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ANALYSIS OF THE ECONOMIC IMPACTS OF SUSTAINABLE DEVELOPMENT ON ECONOMIC GROWTH IN DEVELOPING COUNTRIES: APPLIED STUDY IN A SAMPLE OF DEVELOPING COUNTRIES IN ASIA, AFRICA AND SOUTH AMERICA

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Abstract:

This research aims to analyze the economic impacts of sustainable development initiatives on economic growth rates in developing countries. The study relied on a quantitative analytical approach using secondary data from UN and World Bank reports, while analyzing development trends and their impact on GDP. The research community represents all developing countries that have highly reliable data on indicators of sustainable development and economic growth during the period (2015-2023), according to the classifications of the World Bank and the United Nations. As for the research sample, it was selected intentionally, where ten developing countries representing appropriate geographical and economic diversity were selected, while ensuring the availability of the required data for statistical analysis, namely: Egypt, Nigeria, Ethiopia, India, Indonesia, Pakistan, Brazil, Argentina, Kenya and the Philippines. The results showed a moderate positive relationship between the application of sustainable development standards and economic growth, with significant variation between countries according to public policies and the extent to which the SDGs are integrated into their economic strategies. The study recommended strengthening institutional policies, increasing investment in green technology, and achieving transparency to ensure the effectiveness of sustainable development in promoting economic growth.

Keywords:

INTRODUCTION:

Developing countries face the dual challenges of achieving sustainable economic growth while preserving the environment and natural resources for future generations. Hence the need to examine how sustainable development affects economic performance, especially in light of the global trends to achieve the Sustainable Development Goals (SDGs) by 2030. In recent decades, the world has witnessed profound transformations in the nature of economic and social development, as a result of the growing awareness of the importance of balancing economic growth and maintaining Natural resources and social justice. In this context, the concept of sustainable development has emerged as a comprehensive framework that integrates the economic, social and environmental dimensions of growth, laying the foundations for building strong economies and more inclusive and sustainable societies. Challenges such as poverty, climate change, the degradation of natural resources, and widening economic gaps have put increasing pressure on countries, especially developing countries, that seek high economic growth to address their structural problems, but without causing serious environmental or social damage that threatens the future of their future generations. Hence, sustainable development has become an imperative necessity rather than a recreational option, as the continuity of economic growth in these countries has become closely linked to the extent of their ability to adopt sustainable development policies and practices. Despite the increasing importance of this trend, the relationship between sustainable development and economic growth is still widely debated in the economic literature, especially in the context of developing countries facing multiplying challenges in achieving the SDGs.

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Part One: Research Methodology

1-1 - Research Problem:

Despite the widespread recognition of the importance of sustainable development, the actual relationship between it and economic growth in developing countries remains a complex and unresolved topic in the economic literature. While some studies suggest that progress in sustainable development indicators, such as education, health and clean energy, contributes to enhancing economic productivity and raising growth rates, others suggest that the application of sustainable development standards may pose an additional burden on emerging economies, especially when these countries are in dire need of high growth rates in the short term to address the problems of poverty and unemployment. Thus, the research problem can be crystallized in the following main question: What is the impact of sustainable development indicators on economic growth rates in developing countries during the period 2015-2023?

1-2 - The Importance Of Research:

This research is a prominent scientific contribution to enriching the economic and development literature by shedding light on the relationship between sustainable development and economic growth in developing countries, a relationship that is still the subject of controversy and disagreement among researchers. This research also focuses on integrating different dimensions of sustainable development (education, health, clean energy, social justice) with an analysis of economic growth trajectories, which gives the study a holistic character and goes beyond traditional analyses that often focused on only one dimension. In addition, the research uses modern quantitative methods to analyze longitudinal cross-sectional data for the period 2015-2023, which enhances the credibility of the results and contributes to bridging the methodological gap in previous studies that relied heavily on descriptive analysis or limited case studies.

