# **Human Development Index, analysis of the relationship between different variables**

**Overview**

The Human Development Index (HDI) is a measure used to assess the overall development and well-being of a country's population. It was developed by the United Nations Development Program (UNDP) and takes into account three key dimensions of human development: Life expectancy at birth, Education, Gross National Income (GNI) per capita.

I will make an analysis of various social and economic variables to understand how different factors may influence human development, taking into account gender equality, literacy rates, gross domestic product per capita (although GNI is included in the calculation), living costs, along with other features such as the area and population, to look for patterns and correlations between the development of the nations and the impact of certain variables.

<https://worldpopulationreview.com/country-rankings/hdi-by-country>

**Data and Model**

The World Population Review is an online publication that provides information, data, and insights related to global population trends, demographics, and statistics.

I will use python with libraries such as pandas for the ETL process and seaborn for the creation of charts.

**Results**

**What is the relationship between the key features and our target feature (hdi)**

As shown in the chart below some features such as living costs and gdp per capita seem to follow a positive correlation, while others such as the gender equality rate doesn’t seem to follow a pattern related to the HDI

**A picture containing diagram

Description automatically generated**

**What is the relationship between the living costs and the gdp per capita, considering the tier HDI to which countries belong?**

Apart from a couple of outliers, most of the countries with living costs above 1500 belong to the Very High tier of the HDI, I can also observe that the relationship between the gdp per capita and HDI is very high since there is not a single country with a gdp per capita above 25000 which does not belong to the Very High tier of the HDI.

Chart, scatter chart

Description automatically generated

**What is the average rate of gender equality and the literacy rate based on the HDI tiers?**

Although the difference among the average gender equality rates by HDI tiers don’t seem to be that big, it’s important to emphasize how the countries with the highest HDI rates are the ones which have higher equality rates, and as per the average literacy rates, the correlation between the literacy rate and the HDI seems to be very high since as the literacy rates decrease the HDI also decrease to the Low tier.

**Chart, bar chart

Description automatically generated**

**What is the distribution of the HDI by region taking into consideration the GDP per capita?**

The region with the most countries with very high HDI is Europe, which does not even have any country with a low HDI, in the cases of Oceania and America the very high HDI countries are outliers (probably countries such as Australia, USA and Canada) while the rest are medium or High HDI countries, in the case of Asia, there are several countries with very high HDI and also some with high and medium rates, while in Africa there is not a single country with a very high HDI.

**Chart, scatter chart

Description automatically generated**

**What is the distribution of the hdi by area and population of the country?**

Most of the countries have populations and territories among a range which do not seem to be related at all with the HDI, there are some outliers in the population with a high HDI, while all of the outliers in territory have very high HDI.

**Chart, scatter chart

Description automatically generated**

**What are the top 10 countries with highest hdi and gdp per capita?**

Of the top 10 countries with the highest HDI 8 belong to Europe and although for the first 2 the GDP per Capita seems to be very related to its HDI, the case of Ireland seems very peculiar because even being among the last within this top 10 by HDI, This is the country with the highest gdp per capita

**Chart, bar chart

Description automatically generated**

**What are the 10 countries with the lowest HDI and GDP per capita?**

The country with the lowest HDI is from Africa, while the rest are from Asia, Oceania, and America, it is also noticeable the relationship between HDI and GDP per capita, although the pattern is not that clear for these 10 countries, we can see that as for the highest and lowest HDI in the chart, the GDP per capita corresponds to the highest and lowest as well.

**Chart, bar chart

Description automatically generated**

**Conclusions**

Although this is a rather superficial analysis of what human development of nations entails, we can note that certain issues have an important impact on it and that analyzing areas as varied as the economic and social part of a country can be of great help in the pursuit of the development of nations.