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THE IMPACT OF HUMAN DEVELOPMENT INDICATORS ON DIFE ERENCES BETWEEN EGYPTIAN GOVERNORATES IN THE PERIOD (2010-2022)

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ABSTRACT

The research attempts to measure the impact of a group of indicators for the dimensions of human development in the Egyptian governorates (Gross Domestic Product Index - Life Expectancy Index - Education Index) in the period from (2010-2022), using the descriptive analytical approach and the Statistical Package for the Social Sciences (SPSS), where Differences appeared in the level of human development between the governorates (it decreased slightly) from the year (2010-2022), through governorates that appeared at the first level, such as the governorates of (Port Said - Cairo - Suez - Alexandria), other governorates recorded a low level, And others are at an intermediate level, which gives an indication of the development trends in the lower governorates while exploiting the spatial potential in the governorates. Accordingly, the governorates can be classified according to that variation to determine priorities for directing development according to the values of each guide and the extent of the need of each governorate. It turns out that (the education index) is the strongest influence. In the rise in human development rates with a regression coefficient (0.98), followed by the GDP index with a regression coefficient (0.004), with a severe decline in the life expectancy rate with a coefficient (-0.004). This result is explained by the Covid-19 pandemic, With the classification of the Egyptian governorates in terms of levels of human development, the research recommended the necessity of achieving balance between the governorates by paying attention to focusing development on the three sectors of human development in (Fayoum - Minya - Assiut - Sohag), and paying attention to the health sector in (Beni Suef - Qena - Luxor - Damietta). - Dakahlia), and in the educational sector in Luxor Governorate.

KEYWORDS: Spatial contrast ,Human Development Index, Education Guide, Life Expectancy Guide, GDP Guide.

أثر مؤشرات التنمية البشرية فى التباينات بين المحافظات المصرية بالفترة (2010-2022)

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الملخص

يحاول البحث قياس أثر مجموعة مؤشرات لأبعاد التنمية البشرية بالمحافظات المصرية (دليل الناتج المحلى الإجمالى – دليل توقع الحياة – دليل التعليم) بالفترة من عام (2010-2022) م، بإستخدام المنهج الوصفى التحليلى والحزمة الإحصائية للعلوم الإجتماعية (spss)، حيث ظهرت تباينات لمستوى التنمية البشرية بين المحافظات (انخفضت انخفاضاً بسيطاً) من عام (2010-2022)، وذلك من خلال محافظات ظهرت بالمستوى الأول مثل محافظات (بورسعيد – القاهرة – السويس – الأسكندرية)، وسجلت محافظات أخرى مستوى منخفض، وأخرى مستوى متوسط، مما يعطى مؤشراً بتوجهات التنمية بالمحافظات الأقل مع تحقيق إستغلال الإمكانيات المكانية بالمحافظات، وبناءً على ذلك يمكن تصنيف المحافظات وفقاً لذلك التباين لتحديد أولويات توجيه التنمية وفقاً لقيم كل دليل ومدى احتياج كل محافظة، فتبين أن (دليل التعليم) هو المؤثر الأقوى فى إرتفاع معدلات التنمية البشرية بمعامل انحدار (0.98)، يليه دليل الناتج المحلى الإجمالى بمعامل انحدار (0.004)، مع انخفاض شديد فى معدل توقع الحياة بمعامل (-0.004)، وتفسر تلك النتيجة بسبب جائحة كوفيد19، مع تصنيف المحافظات المصرية من حيث مستويات التنمية البشرية، وأوصى البحث بضرورة تحقيق التوازن بين المحافظات بتركيز التنمية بالقطاعات الثلاثة للتنمية البشرية فى

(الفيوم – المنيا – أسيوط - سوهاج)، والإهتمام بالقطاع الصحى فى (بنى سويف - قنا -الأقصر- دمياط - الدقهلية)، وبالقطاع التعليمى فى محافظة (الأقصر).

الكلمات المفتاحية : التباين المكانى، دليل التنمية البشرية، دليل التعليم، دليل توقع الحياة، دليل الناتج المحلى الإجمالى.

1. INTRODUCTION

The success of the development process requires identifying strategic development foundations that suit the characteristics of the community concerned with the development process, which leads to its progress and development [1]. Development is considered a process of development to bring about continuous improvement in all sectors [2], with the aim of achieving continuous development and progress for all members of society, which is called development. Sustainable [3], and the human and social dimension is considered the effective basis and most accurate concept for achieving development by addressing human poverty in all its dimensions and patterns, and development cannot occur without human development [4]. In light of that approach, the National Planning Institute [5] issued the development report. The Egyptian Human Development Commission in 1994, with its issuance for some governorates in 2016, then its issuance in 2022 to measure human development indicators in the Egyptian governorates and identify the differences between them. Through it, these variations can be measured spatially, through a general average called (the Human Development Index), where the research focused on analyzing and interpreting the spatial variation of a group of different development indicators to measure the Human Development Index, and creating a development classification for them based on the value of the human development indexes, in addition to Evaluating the main dimensions of (health, knowledge, and adequate standard of living) in terms of indicating the areas of excellence and failure in each of them. These governorates were characterized by high indicators of the health dimension, education, and gross domestic product, and others with medium human development, and with a low level of human development in which all dimensions of human development decreased, and the pattern of very low human development, which is represented in (Beni Suef, Fayoum, Minya, Sohag, and Assiut).

Based on this, the differences and imbalances between the governorates appear, the problem of measuring these indicators and the extent of their variation in their balance, which helps in classifying the governorates according to their development priorities, In order to achieve the following goals:

Study and analyze human development indicators in the Egyptian governorates by analyzing those development indicators in the period (2010-2022) to measure the variations in those indicators to classify the Egyptian governorates to guide and determine development priorities through the following:

Identifying the levels of the Human Development Index for each governorate during that period, determining the discrepancy between the human development indicators (life expectancy index, education, and gross domestic product), and clarifying the relationship between the human development indicators and the human development index.

The research assumes that human development indicators vary from the year 2010 compared to the year 2022, and that there are differences between the governorates of the Republic for these indicators, and therefore there is a development classification for the governorates according to these indicators that must be considered and taken into account when measuring development in general so that this disparity is taken into account.