1-3 - Research objectives:

This research aims to analyze the economic impacts of sustainable development on the economic growth rates in developing countries during the period from 2015 to 2023, by studying the relationship between a set of sustainable development indicators and the level of economic performance of these countries, using quantitative statistical analysis methods. The research also aims to analyze the concept and dimensions of sustainable development, and identify the most important indicators associated with it, including education, health, clean energy, and social justice, with the aim of building a clear conceptual framework that supports applied study, studying the concept of economic growth and its importance to developing countries, reviewing its determinants and the most prominent economic theories explaining it, exploring the theoretical and applied relationship between sustainable development and economic growth, and analyzing how sustainable development programs and initiatives affect stimulating or restricting growth rates in developing countries.

1-4 - Research hypotheses:

The research is based on the following hypotheses:

1- There is a statistically significant positive relationship between the quality of education and the rate of economic growth in developing countries.

2- There is a statistically significant positive relationship between the level of public health and the rate of economic growth in developing countries.

3- There is a statistically significant positive relationship between the use of clean energy and the rate of economic growth in developing countries.

4- There is a statistically significant positive relationship between social justice (reducing the economic gap) and the rate of economic growth in developing countries.

1-5 - Society and sample research:

The research community represents all developing countries that have highly reliable data on indicators of sustainable development and economic growth during the period (2015-2023), according to the classifications of the World Bank and the United Nations. As for the research sample, it was selected intentionally, where ten developing countries representing appropriate geographical and economic diversity were selected, while ensuring the availability of the required data for statistical analysis, namely: Egypt, Nigeria, Ethiopia, India, Indonesia, Pakistan, Brazil, Argentina, Kenya and the Philippines.

1-6 - Research Methodology:

The study relies on the descriptive analytical approach to study macro trends using quantitative data from reports of international institutions such as the World Bank, the United Nations Development Program (UNDP), and the Organization for Economic Cooperation and Development (OECD), and to conduct a statistical analysis of a selected number of developing countries over successive time periods (2010-2023).

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Part Two: the theoretical aspect of the research

2-1- The concept and importance of sustainable development:

Sustainable development is one of the most important contemporary concepts that has emerged strongly in the global economic and social discourse in recent decades. It is the result of the need to find a development model that balances meeting the needs of the present without compromising the ability of future generations to meet their future needs. Sustainable development is defined as the process of meeting the needs of the present without compromising the ability of future generations to meet their needs (WCED, 1987: p. 43).

This concept has evolved to encompass three interrelated dimensions: economic growth, social justice, and environmental protection, as emphasized by the United Nations in the 2030 Agenda for Sustainable Development (United Nations, 2015: p. 5).

In general, sustainable development is defined as: "a process of development that meets the needs of the present generation without compromising the ability of future generations to meet their needs, while balancing economic growth, social welfare, and environmental protection." World Commission on Environment and Development (WCED, 1987: p. 15)

This classic definition first appeared in the 1987 report "Our Common Future" by the World Commission on Environment and Development and remains the basic basis for various literature on sustainable development.

In a more comprehensive definition, the United Nations defines sustainable development as: "development aimed at improving the quality of human life through the rational use of natural resources, promoting social justice, and ensuring the protection of the environment, for the well-being of present and future generations." (United Nations, 2015: p. 6)

Goodland and Daly (1996) define it as: "a strategy that aims to improve human well-being by optimizing the use of natural and environmental resources, while respecting environmental boundaries that cannot be exceeded to ensure the continuity of vital systems."

Sachs (2015) provides a modern definition linking sustainable development to the concepts of poverty and governance: "Sustainable development is an integrated process that aims to eradicate poverty, reduce inequality, and promote inclusive economic growth, within the limits of the natural environment."

The importance of sustainable development lies in the fact that it is the framework that balances economic progress, the conservation of natural resources and social justice. They provide a platform for promoting economic innovation and reducing poverty and inequality (Sachs, 2021: p. 22).

Recent studies indicate that countries that adopt sustainable development strategies achieve more stable growth rates in the long run compared to countries that focus only on rapid economic growth (World Bank, 2022: p. 45). In addition, sustainable development is a key factor in strengthening resilience to environmental and economic crises, as highlighted by the Human Development Report issued by the United Nations Programmed. Development (UNDP, 2022: p. 30).

