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Analysis of Factors Affecting the Human Development Index (HDI) in 43 Sub-Saharan African Countries 2018-2022

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Abstract

The Human Development Index (HDI) is a crucial metric for assessing the quality of life and welfare in a region. However, Sub-Saharan African countries continue to encounter challenges in improving their HDI. This research aims to analyze the effects of economic growth, population growth, the Corruption Perception Index, and unemployment rates on HDI across 43 Sub-Saharan African nations from 2018 to 2022. The analytical approach employed includes panel data regression with Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). The Chow test and Hausman test are utilized to identify the most suitable estimation model. The findings indicate that the Fixed Effect Model (FEM) is the most appropriate model, demonstrating the significant impact of population growth and the Corruption Perception Index on HDI in these countries. Conversely, economic growth and unemployment rates do not show a significant influence. Among the 43 Sub-Saharan African nations, Mauritius stands out with the highest HDI, while Niger has the lowest.

1. Introduction

Development is a critical issue for underdeveloped countries. It represents the process of creating something that does not yet exist, transforming something, or improving it. The success of economic development is marked by an increase in the quality of human resources. Therefore, human development is a top priority in current development strategies (Pamungkas & Dewi, 2022). The Human Development Index (HDI) is a method for evaluating the effectiveness of a region's development by reflecting the quality of the population through parameters such as life expectancy, education level, and a decent standard of living. The HDI encompasses different dimensions to represent key aspects of development (Mutiara, 2023).

A nation's wealth lies in its people. Thus, human development becomes an indicator of a nation's progress. The level of a country's development is determined by factors beyond gross domestic product (GDP), such as life expectancy, public health, and education. Human development involves empowering initiatives to provide more choices to the community, with the ultimate goal of enhancing the fundamental human capacity comprehensively so that people can engage in various disciplines (Ismail et al., 2021). The importance of human development lies in the fact that even without natural resource potential, a region can thrive and advance through the optimization of its human resources (World Bank, 2018). The more development targets achieved, the greater the benefits accrued. Development is essentially the process of improvement (Ningrum et al., 2020).

Sub-Saharan Africa is generally considered one of the poorest regions in the world. This situation results from colonial legacies, neocolonialism, ethnic conflicts, and political tensions. Sub-Saharan Africa has low literacy rates, with less than 50 percent literacy among children and adults in twelve countries, and fewer than half of its population attending higher secondary education (CFR, 2022). The region suffers from a significant lack of infrastructure, hindering development progress. This includes infrastructure such as highways, bridges, ports, and electricity supply. Over the past decade, the state of infrastructure in this region has deteriorated dramatically. Damaged roads make it difficult for doctors to obtain medicines and for patients to access healthcare. Businesses are disconnected from

critical markets. About 625 million people, or 68 percent of the population, lack access to electricity. In countries like Chad, only one-tenth of the population has reliable electricity access (CFR, 2022).

Sub-Saharan Africa reports the highest rate of stunting in children globally, leading to frequent illness, learning difficulties, and a higher risk of chronic diseases in adulthood. Fifty million children in Africa are out of school due to challenges in access and education quality. Rapid population growth is one of the primary contributing factors (World Bank, 2018). In Sub-Saharan Africa, increasing life expectancy is accompanied by a rise in non-communicable diseases like cancer and diabetes, which require long-term treatment, posing challenges in areas with limited healthcare access. The lack of basic sanitation also contributes to the high prevalence of waterborne diseases such as cholera. Maternal and child mortality rates remain among the highest in the world in this region. A shortage of healthcare workers is also a severe issue. According to WHO, Sub-Saharan Africa has only 3 percent of the world's doctors, despite bearing 25 percent of the global disease burden (CFR, 2022).

The economic development of a region is reflected in increasing economic growth. However, if social burdens rise, income inequality persists, more individuals live below the poverty line, and poverty rates remain high, economic expansion cannot be deemed successful (Mahroji & Nurkhasanah, 2019). The economic paradigm has become the standard for evaluating economic success, where economic growth influences the Human Development Index through a shift in focus from economic growth to human development (Pamungkas & Dewi, 2022).