Based on the fact that scientific research begins as a continuation of the researchers' journey and not in isolation from other research, this study has therefore used some previous studies related to the research topic, which are as follows:

- Study (National Institute of Planning during the period from 1994 [5]: Previous studies analyzing the Human Development Index by the National Planning Institute during the period from 1994 to 2010 showed that the Human Development Index data and health index data follow a normal distribution, unlike the education and income index data, and that An increase in income will lead to an increase in income, and the study did not give a weight to each indicator
- The study reviewed the various methods of measuring human development through the annual human development reports in 1990, to identify the current situation and know the axes of that development, which are (health - nutrition - poverty - income - unemployment - productivity - Education), and I concluded that education plays an important role [6].
- Human development in the governorates of Egypt. The researcher proposed a guide consisting of ten dimensions to identify the methods used by human development reports, represented by the dimensions (educational - nutritional - social care - economic - demographic) with the preparation of a correlation matrix. Between the indicators of each group [7].
- A study of human development and its dimensions in the Egyptian countryside (villages of Giza Governorate). The study concluded that a decrease in rates (population and mortality, an increase in educated people, the provision of facilities, and an increase in the per capita share of the gross domestic product) would raise the levels of Human development in the rural sector [8].
- Analysis of economic, social and environmental changes in the Egyptian governorates. The study indicates that many positive and negative changes have occurred [9].
- This study was concerned with creating a guide for slum areas and its relationship to the Human Development Index in slum areas in Cairo Governorate and relied on variables related to available services (specific to health services - specific to security aspects - social aspects - governmental aspects) [10]. Explaining the reality of human development by ethnicity and comparing Iraq with neighboring countries through statistical comparison of the country's governorates and regions, while adding new indicators and dimensions to a more comprehensive human development index [11].
- Study and analysis of the determinants affecting the Human Development Index and recommended that the Health Index is one of the most important determinants affecting and thus raising human productivity [12]. Study aimed to measure the human development index and its differences between the Jordanian governorates in the period 2004-2015 AD), using the descriptive analytical approach in calculating the Human Development Index and ArcGIS 9.3 software.And the Statistical Package for the Social Sciences (SPSS), based on data from the General Department of Statistics. The same research methodology was followed [13].
- It aimed to know the level of human development in the governorate Al-Qadisiyah, the reality of each indicator, its level and percentage of deprivation, and to explain the reasons for the discrepancy in level These indicators are at the judicial level, and some quantitative statistical methods are used, such as the score Standardization, Lorenz curve, and Gini coefficient [14].

2.METHODOLOGY

The research followed the descriptive analytical approach to identify the values of the Human Development Index, and through it, the Human Development Index indicators were calculated for each

governorate in the Egyptian state based on the United Nations report, in addition to performing a Pearson correlation to find the relationship between the three dimensions of human development and the main index, and determining the discrepancy between those indicators from During calculations.

A Lorenz curve was created to determine the shape of the population distribution of the Human Development Index over area according to the Human Development Index for each governorate. A simple regression line was drawn to illustrate the relationship between the three human development indicators and the Human Development Index. The coefficient of determination was calculated, which measures the strength of the relationship between the independent variable, which represents (education, health, and domestic product) and the dependent variable, which represents (human development). Multiple regression residuals were also calculated by subtracting the difference between the observed and expected values. From these results, it was possible to prove the hypothesis and determine the values of the differences. Accordingly, the Egyptian governorates were classified according to these differences so that they could be considered when proposing projects and taken into account when determining development priorities.

2.1. Global Human Development Report Methodology

The World Human Development Report has been issued by the United Nations Development Programme since 1990. Over the years, some adjustments and improvements have been made to the index. According to the report, human development is about expanding the richness of human life, not just the richness of the economy in which people live; An approach that focuses on people, their opportunities and choices, human development focuses on improving people's lives rather than assuming that economic growth will automatically lead to greater well-being for all. Income growth is viewed as a means to development and not an end in itself through three foundations: to live a long, healthy, and creative life, to be knowledgeable and knowledgeable, and to obtain the resources necessary for a decent standard of living.

The report quantitatively reflects that development is a balance between the economy and human capital components. The index is based on several sub-axes, such as: health, education, income and resource formation, inequality, gender, poverty, work and employment, and environmental sustainability [15].

It is noted that human development indicators are constantly evolving and changing, through modification and development in order to modify them in accordance with annual reports and statistics, and the Economic and Social Council of the United Nations Development Program issues a report on these indicators annually. The concept of human development expresses indicators of social well-being over time, “as it began with the concept of developing countries and developed countries from the year (1960-1973), and the progress of industry was taken as a criterion for progress. Between the years (1974-1990), another concept of human development appeared, which is countries North and South countries, income has been taken as a criterion for progress and backwardness (1000 dollars per capita) [16].

With the recent emergence of the concepts of economic development and sustainable development, Meyer and Baldwin defined economic development as “development that works to create goods and services from production that increases the real national income (GNP) of a country for a period of time, as this results in an increase in the average share of Per capita income [17] (GDP). The concept of human development indicates that it is a fixed concept and includes

three dimensions, which are (education index, life span index, and gross domestic product index) [18].

2.2. Human development in Egypt

The Human Development Report in Egypt for the year 2021 comes under the title "Development is a Right for All: Egypt's Journey and Path" to monitor and analyze Egypt's development process over the past decade in the areas of sustainable development from the perspective of the "Right to Development" Declaration issued by the United Nations General Assembly in 1986, where This declaration established what was considered the right of developing peoples to choose their development path and achieve their true independence without external dictates and based on their national values. The report discusses the future path of the various reforms taken by the Egyptian state in light of the plans and strategies prepared, and the Human Development Report in Egypt 2021 is of special importance, as it comes ten years after the publication of the last Human Development Report in 2010. Therefore; It covers an unprecedented period in Egyptian history from 2011 to 2021, which witnessed the revolutions of January 2011 and June 2013, which led to a change in the course of Egypt's development process.

Regarding the reality of Egypt's situation in the Human Development Report, Egypt's performance has taken a relatively upward trend since the launch of the report in 1990 until now. The value of the Human Development Index for Egypt for 2021 is 0.731, which proves the country's position in the high human development category, placing it in 97th place out of 191 countries and territories. Egypt advanced by about 19 places in the Human Development Index, ranking 116th in 2020, despite the decline in the value of the index globally for two consecutive years [19].

Fig. 1. shows the annual average growth of the Human Development Index in percentage terms For the years 1990 it was 0.572, while in the following ten years it reached 0.629, meaning the growth rate increased by 0.5 and this indicates an improvement in the levels of human development. In the years (2000-2013 AD), the annual growth rate reached 0.633-0.688, meaning that the levels of human development are increasing. In 2019 AD, the level of human development increased in an unexpected way, reaching 0.735. The percentage increase also reached its highest level (5%) during the past three years, due to the great development in the services sector and the economic sector [20].

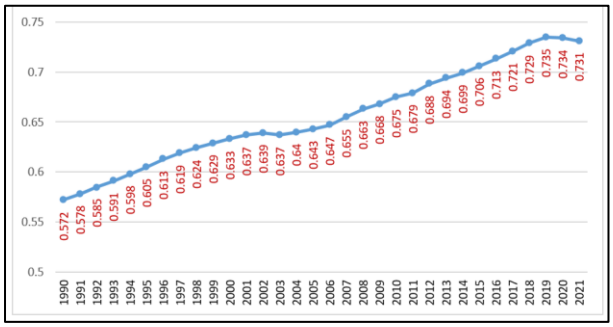


Fig. 1. Evolution of the value of the Human Development Index for Egypt during the period (1990-2021).

Then a slight decrease is observed for the years 2021 and 2020 as a result of Covid-19. Thus, Egypt ranks eighth among 20 Arab countries - to which it belongs among the internal

classifications of the report, while Yemen is at the bottom of the list of Arab countries, ranked 183 globally, while the United Arab Emirates topped the list of Arab countries, occupying 26th place among the countries of the world. Between 1990 and 2021, the average growth in the Human Development Index for Egypt was about 0.79%. Comparing the development of Egypt's performance during the last two decades, it is noted that the annual average growth of the Human Development Index in Egypt during the period (2010-2021) increased by about 14% over the previous decade (2000-2010).