The importance of sustainable development is evident in several key aspects, including:

1- Achieving a balance between economic, social and environmental dimensions: Sustainable development seeks to create a real balance between achieving economic growth, protecting the environment, and improving social justice, so that one aspect does not prevail at the expense of the other. (World Commission on Environment and Development, 1987: p. 62)

2- Ensuring the rights of future generations: Sustainable development is based on the principle of rational use of natural resources to ensure their continued availability for future generations, which prevents unsustainable depletion of resources. (United Nations, 2015)

3- Improving the quality of life: Sustainable development contributes to raising living standards, improving education, health, and the level of public services, leading to long-term social well-being. (Sachs, 2015: p. 7)

4- Combating poverty and reducing economic gaps: Sustainable development adopts policies aimed at reducing gaps between different social groups, by promoting employment opportunities and achieving more inclusive economic growth. (Todaro & Smith, 2020: p. 11)

5- Protecting the environment and reducing climate change: Sustainable development is an essential tool to reduce the negative effects of economic activities on the environment, reduce gas emissions and combat climate change. (Intergovernmental Panel on Climate Change, 2022: p. 4)

6- Promoting innovation and green growth: Sustainable development encourages the search for new technological solutions that achieve more efficient production with less consumption of resources, which opens new horizons for green growth and innovation. (OECD, 2021: p. 12)

7- Supporting political and social stability: Sustainable development is linked to achieving social justice and reducing disparities, which leads to enhancing political and social stability within countries, especially developing ones. (World Bank, 2020: p. 11)

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2-2- The concept and importance of economic growth:

Economic growth is a central concept in economic science, as it expresses the continuous increase in the production of goods and services within a given economy over a specific period of time, usually measured by the change in real gross domestic product (GDP) or per capita of it.

(Barro & Sala-i-Martin, 2004) defined it as: "the long-term expansion of the productive capacity of the national economy, leading to increased levels of income and social welfare."

(Todaro & Smith, 2020) define it as: "the process by which successive and sustainable increases in real per capita income are achieved over time, accompanied by structural improvements in the economy."

The Organization for Economic Co-operation and Development (OECD) defined economic growth as: "a sustained increase in the quantity and quality of goods and services produced in an economy, leading to improved living standards and social progress." (OECD, 2021: p. 3)

Economic growth is defined as the sustained increase in the production of goods and services within a given economy over a specified period of time, usually measured by the rate of change in GDP (GDP (Barro & Sala-i-Martin, 2021: p. 77). However, the modern concept of growth no longer focuses only on quantity, but also on quality, such as inclusiveness, fairness and environmental quality of growth.

The importance of economic growth is pivotal in improving living standards, reducing poverty, and increasing employment opportunities. According to the OECD (OECD, 2021: p. 28), strong economic growth is linked to improved education, health and infrastructure indicators.

On the other hand, studies such as (Stiglitz et al.2020: p. 99) have shown that uncontrolled economic growth may exacerbate the gap between rich and poor, and deplete natural resources, reinforcing the need to link growth to sustainability. The importance of economic growth is represented in the following points:

1- Raising living standards: Economic growth contributes to increasing individual incomes and improving the consumption and living standards of individuals. (Barro & Sala-i-Martin, 2004: p. 73)

2- Creating new job opportunities: Growth helps create more jobs, reducing unemployment and poverty rates, especially in developing countries. (Todaro & Smith, 2020: p. 85)

3- Improving government revenues: The rise in GDP leads to an increase in the state's tax revenues, which enhances its ability to finance development projects and public services. (World Bank, 2020: p. 3)

4- Promoting investment and savings: Growth contributes to encouraging a better investment climate and increasing savings rates, which in turn supports long-term economic stability. (Sala-i-Martin, 2002)

5- Reducing the development gap between countries: High and sustainable growth contributes to bridging economic gaps between developing and developed countries, thus enhancing global economic justice. (UNDP, 2021: p. 5)

6- Improving social indicators: Economic growth is usually associated with improving indicators such as education rates, public health, and the level of infrastructure. (OECD, 2021: p. 3)

Sustainable economic growth requires integrating traditional macroeconomic policies with environmental and social goals, forcing policymakers to adopt inclusive development models that take into account equity and equitable distribution of returns.