The World Bank projects that economic growth in Sub-Saharan Africa will slow to 2.5 percent in 2023 due to increasing fragility and conflict exacerbated by climate change and global economic uncertainty. This region has the lowest total Gross Domestic Product (GDP) globally, with an average per capita GDP below four thousand dollars—only one-fifth of the global average. Four out of five of the most unequal countries in the world are located here. Factors driving this inequality include the fact that economic progress has not significantly improved incomes or created jobs for most people in the region. For instance, Botswana has the highest per capita GDP in the area due to its small population and large diamond reserves but is also one of the most unequal countries in terms of income. The rapid population growth in Sub-Saharan Africa will further impact development challenges. Population size significantly affects regional development issues from a policy perspective. Development planning becomes more manageable with easier access to demographic data, making population growth a critical factor in the Human Development Index (Andani & Putri, 2024).

Long-term impacts on economic growth in Sub-Saharan Africa are also influenced by the Corruption Perception Index. This index serves as one of the anti-corruption scenarios implemented by many countries. Corruption directly affects many government regulatory and economic mechanisms, ultimately slowing economic growth and causing poverty. In the long term, the Corruption Perception Index also impacts economic growth and consequently the Human Development Index. Corruption increases unemployment (Iman & Wahyudi, 2024). In Sub-Saharan Africa, corruption manifests in various forms, from petty bribery to access government services to awarding lucrative contracts to family or friends. This corruption continues to hinder development in the region. In many countries, corruption is rampant, causing significant losses to the economy and society. In South Africa, corruption is so pervasive that it is referred to as "state capture," where a few powerful individuals have full control over the government (CFR, 2022).

According to Haryono et al. (2023), unemployment is a factor influencing human development. It also affects economic growth. High labor turnover rates not balanced by sufficient job creation can lead to

unemployment. Low labor absorption is caused by slow job creation to accommodate the workforce ready to work (Mahroji & Nurkhasanah, 2019). In Sub-Saharan Africa, only three million out of the ten to twelve million young people entering the workforce each year secure employment. This indicates that one in three people aged fifteen to thirty-five in Sub-Saharan Africa experiences unemployment. High unemployment rates, coupled with the growing youth population and significant demographic shifts, can lead to instability and unrest. Most African countries rely on agriculture for employment, with about half of the workforce engaged in the sector. In countries like Burundi, Burkina Faso, and Madagascar, the proportion is much higher, reaching around 80 percent (CFR, 2022).

2. Literature Review

2.1 Human Development Index (HDI)

The Human Development Index (HDI) is a composite indicator encompassing three fundamental aspects of human development: life expectancy, education level, and standard of living. The life expectancy indicator is represented by life expectancy at birth, the education indicator is measured by the expected years of schooling and the average years of schooling, while the standard of living is determined by adjusted per capita expenditure (BPS, 2018). The Human Development Improvement Program, according to UNDP, is a process of expanding choices available to the population. Consequently, individuals have diverse options to meet their needs across various aspects of social, economic, and cultural life. These three aspects—living a long and healthy life, acquiring knowledge, and achieving a decent standard of living—are measured on a scale from 0 to 100 (UNDP, 2020).

2.2 Economic Growth

According to Todaro in Ramadhani & Utomo (2023), the theory of economic growth emphasizes the importance of government involvement in strengthening human capital development and innovation to enhance individual work efficiency. Through the education sector, significant improvements in human resources are expected, reflected in their knowledge and skills. As the quality of individuals improves, their productivity is anticipated to grow, driven by enhanced knowledge and skills. Research by Regina et al. (2020) in Fitriani (2022) explains that increased economic growth accelerates the process of economic development, which in turn impacts the improvement of human resources, such as better health and education facilities and a decent standard of living. According to the study by Aurora & Asmara (2024), sustainable economic growth can positively contribute to the Human Development Index (HDI). Economic growth refers to the increased production capacity in an economy, reflected in rising national income. The increase in per capita output also enhances purchasing power, which contributes to improved societal welfare.