According to the Ministry of Planning and Economic Development's statement regarding the report, Egypt's higher ranking in the index is due to its improved performance in the indicators of the two dimensions of knowledge (the fourth international goal: quality education) and a decent standard of living (the eighth international goal: economic growth and decent work). This prompts us to take a deeper look at the report's sub-indicators.

According to the United Nations report, the Human Development Index ranges between zero and one, and is classified Based on the Human Development Index: "It is a composite index that measures average achievements in three main dimensions Human development means a long and healthy life, knowledge and an adequate standard of living," and according to the United Nations report, 2014 [21].

Human development has two dimensions: the first dimension is concerned with the level of human development in the various stages of life, while the second dimension is represented by investing resources and economic activities, through interest in improving education and encouraging vocational education to increase the gross domestic product and improving health care through expanding the establishment of health centers and hospitals and paying attention to methods of organizing... Family and health projects for a decent life, the 100 million health project, and the well-being of society through increased income and the elimination of the problems of poverty and unemployment...etc.

Egypt is one of the countries with multiple resources, and the concentration of these capabilities varies from one region to another, which in turn affected the population concentration in one governorate rather than the other, along with the discrepancy in development plans between those governorates, which led to the occurrence of disparities and development gaps between all governorates.

2.3. Human development axes

Include the following:

2.3.1 Life Expectancy Guide

Through studying the health axis according to the following : The life expectancy index at birth has become one of the most important indicators indicating the improvement of the health sector and has taken an upward curve. However, expectations have declined in the last two years due to the spread of the Corona pandemic. The average life expectancy at birth in 2021 has reached 70.2 years, while the life expectancy at birth for females has reached 70.2 years. to 72.6 years, while the age for males was 67.9 years.

This confirms that the health initiatives that were launched in recent years, whether directed at women or treating chronic and non-communicable diseases, were reflected in the index. Egypt is unique in the initiative of the President of the Republic, 100 Million Health, for

early detection and treatment of chronic and hereditary diseases for all categories of the Egyptian people. This initiative falls under dozens of health initiatives for free detection and treatment of all categories, starting from the fetus in the mother's womb to the health care initiative for the elderly.

It included an initiative to detect Hepatitis C and noncommunicable diseases, from October 2018 to April 2019, which contributed to reducing the rate of new infections with the virus by more than 92% annually, and more than 60 million citizens were examined nationwide. Among the initiatives also included are: Initiative to eliminate waiting lists for critical interventions in July 2018; With the aim of reducing the waiting time for surgical interventions and alleviating the financial burden on patients, 1.4 million citizens were registered on the system and 1.2 million citizens were treated. 29.2 million citizens were examined and provided with the necessary treatment within the initiative to treat chronic diseases and early detection of kidney disease, which was launched in June 2020[22].

By calculating the life expectancy index for the Egyptian governorates 2010-2022 based on the analysis of the Human Development Report data, it was shown that there are governorates that obtained a very high index from the life expectancy index for the year 2010, namely (Gharbia - Dakahlia - Qalyubia) with a rate of (0.78), and this indicates an improvement. The level of health care in those governorate,The governorates (Cairo, Dakahlia, and Menoufia) recorded the highest level of the life expectancy index for the year 2022, reaching (0.772), as shown in **Fig.2.**

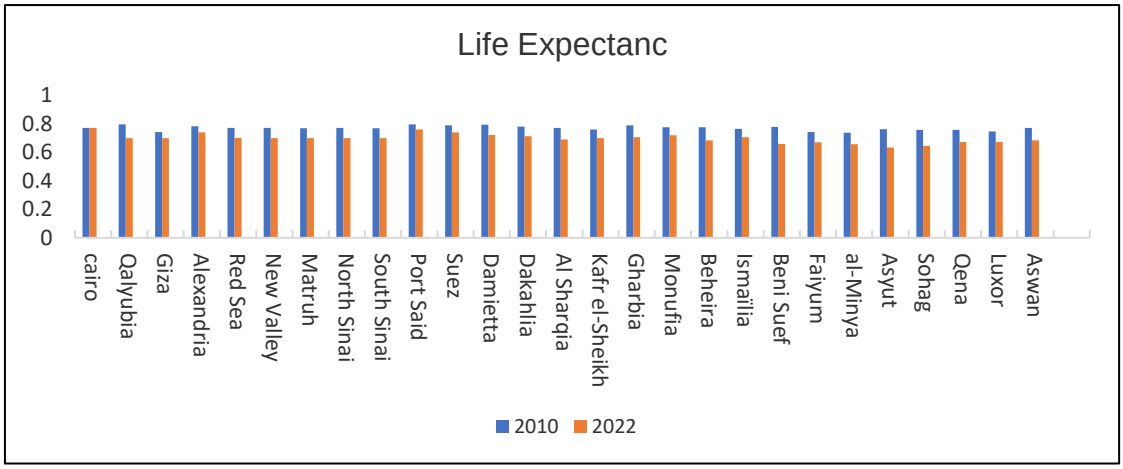


Fig. 2. Development of health index values for Egyptian governorates in the periods 2010-2022

It is evident that the life expectancy rate in all governorates in 2022 has decreased compared to its counterpart in 2010, as it decreased from (0.75) to (0.65) in the governorates (Beni Suef - Fayoum - Minya - Assiut - Sohag - Qena, Luxor, Damietta, and Dakahlia). It also decreased, but slightly, in the governorates of (Al-Sharqia, Kafr El-Sheikh, Beheira, Matrouh, and Aswan), reaching a value of (0.68).

2.3.2. Education Index

Education is one of the main needs in society to improve the quality of life for their families. It is a measure that indicates the index of literacy among adults, meaning the percentage of learners, and the total education index, meaning the percentage of those enrolled.

The education sector in Egypt has a system of human resources with competitive capacity capable

of providing society with educational experiences on an ongoing basis and closely related to its future needs, in response to achieving and stimulating sustainable development by preparing educated individuals, And a skilled workforce [23].

Data from the Human Development Report for 2022 indicate Egypt's progress in terms of knowledge and education, as the expected number of years of study reached 13.8 years, while the total expected years for females was greater than that for males, who recorded 13.7 expected years. The percentage of the female population with secondary education exceeded 81.6% during the year 2021, while the percentage among males reached only 76.6%. This may be due to awareness-raising initiatives directed at females in particular.

The education index is one of the important indicators affecting human development, and after calculating the index Education for the year 2010-2022 AD It turned out that the highest governorates in 2010 were the governorates of (Suez - Red Sea - New Valley) with a rate of (0.82), and it turned out that the lowest governorates were (Fayoum - Minya - Beni Suef) with a low level that reached (0.64) in 2010 AD. This is due to the high rate of illiteracy due to adherence to customs and traditions, early marriage, and the low rate of female education. The **Fig. 3.** indicates that the rest of the governorates with regard to the level of human development were of the same level of development Human population is high due to the urban sprawl of rural communities.