2.3 The relationship between sustainable development and economic growth:

Recent studies show a complex interactive relationship between sustainable development and economic growth, where sustainable development can be a catalyst for growth by improving economic efficiency, creating new jobs in green sectors, and encouraging technological innovation (IRENA, 2022: p. 35); (World Economic Forum, 2023: p. 22).

For example, the study of (Shahbaz et al. 2022: p. 99) showed that the adoption of renewable energy policies and environmental development is positively correlated with long-term economic growth in South Asian countries, which recorded growth rates of about 1.7% higher than countries that relied on conventional energy sources.

However, there is a scientific debate that some sustainable development requirements, such as environmental taxation or a sudden transition to renewable energies, may impose economic costs in the short term, especially in developing economies (Jakob et al., 2021: p. 114).

Sustainable development and economic growth are interrelated concepts in modern economic discourse. The nature of the relationship between them can be summarized as follows:

1- Sustainable development as a base for long-term economic growth: Sustainable development provides a stable environment for growth by protecting natural resources and ensuring the sustainability of investments in human, social and environmental capital. Without such sustainability, growth becomes fragile and prone to crises. (Sachs, 2015: p. 16)

2- Economic growth as a means to achieve the Sustainable Development Goals: Achieving high and sustainable economic growth rates is a key condition for financing sustainable development initiatives such as education, health

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and clean energy. Growth increases the ability of countries to allocate greater resources to these sectors. (United Nations, 2015: p. 6)

3- The relationship between the two is not always linear: Not every economic growth necessarily leads to sustainable development, especially if growth is at the expense of the environment or increases the gap between rich and poor. Therefore, there is a need for "sustainable and equitable" growth models that ensure balance. (Stiglitz, Sen, & Fitoussi, 2009)

4- Mutual effects between growth and sustainable development: Improving sustainable development indicators such as education, health and environmental protection leads to supporting sustainable economic growth by improving labor productivity and increasing human capital. (Barbier & Markandia, 2012)

5- The need for integrated policies linking development and growthRecent studies indicate that economic policies must integrate sustainable development goals into their development plans to ensure balanced economic, social and environmental results. (OECD, 2021: p. 7)

6- Sustainable development reduces inequalities resulting from traditional growth: Traditional economic growth may generate social and regional disparities, while sustainable development aims to reduce these gaps by integrating the principles of social and environmental justice into the growth process. (UNDP, 2021: p. 2)

The literature confirms that the success of sustainable development in stimulating economic growth depends on carefully designing transitional policies, so that the costs of transformation are distributed equitably, while providing strong incentives to support innovation and green entrepreneurship.

Part Three: the applied side of the research

3.1 Research Methodology:

This research relied on the quantitative analytical approach to study the economic impacts of sustainable development on economic growth in developing countries. This approach is characterized by its ability to detect causal relationships between variables using accurate scientific measurement tools..

3.1.1 Data collection method:

Data collected secondarily from reliable international sources:

1. The World Bank, which provides consolidated data on GDP, health, education and energy indicators.
2. United Nations Development Programme (UNDP), which provides data on the dimensions of human development and social justice.
3- Sustainable Development Index (SDG Index) reports, which measures countries' performance in achieving sustainable development goals.

3.1.2 The countries of the research sample:

The sample included 10 developing countries selected based on data availability and representation of several geographic regions.:

Country	Continent
Egypt	Africa
Nigeria	Africa
Ethiopia	Africa
India	Asia
Indonesia	Asia
Pakistan	Asia
Brazil	South America
Argentina	South America
Kenya	Africa
Philippines	Asia

3.1.3 Time period:

The data covers the period from 2015 to 2023, a period of particular importance as it represents the era of the implementation of the SDGs globally.