2.3 Population Growth

Population growth in a country not only relates to its size but also has implications for overall human development and welfare. In the context of development, perspectives are divided. Some view population growth as an obstacle to development, while others see it as a driver of development (Khairunnisa et al., 2023). The Malthusian theory, as discussed in Anisa (2024), argues that uncontrolled population growth can lead to pressure on natural resources, ultimately hindering human development by increasing poverty and hunger. Neo-Malthusian theory updates this by considering environmental capacity and resource sustainability. According to Dewi (2023), an excessively large population without adequate resource support can lower living standards, reduce health due to limited access to food and healthcare, and decrease education quality due to insufficient resources for schools, thereby impeding human development.

2.4 Corruption Perceptions Index

The Corruption Perceptions Index (CPI) is a metric used to assess the level of corruption in a

country or region. CPI is published by Transparency International, a non-profit organization committed to combating corruption. On the CPI scale, a score closer to 100 indicates a higher level of cleanliness from corruption, while a score near 0 indicates a high level of corruption (Transparency International, 2023). According to research by Anantika & Sasana (2020), corruption is a critical issue in public administration that can hinder societal prosperity, as public funds meant for improving human development are diverted inefficiently. Fitriani (2022) explains that countries with lower corruption levels tend to have higher Human Development Index scores because they can allocate resources more efficiently, build stronger institutions, and ensure the protection of basic human rights. Conversely, countries with high corruption levels are vulnerable to a decline in the Human Development Index because corruption undermines a country's ability to provide quality and equitable basic services to the public.

2.5 Unemployment

Sukirno in Mahroji & Nurkhasanah (2019) explains that low purchasing power, as one of the parameters in HDI, can lead companies to reduce production levels and their ability to absorb surplus labor, resulting in an imbalance between labor supply and demand and frequently causing unemployment issues. According to Saputra & Lubis (2023), unemployment negatively affects the economic dimension of the Human Development Index because it reduces individual and family incomes, leading to poverty and economic instability. This situation lowers accessibility to quality education and healthcare services and limits opportunities to gain the skills and experience needed to enter the job market.

3. Research methods

3.1 Type and Source of Data

The type of data used in this research is quantitative, which includes the Human Development Index (HDI), Corruption Perceptions Index (CPI), economic growth, population growth, and unemployment in 43 Sub-Saharan African countries from 2018 to 2022. The data source for this research is secondary data obtained from the Human Development Report, Transparency International, the World Bank, and other relevant sources.

3.2 Data Analysis Method

Penelitian ini menggunakan metode analisis regresi data panel dengan estimasi model ekonometrika sebagai berikut.

$$\mathbf{IPM_{it} = \beta_0 + \beta_1 PE_{it} + \beta_2 PP_{it} + \beta_3 IPK_{it} + \beta_4 UNEMP_{it} + \varepsilon_{it}}$$

Description:

- HDI: Human Development Index
- EG: Economic Growth (%)
- PG: Population Growth (%)
- CPI: Corruption Perceptions Index
- UNEMP: Unemployment (%)
- β 0 : Constant
- β 1 , β 2 , β 3 , β 4 : Regression Coefficients
- ε: Residual
- i: 1, 2, 3,…, 43 (Cross-sectional data for 43 Sub-Saharan African countries)
- t: Time series data (years 2018–2022)

4. Results and Discussion

4.1 Research result

The estimation results of the econometric model using the Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM) approaches, along with the model selection test results, are summarized in Table1.