For the year 2022, it is high in the governorates (Cairo - Alexandria - Port Said - Suez) at a rate of (0.75), and it is decreased in the governorates (Fayoum - Minya - Assiut - Sohag - Luxor - Beni Suef) at a rate of (0.064). As shown in **Fig. 3.**

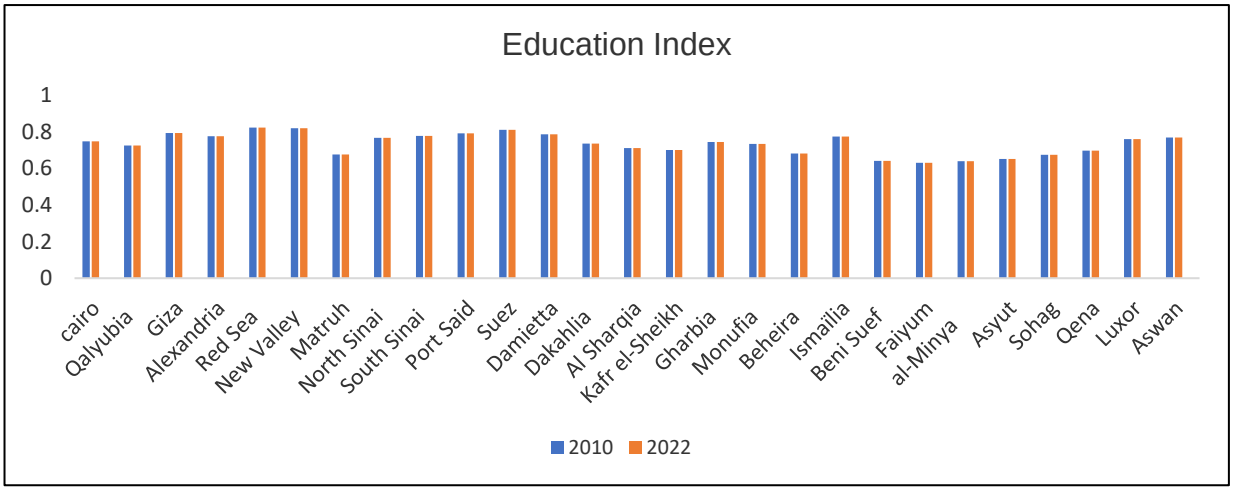


Fig. 3. Development of the values of the education guide for Egyptian governorates in the periods 2010-2022

2.3.3. GDP guide

Economic conditions play an important role in determining the level of human development of a country through the domestic product, which is the total value of goods and services produced and marketed within the borders of the country during a certain period of time (three months or a year) [24].This indicator reflects the economic situation of the country, and the increase in production expresses the improvement of the economic situation of the country and its ability to provide more job opportunities, and thus an increase in the income of individuals, which is reflected in an increase in their consumption, savings, and investments, which leads to an increase in production, and vice versa [25].

The Egyptian economy is characterized by a high dependency rate and low population participation in the labor force. This is due to factors, the most important of which are: the high proportion of young people and the late age of joining the labor market, due to the great demand for completing higher education, which has led to an increase in the number of years of study in an individual's lifespan.

Upon analysis, it was found that the GDP index for the year 2010 was of high human development in the governorates (New Valley - South Sinai - Port Said) representing (0.75), and it was of low human development according to the GDP index in the governorates (Qena - Aswan) at a rate of (0.68). As for the rest of the governorates, they represented an average level of human development according to the GDP index, with a rate of (0.71) **Fig. 4.**

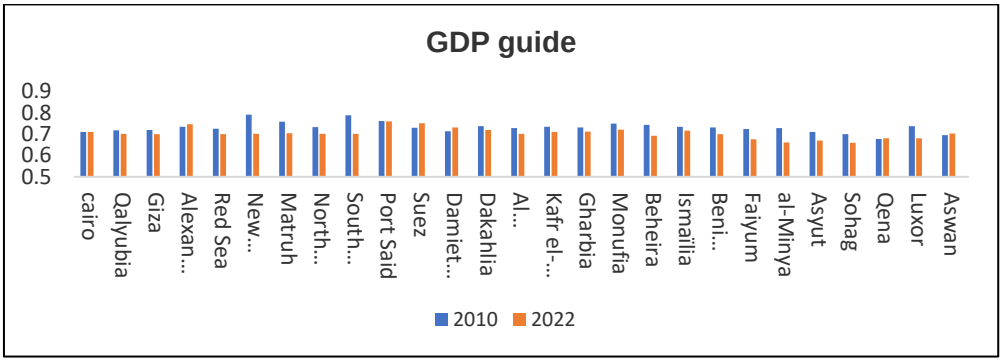


Fig. 4 . Evolution of the GDP index values in the Egyptian governorates in the period from 2010-2022

2.3.4 Human Development Index

The Human Development Index [26] witnessed an increase in the first period in 2010 and then decreased significantly until the year 2022. for some governorates and a slight decrease for other governorates, except for Cairo Governorate, in which human development values were equal during the two periods.

The Human Development Index reached the above governorates of the Republic (Port Said, Suez, Cairo, and Alexandria) respectively with a rate of 0.745, followed by the governorates of (Damietta, Menoufia, Dakahlia, Gharbia, and Ismailia) with a rate of 0.720, and the governorates of (Kafr El-Sheikh, the Red Sea, the New Valley, and North and South Sinai) came in third place with a rate of 0.702, representing The governorates (Giza, Qalyubia, Sharqia, Beheira, and Aswan) had average development rates of 0.695, followed by the governorates (Qena, Luxor, Fayoum, Beni Suef, Minya, Sohag, and Assiut) with a rate of 0.650, as **Fig.5 .** shows.

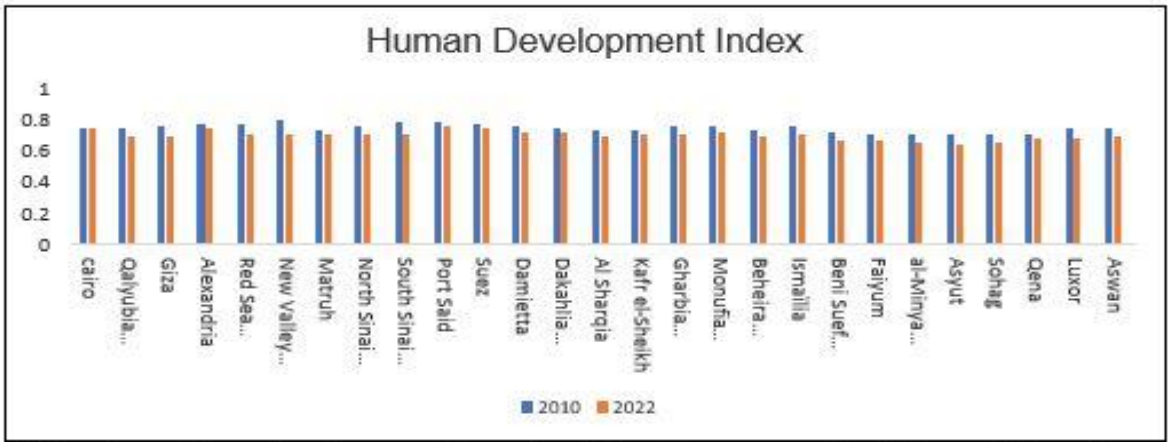


Fig. 5 . Evolution of Human Development Index values in Egyptian governorates in the period from 2010-2022 .