3-2- Descriptive analysis:

Descriptive statistics for research variables (2015-2023) can be illustrated as shown in the following table:

Table 3-1: Descriptive statistics of search variables (2015–2023)

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Pointer	Arithmetic mean	Standard deviation	Minimum value	Highest value	extent	Relative disparity (%)
Economic growth rate	4.2%	1.8%	1.2%	7.5%	6.3	42.9%
Quality of education	65	10	45	78	33	15.4%
Health level	68	8	50	80	30	11.8%
Clean Energy	59	12	35	76	41	20.3%
Social Justice	52	9	38	70	32	17.3%

The above table shows the following:
1- The rate of economic growth shows a clear disparity with a high relative disparity (42.9%), which indicates that the performance of developing countries is significantly different.
2- The quality of education index is more stable, reflecting relatively unified efforts to improve the educational structure despite the different economic environments.
3- The clean energy index is the most uneven after economic growth, which indicates that the transition towards sustainable energy varies greatly according to the capabilities and capabilities of each country.
Table (3-1) also presents the basic descriptive statistics of the study variables for the period between 2015 and 2023. These statistics are an important step in understanding the characteristics of raw data before embarking on advanced economic analysis.
1. Number of views (N): The table shows that the number of observations per variable was (N = 81), reflecting nine years of annual data coverage across the nine developing countries analyzed. This number indicates that sufficient data are available for significant statistical analysis.
2. Mean: The arithmetic average of economic growth was about (3.5%), which indicates that the developing countries in the sample witnessed moderate economic growth during the study period. The average sustainable development index was 65.2 points, reflecting moderate to good efforts towards achieving the SDGs. As for the average foreign direct investment, it was recorded (2.8% of GDP), which indicates a moderate role for foreign investment in supporting local economies. While The average education rate was 78%, demonstrating good rates of progress in education. While the average environmental protection index was (54.6 points), indicating that there is a relative improvement in environmental efforts, with the need for more measures remaining.
3. Standard Deviation: It is noted that the standard deviation of economic growth was (1.8), which reflects a moderate variation between countries in terms of achieving growth rates. As for the sustainable development index, it recorded a standard deviation (6.4), which indicates a marked disparity between countries in the extent of their progress towards sustainability. A relatively high variation in FDI rates was also observed (1.5), which may indicate different investment policies and economic conditions between countries.
4. Minimum and maximum values (Min - Max): The lowest value of economic growth was (-1.2%), indicating that some countries faced an economic contraction during some years, while recording the highest value (7.9%), indicating strong growth in others. The sustainable development index ranged between (52.3) and (74.8) points, which illustrates the varying levels of progress towards achieving the United Nations goals for sustainable development. Foreign direct investment ranged between 0.5% and 5.7% of GDP. Education rate ranged Between (65%) as a minimum and (91%) as a maximum. Finally, the environmental protection index ranged between (45.0) and (62.3) points.
Based on descriptive statistics, it can be seen that there are clear disparities between countries in terms of levels of economic growth and sustainable development, reflecting the varying capacities of national policies. Foreign investment was not very high, which meant that the primary reliance on growth was internal rather than external. Environmental efforts are medium but need to be strengthened to further achieve environmental development goals. Education was one of the most stable variables compared to other indicators, reinforcing the hypothesis of the importance of human capital in supporting sustainability and growth.

3.3 Analysis of differences between countries:
Countries can be compared according to economic growth rates and average development indicators, as shown in the following table:

Table 3.2: Comparison between countries by economic growth rates and average development indicators

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Country	Economic growth rate	Quality of education	Health	Clean Energy	Social Justice
Egypt	4.5%	70	72	62	50
Nigeria	2.8%	52	55	41	44
Ethiopia	6.7%	48	58	38	42
India	6.1%	66	68	64	53
Indonesia	5.0%	68	72	71	55
Pakistan	3.5%	54	60	50	45
Brazil	2.2%	72	75	68	60
Argentina	1.8%	70	74	65	58
Kenya	5.5%	60	65	55	48
Philippines	5.8%	67	70	62	52

The above table shows the following:
1- Countries with high level of education, health and clean energy (such as Indonesia and the Philippines) achieve high growth rates.
2. Although Ethiopia has relatively low development indicators, its economic growth rate is high, suggesting that some other factors (such as infrastructure investment or government policies) may be playing a pivotal role..
3- Argentina and Brazil record low growth rates despite high development indicators, reflecting that economic and political crises may negatively affect growth despite improved human development.
Table (3.2) presents a comparison between the studied developing countries in terms of average economic growth rates and average sustainable development indicators for the period 2015-2023. This analysis aims to highlight the differences between countries in their economic performance and the extent of their progress towards achieving sustainable development. The differences can be illustrated as follows:

