**1. Framework and objectives**

**2. Brief theoretical and Technical Review on HDI**

The human development index (HDI) is considered very important to measure the development of countries and is considered a fairer measure-to-measure economic welfare. According to Gezikol, Ergüzel and Tunahan (2019) welfare includes basic concepts such as happiness, health, education and income, with the HDI emerging as one of the most important indicators for assessing the welfare and performance of countries and different regions. Calculated and disseminated by the United Nations (UN) since 1990, this indicator includes key dimensions of development that reflect social and economic welfare: a long and healthy life, access to knowledge and a decent standard of living (Javaid, Akbar & Nawaz, 2018).

According to the United Nations, the HDI was created to emphasize that people and their capabilities should be the final criteria for evaluating a country's development, in contrast to the idea of ​​using only economic growth (GDP). Thus, the UN Human Development Report (2015) states, “human development focuses on the enlarging people’s choices and richness of human lives”.

**Measuring and Calculation of human development[[1]](#footnote-1)**

According to the United Nations Human Development Report (2018), “the HDI is a composite index focusing on three basic dimensions of human development: the ability to lead a long and healthy life, measured by life expectancy at birth; the ability to acquire knowledge, measured by mean years of schooling and expected years of schooling; and the ability to achieve a decent standard of living, measured by gross national income per capita”.

Technically, according to the same organization, the HDI is the geometric mean of the normalized indices for each of the three dimensions, where: - the health dimension is evaluated by life expectancy at birth, the education dimension is measured by the average of the years the level of education of adults aged 25 years and over and the years of education expected for school-age children, and the dimension of the standard of living is measured by the gross national income per capita.

Mathematically, the HDI is calculated as follows:

[1]

As equation [1] demonstrates, to calculate HDI, we first need to calculate the sub-indices of the dimensions. These indexes are calculated according to the pre-established minimum and maximum values. These values, according to the UN are defined in order to transform the indicators expressed in different units into indexes between 0 and 1, as shown in table 1.

**Table1**: Minimum and Maximum Value for each Indicators

|  |  |  |  |
| --- | --- | --- | --- |
| **Dimension** | **Indicator** | **Minimum** | **Maximum** |
| Health | Life expectancy (years) | 20 | 85 |
| Education | Expected years of schooling (years) | 0 | 18 |
| Mean years of schooling (years) | 0 | 15 |
| Standard of living | GNI per capita (2017 PPP$) | 100 | 75.000 |

Source: 2018 UN Human Development Report

Taking into account the values in Table 1, the index of each dimension referring to each country is calculated as follows:

[2]

The definitions of indicators used in the calculation of dimensions indexes consisted of HDI and calculation manner of indexes are being provided below.

***Long and Healthy Life (Health):*** Life expectancy at birth (years); the average number of years expected for a newborn individual to live in case of being subjected to mortality speed peculiar to age in a specific period along his life.

[3]

***Knowledge (Education):*** For the education dimension, eq.[2] is first applied to each of the two indicators, and then the arithmetic mean od two resulting indices is taken, as indicates in eq.[4], [5] and [6].

[4]

[5]

[6]

***A Decent Standard Of Living (Income):*** calculated as GNI per capita adapted to Purchasing Power Parity along with the report issued in 2010. Income index is being calculated through the 7 numbered equation below.

[7]

Using the eq. [1], the HDI is obtained for a certain period and the countries are grouped according to Table 2 (UN Reporte, 2018).

**Table 2:** Degree of human development index

|  |  |
| --- | --- |
| Very high human development | 0.800 and bove |
| High human development | 0.700 -0.799 |
| Medium human development | 0.550-0.699 |
| Low human development | Below 0.550 |

**3. A multivariate analysis of the human development index: Proposal and Comparison**

1. This topic is based on the technical note of the United Nations Human Development Report [↑](#footnote-ref-1)