2.4. Analysis of spatial variation of the Human Development Index

Statistical analysis of human development data is used through several statistical methods as follows:

2.4.1. Measuring the Lorenze Curve

The research used the Lorenze Curve to determine the relationship between the three human development indicators and the Human Development Index during the study periods, to reach the degree of concentration and spread of the spatial distribution of the Human Development Index to know the shape of the population distribution of the indicator. On the areas of the governorates of the Republic.

The Lorenz curve shows the ideal distribution line in **Fig. 6.**, which shows the relationship between the two variables. When the distance between the curve and the ideal distribution line increases, this indicates the strength of the relationship between them and the higher the rate of human development, and the further away it is from the ideal distribution curve, this indicates a decrease in the human development index [27].

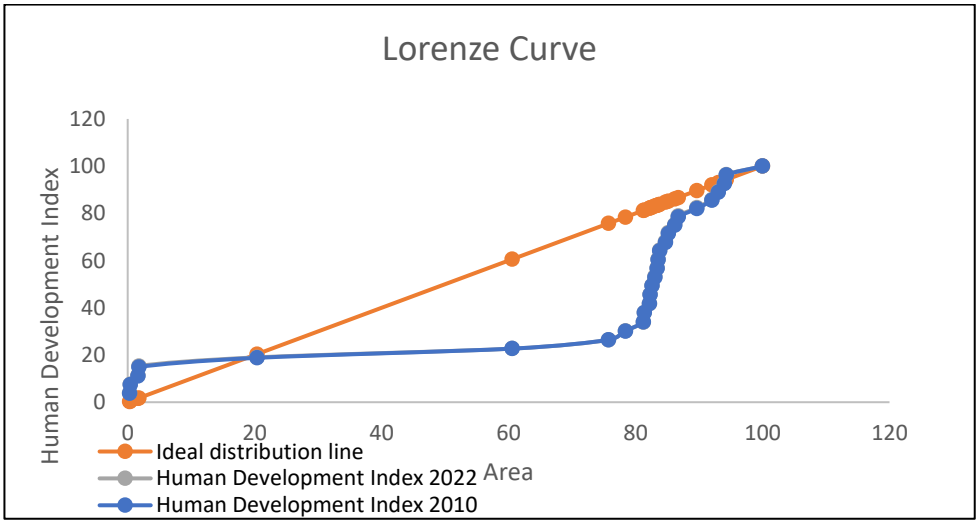


Fig. 6. shows the Lorenz curve according to the Human Development Index 2010-2022 in Egypt's governorates.

Through an analysis of the proportions of the Human Development Index in the governorates of the Republic in relation to the area of those governorates, **Fig. 6.** shows the following:

The human development rate varies slightly during the two periods, and approaches the ideal distribution line in some governorates, which confirms that the governorate's area is compatible with that rate, and it is far from other governorates.

- It turns out that the level of the Human Development Index is not related to the area of the governorate. We find that some governorates with larger areas have a low index, as a result of the high rate of illiteracy, unemployment, and poverty, such as (New Valley) Governorate. There are factors other than area that affect this, such as population size, climate, services, economic activity, and the concentration of economic projects.

The human development rate increases in certain governorates for the year 2022 and decreases in others compared to 2010. The increase is due to the expansion of national projects and services, the increase in job opportunities, and the empowerment of women, which led to an increase in the gross domestic product. The decrease is a result of the increase in population densities with the passage of the Covid-19 pandemic and economic conditions. In the world and the increase in the number of refugees to Egypt in recent periods, which led to a decline in development levels. Humanity.

2.4.2. Measure the Pearson Correlation Coefficient

The Pearson correlation coefficient was used to measure the relationship between the Human Development Index and the three indicators [28]. (Life Expectancy Index - Education Index - G D P) On the other hand, it was found that the relationship between the three indicators and the Human Development Index was (direct) but it was strong and direct between the Education and Gross Domestic Product indicators on the one hand and the Human Development Index on the other hand. With very high statistical significance Less than or equal to (0.700).

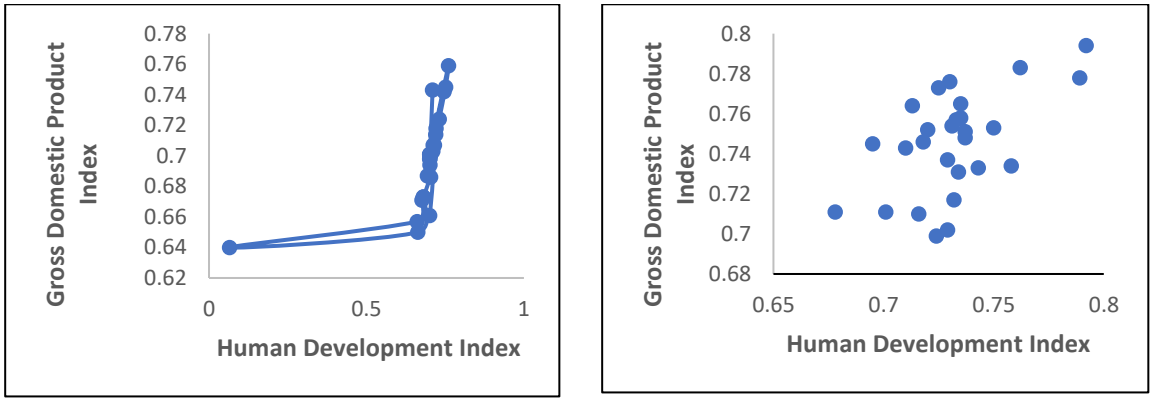


Fig. 7. The relationship between human development and GDP for Egypt's governorates, 2010 and 2022, respectively.

It is noted from **Fig. 7.** that the relationship between human development and the gross domestic product of Egypt's governorates is positive and strong, with a factor equal to (0.547) for the year 2022, and in 2010 it reached a value of (0.55).

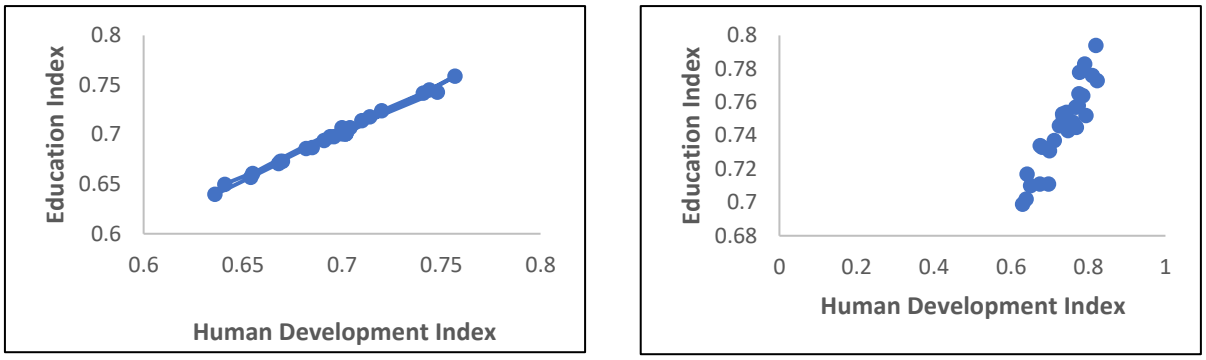


Fig. 8. The relationship between human development and education for the governorates of Egypt, 2010 and 2015, respectively.