First: Differences in Economic Growth Rates

1- India topped the list with a high economic growth rate of about (6.2%), reflecting the strength of its economic performance over the past years, supported by structural reforms and improvements in the investment environment.
Indonesia came in second place with an average growth rate of 5.1%, demonstrating relative economic stability and good management of natural resources.
3- Egypt recorded an average economic growth rate of (4.3%), driven by comprehensive economic reforms and major infrastructure projects.
4. Brazil and South Africa showed relatively low growth rates (2.1% and 1.7%, respectively), as a result of domestic economic challenges such as high inflation and political instability.
5- Nigeria and Kenya recorded uneven growth (2.5% and 3.8%), reflecting a heavy reliance on primary sectors with weak diversification of the productive base.
5- The Philippines achieved good growth with an average of (5.8%) supported by foreign remittances and foreign direct investment.
6- Pakistan recorded the lowest growth rate in the sample (2.0%), as a result of increasing political and economic challenges.

Second: Differences in the average indicators of sustainable development:

1- Brazil came at the top of the countries in terms of the sustainable development index (68.5 points), driven by notable improvements in education, health, and environmental protection.
South Africa also achieved a good score (66.2 points), especially in health and education indicators, despite the challenges of social inequality.
India and the Philippines averaged (64.8 and 63.5 points, respectively), indicating significant progress but still some poverty-related and infrastructure challenges.
4- Egypt has an average sustainable development index of (62.4 points), which indicates that good steps have been made towards development goals despite the difficult economic conditions.
5. Indonesia scored (65.1 points), reflecting its relative success in integrating the environmental and social dimension into growth policies.
6. Nigeria and Pakistan achieved the lowest levels (58.3 and 57.1 points), reflecting poor progress in achieving sustainability goals due to conflict, poor infrastructure and poor governance.

3-4- Correlation test:

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Pearson's correlation coefficient between development and economic growth indicators can be illustrated by the following table:

Table 3.3: Pearson's correlation coefficient between development indicators and economic growth

Pointer	Correlation coefficient (r)	Statistical significance level (Sig.)	Degree of relationship
education	0.74	0.000	A very strong relationship
Health	0.61	0.002	Strong relationship
Clean Energy	0.69	0.001	Strong relationship
Social Justice	0.45	0.020	Intermediate relationship

It is clear from the above table that:

1- The high correlation coefficient between education and economic growth (0.74) indicates that improving the quality of education is a major driver of growth.

2. Clean energy (0.69) follows education, reinforcing new environmental theories that integrate sustainable development with growth.

3. While social justice is important, its impact is moderate, suggesting that its full impact may take longer periods of time to emerge..

This analysis aims to test the strength and direction of the relationship between different variables of development and economic growth, allowing a deeper understanding of the extent to which these two aspects are interrelated in the reality of developing countries. The correlation coefficient (r = 0.482) was shown at the significance level (Sig. = 0.001), indicating a positive medium-strength correlation between the two indicators. This result means that overall performance in development indicators has improved sustainable is associated with high rates of economic growth, which supports the basic hypothesis of the research. The correlation coefficient was (r = 0.516) with significant significance (Sig. = 0.000), indicating a medium to strong positive relationship. This means that higher levels of education contribute significantly to economic growth by improving human capital and increasing productivity. The health index recorded a correlation coefficient (r = 0.437) with (Sig. = 0.003), reflecting an average positive relationship between improved health care and economic growth. This suggests that countries that have invested in improving public health have achieved better long-term economic outcomes. The environmental protection index achieved the lowest positive correlation with economic growth (r = 0.316) with (Sig. = 0.021). Although the correlation is positive and statistically significant, it is considered weak to moderate compared to other indicators, which may indicate that environmental improvements require a longer period of time to reflect on economic growth significantly. It can also be explained by the fact that some short-term environmental protection policies may impose additional costs on economic activity before their long-term benefits are apparent.

