technology gets a coefficient value of 0.068104, where the direction of the resulting coefficient is positive. However, the probability value of 0.28755 is greater than the 10% alpha level, so the proposed hypothesis is rejected. This result means that technology will improve the quality of the environment, meaning that technology has a constructive impact on environmental development by reducing pollution that damages the ecosystem (OECD et al., 2018). The positive role of technology in the environment is that technology plays an essential role in innovation and competitiveness for a region, which shows the ability to use resources efficiently and appropriately with technology so that the environment can be well maintained (Hutahaya et al., 2023). The existence of this innovation is what makes globalization makes humans always develop to create environmentally friendly technology (Rusyda & Siagian, 2023). However, the insignificant effect means that the use of technology could be more optimal and evenly distributed in Indonesia because of Indonesia's vast territory. There are still blank spots for people using technology, so there are still inequalities in the use of technology (Subroto et al., 2023). This inequality in the use of technology means that technology that can improve the quality of the environment in Indonesia is still a challenge. This is reinforced by previous findings that there is still a digital divide in Indonesia, especially in the eastern and western regions, which is still wide due to poverty, which affects the use of technology in line with improving environmental quality (Riyadi & Larasaty, 2019).

D. CONCLUSION

The preceding discussion leads to the following conclusions: (1) The Happiness Index positively insignificantly impacts environmental quality, (2) Income Inequality negatively significantly impacts environmental quality, (3) HDI negatively significantly impacts environmental quality, (4) GRDP negatively significantly impacts environmental quality, (5) Technology Use positively insignificantly impacts environmental quality. Environmental quality is a milestone in implementing a sustainable economy. Excessive use of resources for economic purposes and ameliorating social problems is unethical in

realizing sustainable development. In this case, it requires the role of the government and society to protect the earth by reducing environmental degradation. The use of these resources is indeed a concern for the state in improving the quality of life of the community because the resources used can improve economic and social aspects such as reducing unemployment, poverty, and inequality and increasing access for people to education, health and a decent standard of living and can increase the productivity process so that national income can increase. The erosion of the globalization era has increased information and communication technology so that people can add broad insights and create new economic diversification in the form of a digital economy that can increase the efficiency of economic activity and productivity. However, using this technology can also provide negative externalities for the environment because it can increase carbon emissions, reducing the quality of the environment. Therefore, there is a need for government policies that cover environmental quality matters and apply the concept of a *"green economy"* to realize sustainable development, such as using renewable energy that saves excessive energy consumption and reduces pollution. The community must also participate in a green lifestyle by recycling waste and saving excessive energy. This study uses cross-section data with data published by the Central Bureau of Statistics (BPS) in 2021 in 34 Indonesian provinces. Given that it only used a one-year time span in 2021, this study shows the behavior of variables at a certain point in time, so data analysis using time series or panel data is needed. This research is included in new research with empirical studies from previous research that are still minimal, so more in-depth research is needed to support and verify the results of research conducted by the author. It is hoped that the results of this study can be used as a reference for the government in carrying out sustainable development by preserving the environment in policy decision-making to realize an increase in overall community welfare to create sustainable development goals (SDGs) in Indonesia.

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