It is noted from **Fig. 8.** that the relationship between human development and education for the governorates of Egypt is a strong direct correlation with a coefficient equal to (0.9667) for the year 2022, and in 2010 it reached a value of (0.927).

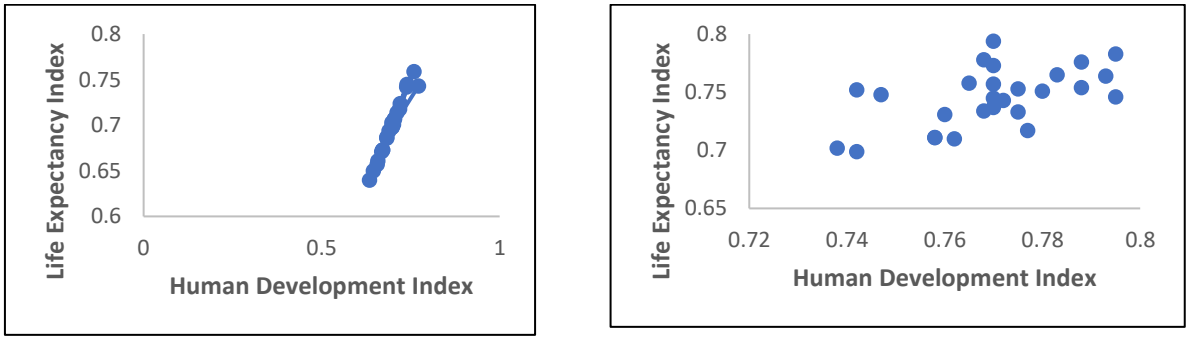


Fig. 9. The relationship between human development and life expectancy for the governorates of Egypt 2010 and 2022, respectively.

It is noted from **Fig. 9.** that the education index (0.996) is the furthest from zero and has the most impact on the level of human development compared to the year 2010, which was interpreted as (0.09279). Then comes in the next place: the relationship between human development and life expectancy for the governorates of Egypt has become a strong direct relationship with a coefficient It is equal to (0.983) for the year 2022 compared to the value of (0.555) for the year 2010. As for the GDP in third place, interpret the relationship as a direct value (0.54) for the year 2022.

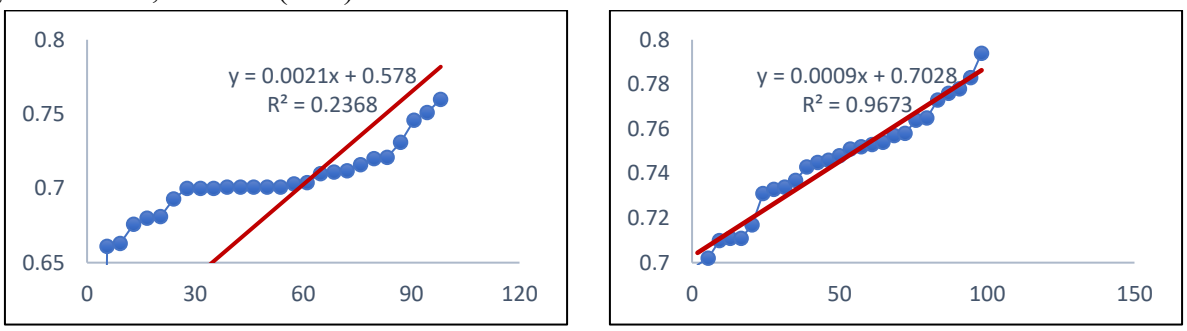
The Pearson correlation coefficient for the Human Development Index and its dimensions for the year 2022 resulted in a strong direct relationship between the three indicators, but the most influential factor in the Human Development Index is the education index as a result of the high rates of education, women's education, and the high rate of urbanization.

2.4.3. Measuring the simple regression line

By drawing a simple regression line, which represents the relationship between two variables, one of which is the variable(The independent variable), represented by the horizontal axis, and the second is (the dependent variable), represented by the vertical axis. If there is a relationship between the two variables, this line will exist. However, if the relationship does not exist, it is not possible to draw such a line, meaning that the existence of the relationship Between them leads to a general trend for the points we define at Drawing in front of the values of the independent variable.

The relationship is either straight (linear), or it is not straight (non-linear). If all the points fall on the regression line, this is evidence of the complete connection between the two phenomena, but if the points approach the general trend line or most of them fall on it, this indicates that On the intensity of the connection between the two phenomena, while if most of them are far from the regression line, this is evidence of Weak connection between the two phenomena.

By signing the specific values for each governorate of the GDP index on the horizontal axis and signing the human development rates on the vertical axis in the two periods (2010 and 2022). It is noted from **Fig. 10.** that the governorates that lie above the straight line have a high human development rate, and in fact all governorates lie above That axis. If the relationship between the Human Development Index and life span was tested, it turned out that (0.922) of Differences in the development index can be explained by the life expectancy index between governorates, because (0.07) of These differences are the result of random errors.



Fi g. 10. Regression line for the human development variables and the GDP index, 2010 and 2022, respectively.

It is also possible to calculate the coefficient of determination (R^2) (Coefficient of determination), which measures strength The relationship between the dependent variable and the independent variable [29]is as follows:

The R^2 values when using the simple regression method were as follows:

R^2 =(0.9967) for the Human Development Index and GDP 2010, and reached (0.236) in 2022.

R^2 =(0.939) for the Human Development and Education Index 2010, and reached (0.906) in 2022.

R^2 =(0.979) for the Human Development Index and Life Expectancy 2010, and reached (0.922) in 2022.

The results of the simple regression line differed for the year 2022. It was shown through the coefficient of determination in Figure (10) that the GDP index explained (0.236) of the differences in the Human Development Index and that they occurred as a result of random errors. Therefore, there was no effect of the GDP index on the Human Development Index.

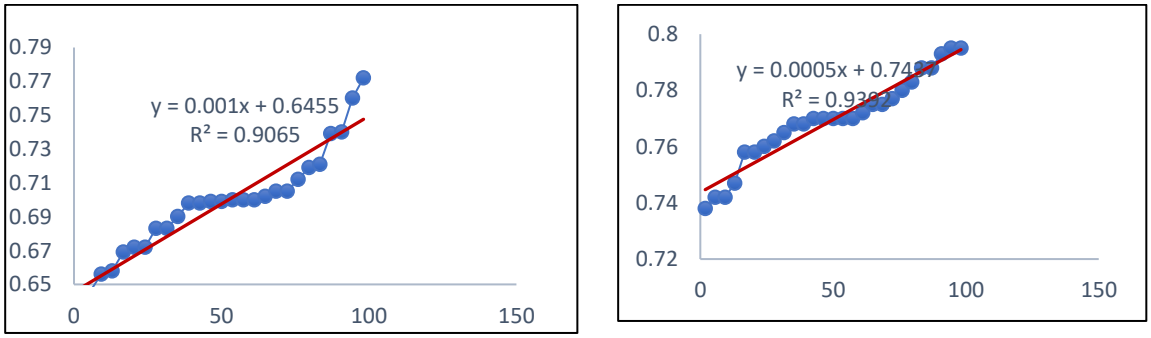


Fig. 11. Regression line for the human development variables and the education index 2010 and 2022, respectively.