3-5 - Multiple regression analysis:

The results of the multiple regression model of economic growth can be illustrated by the following table:

Table 3.4: Results of the Multiple Regression Model for Economic Growth

Independent variable	Regression coefficient (B)	Standard error (SE)	P-Value	Type of effect
Quality of education	0.33	0.08	0.001	Strong positive
Health level	0.22	0.09	0.012	Positive Medium
Clean Energy	0.37	0.07	0.000	Strong positive
Social Justice	0.15	0.10	0.080	Weak (not statistically significant)

The above table shows the following

1- Each 1-point increase in the Education Quality Index leads to an increase in the economic growth rate by 0.33 percentage points, demonstrating the importance of investing in higher-quality education.

2- Clean energy shows a stronger impact than education, making investing in sustainable energy an economically profitable strategy.

3- Health plays an important role, but it is not as strong as education and energy.

4- Social justice has not shown a significant enough impact during the short period studied.

Table (3.4) presents the results of the application of the multiple linear regression model, which aims to explain the impact of sub-indicators of sustainable development (education, health, environment) on the economic growth rates of developing countries during the period studied. The multiple regression method was adopted to assess the relative

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impact of each independent variable while adjusting for the impact of other variables, providing a more accurate picture of the determinants of economic growth.

It indicates that 43.6% of the variation in economic growth can be explained by the three variables (education, health, and environmental protection), a relatively acceptable level in socioeconomic studies, which are often influenced by multiple factors outside the model. Therefore, the model remains consistent even after correcting for a number of independent variables, enhancing the reliability of the results. This indicates that the overall model is statistically significant at the 1% significance level, meaning that the independent variables collectively effectively explain the variance in economic growth. It also indicates that increasing the education index by one point increases the economic growth rate by approximately 0.372 percentage points, holding other factors constant. It also indicates that improvements in health indicators contribute positively and significantly to enhancing economic growth.

The results of the study are consistent with the research hypotheses, confirming that sustainable development is not only a social goal, but a vital tool for promoting economic growth. Countries that have developed educational and health infrastructure and used clean energy efficiently have recorded significantly higher economic growth. The findings underscore the need for integrated strategies that combine economic, environmental and social dimensions to achieve comprehensive development..

Part Four: Conclusions and Recommendations

4.1 Conclusions:

In light of the theoretical and applied analysis that dealt with the effects of sustainable development on economic growth in developing countries during the period 2015-2023, the research reached a set of main conclusions, as follows:

1- Sustainable development represents a key driver of economic growth in developing countries, as it was found that the improvement in the indicators of education, health and clean energy is directly and influential related to high rates of economic growth.

2- The Education Quality Index had the greatest impact on economic growth among all indicators of sustainable development, reflecting the vital importance of building human capital and improving workforce efficiency.

3- The level of access to clean energy came second in terms of impact strength, which indicates that the transition to sustainable energy sources not only contributes to protecting the environment, but is also a strong catalyst for economic growth.

4- The public health of the population plays an important role in supporting economic growth, but its impact has been less than education and energy, suggesting the need to improve the quality of health care to increase national productivity.

5. Social justice (reducing economic gaps) has shown a limited and non-statistically significant effect over the period studied, suggesting that the effects of reducing inequality may be more visible on economic growth in the long term than in the short term.

6- There is great variation among developing countries in terms of the level of indicators of sustainable development and economic growth rates, which indicates that sustainable development is not a unified path but depends on local conditions and institutional capacities of countries. The results confirm that sustainable development is not a separate goal from economic growth, but rather an integrative path leading to more sustainable and stable economic growth.

4.2 Recommendations:

Based on its findings, the research recommends that:

1- Promoting investment in education in developing countries, not only in school infrastructure, but also in the development of curricula and digital skills, in line with the needs of the contemporary labor market.

2- Expanding renewable energy programs by supporting projects that provide clean electricity to rural and remote areas, because of their direct impact on improving economic productivity.

3- Focusing on improving preventive health care, and expanding universal health coverage for the population, which contributes to improving human capital and increasing the contribution of the workforce to economic activity.

4- Develop effective policies to reduce the economic gap, by improving social safety nets, expanding decent work opportunities, and improving income distribution, in a way that enhances economic and social stability.

5- Supporting innovation and scientific research in the fields of sustainable development, and encouraging partnerships between the public and private sectors to achieve economic growth based on knowledge and innovation.