Table 1
Panel Data Regression Estimation Results – Cross Section

Variable	Regression Coefficient
	PLS
C	-0.7571
PE	0.0244
PP	-0.0031
IPK	0.0319
UNEMP	0.0571
R^2	0.5153
Adjusted R^2	0.5060
F Statistic	55.5552
Prob. F Statistic	0.0000
Model Selection Tests	
Chow Test	Cross-Section F(42, 167) = 2,265.8451; Prob. F(42,167) = 0.0000
Hausman Test	Cross-Section Random $\chi^2(4)$ = 223.0820; Prob. $\chi^2(4)$ = 0.0000

Source: Processed data from World Bank, Human Development Index, Transparency International

Based on Table 1, the Chow test and Hausman test results indicate that the Fixed Effect Model (FEM) is the best estimation model, as evidenced by the empirical probabilities of the F-statistic and χ^2-statistic, both being 0.0000 (< 0.01). The detailed estimation results of the FEM model are summarized in Tables 2 and 3.

Table 2

Variable	Coefficient	Standard Error	Significance Level
Intercept (Constant)	54.8075	0.2047	-
PE	-0.0117	0.0991	*** (α = 0.10)
PP	0.1655	0.0068	* (α = 0.01)
IPK	-0.0174	0.1123	-
UNEMP	-0.0536	-	-
R^2	0.9988	-	-
DW	1.8530	-	-
F-statistic	3033.749	-	-
Prob. F	0.0000	-	-

Notes:
- Significant at α = 0.01
- Significant at α = 0.05
- Significant at α = 0.10

Source: Processed data from World Bank, Human Development Index, Transparency International

Table 3
Regional Constant Effects

No	Country	Regional Effect	Constant
1	Angola	5.365421	60.172921
2	Benin	-3.973767	50.833733
...	...	...	...
43	Zimbabwe	1.267323	56.074823

Source: Processed data from World Bank, Human Development Index, Transparency International

From Table 2, the FEM model exists with an empirical probability of the F-statistic of 0.0000 (< 0.01) and a determination coefficient (R^2) of 0.9988. This indicates that 99.88% of the variation in the Human Development Index (HDI) is explained by variations in economic growth, population growth, the Corruption Perception Index (CPI), and unemployment rates, while the remaining 0.12% is influenced by factors outside the estimated model. Of the five variables in the econometric model, only two variables—population growth and the Corruption Perception Index (CPI)—have a significant impact on the HDI, with t-statistic probabilities of 0.0991 (< 0.1) and 0.0068 (< 0.01), respectively.

The population growth variable shows a regression coefficient value of 0.1655, indicating a linear relationship. In other words, a 1% increase in population growth will raise the HDI by 0.1655, while a 1% decrease will lower the HDI by the same amount. The CPI variable has a regression coefficient of -0.0174, also showing a linear relationship. A 1% increase in the CPI reduces the HDI by 0.0174, while a 1% decrease in the CPI improves the HDI by the same amount.

From Table 3, it can be observed that Mauritius has the highest constant value of 81.01336. This indicates that, in the context of the influence of economic growth, population

growth, CPI, and unemployment, Mauritius tends to have a higher HDI than other Sub-Saharan African countries. Following Mauritius, the countries with the highest constants are South Africa (74.7252) and Botswana (71.76512). Meanwhile, Niger has the lowest constant value of 39.06839. This indicates that, in the same context, Niger tends to have a lower HDI compared to other countries. Following Niger, the countries with the lowest constants are the Central African Republic (39.23912) and Chad (39.37127).

4.2 Economic Interpretation

The Human Development Index (HDI) in Sub-Saharan African countries during the 2018-2022 period was found to be positively influenced by Population Growth (PG) and negatively affected by the Corruption Perception Index (CPI). Meanwhile, Economic Growth (EG) and Unemployment (UNEMP) did not have an impact on the Human Development Index in Sub-Saharan Africa.

Similar results were found in the studies by Idris et al. (2024), Wahyuningrum & Soesilowati (2021), and Ramadhani & Utomo (2023), which state that economic growth does not impact the Human Development Index. Income inequality can hinder the development process, especially access to education and healthcare for the population, which ultimately affects the productivity of a region, leading to a decline in the Human Development Index. This study is also in line with the research by Salsabila & Hasmarini (2023), which states that economic growth negatively and significantly affects the Human Development Index. A negative impact means no effect, as when the independent variable increases, the dependent variable tends to decrease, showing that the independent variable does not enhance the other variable (Syiffa & Setyowati, 2023). Rapid economic growth that is not properly and wisely allocated will not affect the Human Development Index.