It turned out that the relationship between the Human Development Index and the Education Index is strong, as it became clear that (0.906) of the differences in the Human Development Index can be explained in the GDP index for the governorates, and that (0.001) of these differences are the result of random errors, as in **Fig. 11.**

It is noted that most of the governorates fall below the straight line for the year 2010, which confirms their suffering from high birth rates, a low child mortality rate, and thus a high dependency ratio, which contradicts the concept of human development. As for the year 2022, it becomes clear that it is located above the straight line, which confirms that it is at a high level. Therefore, it is clear from what was mentioned above that the education index had the greatest impact on the Human Development Index for all governorates of the Republic for the year 2022, unlike the Human Development Index for 2010, which showed that the education index had the greatest impact on the GDP index for the year 2010.

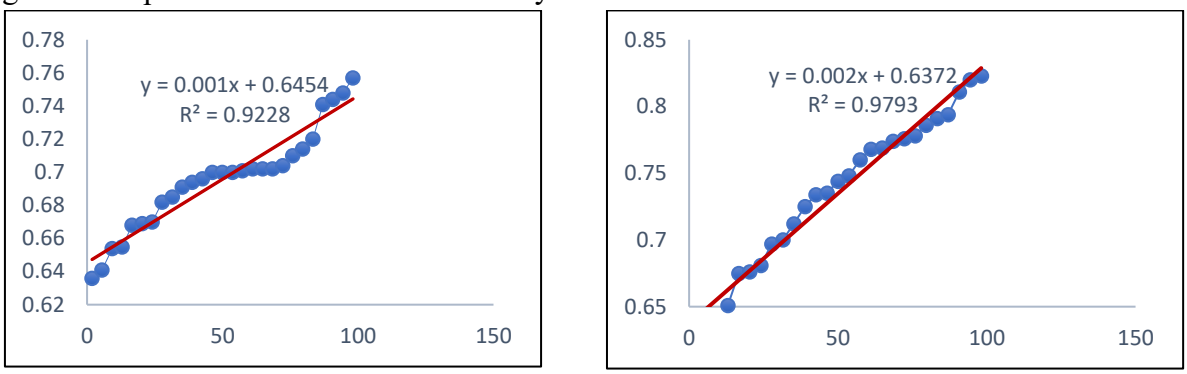


Fig. 12. Regression line for the variables of human development and the health index 2010 and 2022 AD, respectively.

It was found that the relationship between the Human Development Index and the Health Index is strong, as it turned out that (0.922) of the differences in the Human Development Index can be explained by the life expectancy index for the governorates, and that (0.001) of these differences are the result of random errors, as in **Fig. 12.**

2.4.4. Multiple Regression Line

The researchers used the multiple regression equation, which is a regression of the dependent variable Y on several independent variables, X1, X2,...X3. This is called multiple linear regression Linear[30]. It is clear from the following **Table 1.** that the correlation coefficient (Multiple R) is equal to (0.99), meaning it explains 99% of the coefficient of determination. It indicates that the three independent variables (human development indicators) explain 99% of the dependent variable, which is the Human Development Index, and 1% is due to to other factors.

Table 1. Regression Statistics.

Multiple R	**0.9971**
R Square	0.9942
Adjusted R Square	0.9934
Standard Error	0.0023
Observations	27

Table 2. shows the regression coefficients for the three variables, and they appear high for the education index, medium for the GDP index, and low for the health index.

Table 2. Regression coefficients for the three variables.

	Coefficients	Standard Error	Lower__ 95.0%	Uper 95.0%
Intercept	0.040	0.0112	0.017	0.063
Life Expectanc	-0.043	0.092	-0.23	0.147
Education Index	0.984	0.096	0.784	1.183
GDP guide	0.004	0.0041	-0.004	0.014

Through statistical analysis, the residuals in **Table 3.**were highest in (Ismailia - Sohag - Port Said) governorates and low in (New Valley - Red Sea - South and North Sinai) governorates.

Table 3. Calculating the multiple linear regression residuals for the variables in 2022.

Governorates	Predicted HDI(2022)	Residuals	Standard Residuals	Influential evidence	Development rates and inequality
Cairo	0.743	-0.0037	-1.637	EI	**High**
Qalyubia	0.698	0.0014	0.623	GDP	**Low (imbalance)**
Giza	0.698	-0.0006	-0.277	GDP	**Low (imbalance)**
Alexandria	0.742	0.0006	0.291	EI- GDP	**High**
Red Sea	0.701	-0.0024	-1.061	LEI	**High**
New Valley	0.701	-0.0034	-1.543	EI- GDP LEI	**High (imbalance)**
Matruh	0.701	-0.0015	-0.686	EI- GDP	**High (imbalance)**
North Sinai	0.701	-0.0034	-1.543	EI- GDP LEI	**High (imbalance)**
South Sinai	0.701	-0.0034	-1.543	EI- GDP	**High (imbalance)**
Port Said	0.759	0.0027	1.229	GDP- LEI	**Very High**
Suez	0.745	0.0007	0.321	GDP	**High**
Damietta	0.724	0.0026	1.17	GDP	**High**
Dakahlia	0.714	0.0021	0.948	GDP	**High**
Al Sharqia	0.694	00004	-0.021	GDP	**Low (imbalance)**
Kafr el-Sheikh	0.703	0.0004	0.177	GDP	**High**
Gharbia	0.707	0.0008	0.339	GDP	**High**
Monufia	0.718	0.0025	1.11	GDP	**High**
Beheira	0.687	-0.0014	-0.63	GDP	**Low (imbalance)**
Ismaïlia	0.707	0.0047	2.095	EI	**High (imbalance)**

Beni Suef	0.661	0.001	0.452	GDP	**Low (imbalance)**
Faiyum	0.671	-0.0012	-0.538	GDP	**Low**
al-Minya	0.657	-0.0019	-0.857	GDP- LEI	**Low (imbalance)**
Asyut	0.64	0.0007	0.319	GDP	**Low (imbalance)**
Sohag	0.65	0.0034	1.544	GDP	**Low (imbalance)**
Qena	0.673	-0.0011	-0.474	LEI- EI	**Low (imbalance)**
Luxor	0.673	-0.0001	-0.035	GDP	**Low (imbalance)**
Aswan	0.686	0.0005	0.224	GDP	**Low (imbalance)**

It turned out that the residuals were positive in some governorates and negative in others, and their values were as follows:

- Governorates with a value of (0.2-1.1) represented by the governorates of (Ismailia - Sohag - Port Said - Damietta - Menoufia).
- Governorates with values from (0.9 - 0.1) are represented by the governorates of (Dakahlia - Qalyubia - Beni Suef - Assiut - Gharbia - Suez - Aswan - Alexandria - Kafr El-Sheikh).
- Governorates with values ranging from (-0.6) - (-1.0) are represented by the governorates of (Red Sea - New Valley - North Sinai - South Sinai).
- It turns out that the values are divided into the following:
  - The observed values are greater than the calculated values because they were better than what was expected, which indicates a reconsideration of (GDP rates and life expectancy index) in those governorates (Cairo - Giza - Red Sea - Beheira - Fayoum - Minya - North and South Sinai - Qena - Luxor - Fayoum).
  - The calculated values are greater than the observed value for the governorates as a result of the high level of human development in those governorates, with variations occurring among them, represented in the rest of the governorates. This is due to the high level of human development in the three indicators, the high education index, and the concentration of development projects there, which provides job opportunities. The value is expected It is calculated that these governorates will have high human development, which has contributed to raising the state's gross domestic product, as it appears with positive values (0.0047) as a result of the increase in job opportunities due to the large number of national investments and projects.