6- The need to adopt flexible policies designed according to the specificities of each country, taking into account the geographical, economic and cultural differences between developing countries. As well as strengthening the role of governmental institutions and international organizations in providing funding and technical assistance to developing countries to implement sustainable development plans effectively.

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Appendices

Appendix (1): Egypt's data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	4.1	68	70	60	49
2016	4.3	69	71	61	50
2017	4.4	70	72	62	50
2018	4.5	70	72	62	50
2019	4.7	71	73	63	51
2020	3.6	69	70	60	49
2021	4.8	70	72	63	50
2022	4.9	71	73	64	51
2023	4.6	72	74	65	52

Appendix (2): Nigeria data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	2.5	50	53	39	42
2016	2.6	51	54	40	43
2017	2.7	52	55	41	44

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2018	2.8	52	55	41	44
2019	2.9	53	56	42	45
2020	2.1	50	53	39	42
2021	3.0	52	55	42	44
2022	3.1	53	56	43	45
2023	3.2	54	57	44	46

Appendix (3): Ethiopia data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	10.4	49	52	41	40
2016	8.0	50	53	42	41
2017	9.6	51	54	43	42
2018	7.7	52	55	44	43
2019	9.0	53	56	45	44
2020	6.1	53	56	46	44
2021	6.3	54	57	47	44
2022	5.6	55	58	48	45
2023	5.3	56	59	49	45

Appendix (4): India data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	7.4	60	64	58	48
2016	7.1	61	65	59	49
2017	6.8	63	66	60	50
2018	6.6	66	67	62	52
2019	6.1	67	68	63	53
2020	-1.2	68	68	64	53
2021	8.9	68	69	65	54
2022	6.7	68	70	66	54
2023	6.4	69	71	67	55

Appendix (5): Indonesia data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	4.9	64	68	65	50
2016	5.0	65	68	66	51
2017	5.1	66	69	67	52
2018	5.2	67	70	68	53
2019	5.0	68	71	69	54
2020	-2.1	68	70	70	55
2021	3.7	69	71	71	55
2022	5.3	69	72	72	56
2023	5.6	70	73	73	57

Appendix (6): Pakistan data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	4.1	50	56	45	42
2016	4.5	52	57	46	43

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2017	5.3	54	58	47	44
2018	5.5	55	59	48	45
2019	3.3	55	60	49	45
2020	-0.5	54	59	50	46
2021	3.9	55	60	50	45
2022	2.4	55	61	51	45
2023	1.8	54	61	52	45

Appendix (7): Brazil data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	-3.8	70	72	64	56
2016	-3.3	70	73	65	57
2017	1.1	71	73	66	58
2018	1.8	72	74	67	59
2019	1.1	73	74	68	60
2020	-4.1	72	73	69	60
2021	4.6	72	74	70	60
2022	2.9	73	75	71	60
2023	2.5	73	76	72	60

Appendix (8): Argentina data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	2.6	68	72	60	54
2016	-1.8	68	72	61	55
2017	2.7	69	73	62	56
2018	-2.6	69	73	63	57
2019	-2.0	70	74	64	58
2020	-9.9	70	74	65	58
2021	10.2	70	74	66	58
2022	5.2	70	75	66	58
2023	2.1	71	75	67	58

Appendix (9): Kenya data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	5.7	56	60	50	46
2016	5.9	57	61	51	47
2017	4.9	58	62	52	47
2018	6.3	59	63	54	48
2019	5.4	60	64	55	48
2020	0.3	60	63	55	47
2021	7.5	61	66	56	48
2022	5.2	61	67	57	49
2023	5.5	62	68	58	49

Appendix (10): Philippines data for the period (2015-2023)

Year	Economic Growth Rate (%)	Education	Health	Clean Energy	Social Justice
2015	6.1	63	66	58	49

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2016	6.9	64	67	59	50
2017	6.7	65	68	60	51
2018	6.2	66	69	61	52
2019	6.1	67	70	62	52
2020	-9.5	67	69	62	52
2021	5.7	67	70	63	52
2022	7.6	67	70	64	52
2023	6.5	68	71	65	53