In contrast, Taqi et al. (2021) found a positive and significant correlation between economic growth and the Human Development Index. Similarly, Senewe et al. (2021) showed that a decline in economic growth negatively affects the Human Development Index, such as imbalances in production and consumption, leading to a recession and a loss of investor confidence.

Research by Khairunnisa et al. (2023), Irham & Putri (2023), and Wahyuningrum & Soesilowati (2021) supports this study's findings that the population size of a region significantly affects the Human Development Index. As population growth increases, the number of people living in a region rises, and the government is expected to improve and provide more comprehensive public facilities, and vice versa. Therefore, it can be concluded that higher population density is related to the availability of public service facilities, and quality public services and infrastructure will improve people's living standards.

The research by Khadijah et al. (2022) presents a different finding, stating that population growth negatively impacts the HDI. The increase in population reduces the HDI because it is not accompanied by the creation of job opportunities, which can threaten the welfare of the population due to unemployment. Fitriani's (2022) research shows that the Corruption Perception Index significantly affects the Human Development Index, in line with this study's results. However, there is a difference in the direction of the variable's influence. This study shows that the CPI negatively impacts the HDI, while the research by Anantika & Sasana (2020) found that the CPI positively impacts the HDI. This finding is supported by Sarabia et al. (2020), who stated that countries with low CPI scores tend to have higher HDI values. The Corruption Perception Index data used is on a scale of 0-100. If the CPI value is close to 100, the country is considered to be free from corruption, while a value close to 0 indicates a country with high corruption. Thus, the lower a country's CPI, the higher the perceived corruption and the lower the human development in that country.

Similar findings were observed in the studies by Astriani et al. (2021) and

Wahyuningrum & Soesilowati (2021), which state that unemployment does not affect the Human Development Index. This is because an increase in the Human Development Index occurs when many unemployed people seek jobs that better match their skills, leading to a decrease in unemployment and more equal income distribution. This finding is also in line with Si'lang et al. (2019), who stated that unemployment has an inverse relationship with the HDI, though it does not significantly affect it. The likely reason is the increase in labor in sectors with higher welfare levels, while sectors with lower welfare levels experience a decrease in labor.

In contrast, the study by Idris et al. (2024) found that unemployment has a negative and significant impact. The HDI increases when the population is able to meet basic needs such as education and healthcare. This finding also differs from the study by Sumiyarti et al. (2022), which shows that unemployment has a negative and significant effect on the HDI.

5. Closing

5.1 Conclusion

Based on an analysis of the Human Development Index (HDI) in Sub-Saharan African countries during the 2018-2022 period, it was found that:

1. Population Growth (PP) has a positive effect on HDI, which shows that increasing population encourages the government to improve public facilities, which ultimately improves people's quality of life.
2. The Corruption Perception Index (IPK) has a negative effect on HDI. Countries with low GPA scores tend to have lower human development, indicating that corruption can hinder access to quality education and health.
3. Economic Growth (PE) and Unemployment (UNEMP) do not show a significant influence on HDI. This indicates that even though economic growth is increasing, if it is not accompanied by equality and job creation, the impact on HDI could be limited.

5.2 Suggestion

Improving the Quality of Public Facilities: Governments in countries with high population growth rates need to focus on providing better public facilities, such as education and health services, to meet the growing needs of society.

1. Eradicating Corruption: To increase HDI, Sub-Saharan countries need to reduce levels of corruption by strengthening transparent and accountable governance systems. This will increase people's access to better basic services, such as education and health.
2. Wise Allocation of Economic Growth: While economic growth is important, countries in Sub-Saharan Africa need to ensure that it is allocated wisely, by creating jobs and equitable development across sectors to improve the quality of life of society as a whole.
3. Job Creation: To reduce the negative impact of unemployment on HDI, there needs to be a focus on policies that can create jobs, especially in less developed sectors, so that people can better meet their basic needs.

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