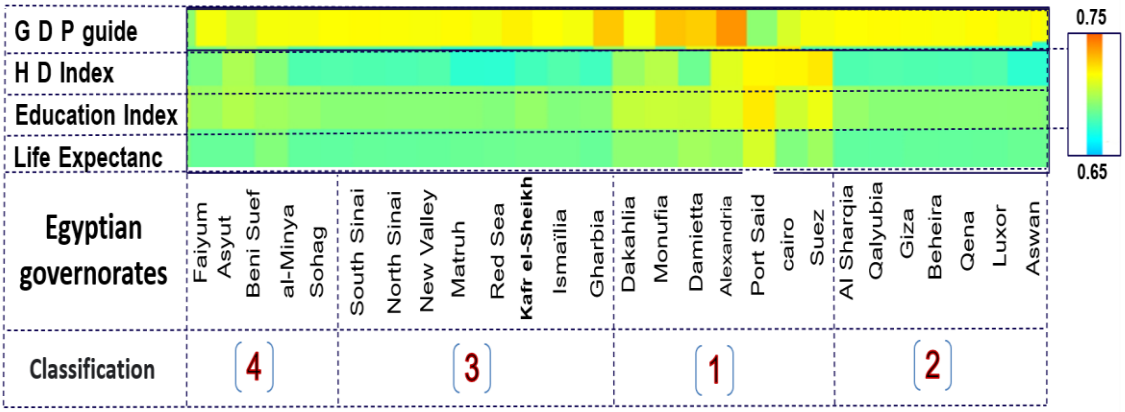


Fig. 13. Classification of Egyptian governorates according to human development groups.

The governorates of the Arab Republic of Egypt can be classified through the previous analysis into **Fig. 13.** Governorates with a high level of development (Group 1) - Governorates in which the level of human development is expected to rise (Group 1,2) - Governorates with a low level of human development (Group 4) -Governorates in which levels of human development are expected to decline (group 3, 4), and the classification of governorates is not related to their area, but rather depends on other factors (population densities, concentration of development projects, job opportunities resulting from the governorate, investments directed to it, and interest in the education sector).

The following **Fig. 14.** shows the classification of governorates according to current human development rates according to four development groups. This classification can be signed on the map of Egypt in light of the previous analysis.

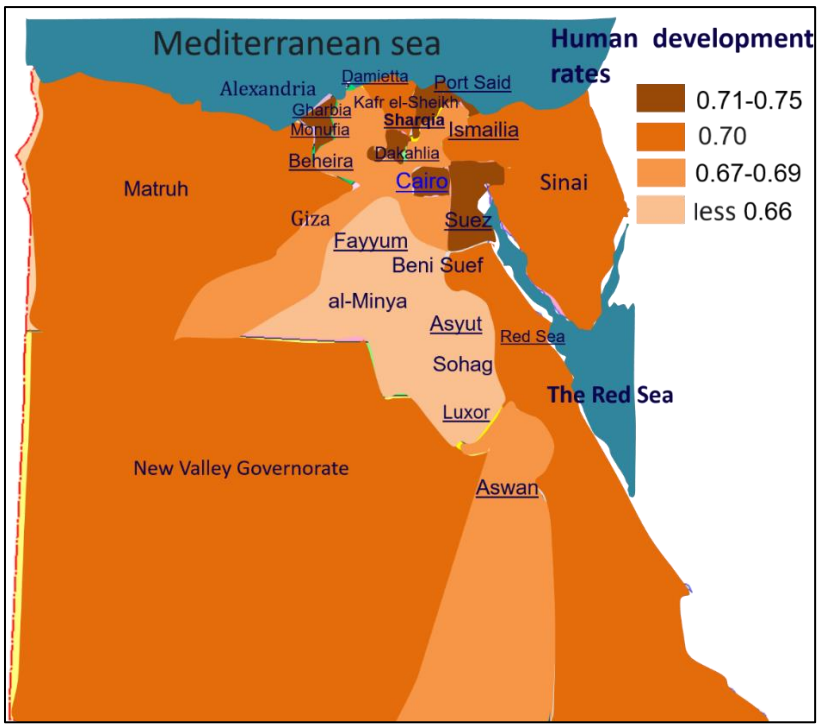


Fig. 14. Classification of governorates according to human development rates based on the specified indicators.

The governorates of the Arab Republic of Egypt can be classified through the previous analysis into (governorates with a high level of development - governorates in which the level of human development is expected to rise - governorates with a low level of human evelopment - governorates in which levels of human development are expected to decrease), and that the classification of governorates is not related to their area. Rather, it depends on other factors (such as development projects, job opportunities resulting from the governorate, investments directed to it, and interest in the education sector).

Conclusions

The current study aims to measure the level of human development in the governorates of Egypt as a composite index measured resulting from the analysis of several indicators called human development indicators (health, education, and domestic product) The impact of each

indicator on development in the governorates. The study concluded through statistical analysis that there are disparities between the years 2010 and 2022 AD, concentrated in Governorates (Port Said - Suez - Cairo - Alexandria), and human development rates are expected to rise in the governorates (Cairo - Qalyubia - Giza - Alexandria - Red Sea - Assiut - Sohag - Qena - Luxor - Aswan) as a result of their proximity to the ideal distribution line. The increase in the index is not proportional to the area, but depends on the number of population and the concentration of services.

The relationship between the three indicators (education and output) is strong (GDP) and the Human Development Index in the two periods, and the (Education) index is the most influential with a rate of (0.996) as a result of the high rates of education, women's education, and the high rate of urbanization, followed by the (Life Expectancy) index through a strong direct relationship with a coefficient equal to (0.983) for the year 2022 compared to the relationship for the year 2010 value (0.555). (Gross Domestic Product) ranks third, interpreting the direct relationship with a value of (0.54) for the year 2022.

Accordingly, the governorates can be classified into (the observed value is greater than the calculated value) because it was better than what was expected, which indicates a reconsideration of (GDP, life expectancy) in those governorates (Cairo - Giza - Red Sea - Beheira - Fayoum - Minya - North and South Sinai - Qena - Luxor - Fayoum). In other governorates, the observed value is smaller than the observed value and is represented in the rest of the governorates, It was found that the index of health, education, and gross domestic product (GDP) was high in Cairo Governorate, because it enjoyed a concentration in development and acquisition of investments, which led to discrepancies between it and other governorates. Also, the governorates of (Assiut, Minya, and Sohag) had a decrease in the three indexes, which indicates that development is directed to those governorates. And directing development in all sectors of those governorates until a fair balance is achieved.

Recommendation

The research recommends the need for a careful analysis of the level of human development through (classifying the governorates in terms of levels of human development), and recommends the need to focus development in the three sectors in the governorates (Fayoum - Minya - Assiut - Sohag), due to the low dimensions of human development in them, and attention to the health sector in the governorates (Benni). Suef - Qena - Luxor - Damietta - Dakahlia), and looking at the educational sector in the governorates (Luxor).

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