DOI: 10.47899/ijss.1241492

The Country Development Index: A Holistic Approach to Assessing Socioeconomic Progress*

Ülke Gelişim Endeksi: Sosyoekonomik İlerlemenin Değerlendirilmesinde Bütüncül Bir Yaklaşım

Mahmut Zeki AKARSU[1]

Abstract

As the global economy continues to evolve, the traditional approach of measuring national prosperity based solely on GDP has become increasingly inadequate. The limitations of this approach have prompted the development of the Country Development Index, which aims to redefine how we evaluate a country's progress and well-being. By incorporating a diverse range of social and economic indicators, such as income equality, access to opportunities, and democratic values, this innovative metric seeks to provide a more nuanced and holistic understanding of a nation's prosperity and advancement. The Country Development Index's methodology involves a rigorous and multifaceted approach that draws upon a wide range of data sources and indicators, and uses a sophisticated algorithm to generate a composite score for each country. This methodology will be subjected to rigorous testing and validation to ensure its reliability and validity. Ultimately, the Country Development Index has the potential to revolutionize how we evaluate and compare countries, and to provide policymakers with a powerful tool for promoting human well-being and societal progress.

Keywords: Economic Development, Social Development, Index, GDP

Öz

Küresel ekonomi geliştikçe, milli refahın sadece GSYİH'ya dayalı ölçümü giderek yetersiz hale gelmektedir. Bu yaklaşımın sınırlamaları, Ülke Gelişim Endeksi'nin geliştirilmesine öncülük etmiştir ve bu endeks, bir ülkenin ilerlemesini ve refahını değerlendirmenin nasıl yeniden tanımlanacağına dair bir hedef taşımaktadır. Gelir eşitliği, fırsatlara erişim ve demokratik değerler gibi çeşitli sosyal ve ekonomik göstergeleri içeren bu inovatif metrik, bir ülkenin refahının ve gelişiminin daha ayrıntılı ve bütüncül bir anlayışını sağlamayı amaçlamaktadır. Ülke Gelişim Endeksi'nin metodolojisi, geniş bir veri kaynağı ve göstergeler yelpazesinden faydalanarak sıkı ve çok yönlü bir yaklaşımı içermekte ve her ülke için bir bileşik skor üretmek için sofistike bir algoritma kullanmaktadır. Bu metodoloji, güvenilirliğinin ve geçerliliğinin sağlanması için sıkı test ve doğrulamalardan geçirilecektir. Sonuç olarak, Ülke Gelişim Endeksi, ülkeleri değerlendirmenin ve karşılaştırmanın yeniden tanımlanmasına ve insan refahı ve toplumsal ilerleme teşvik etmek için politikacılara güçlü bir araç sağlama potansiyeline sahiptir.

Anahtar Kelimeler: Ekonomik Gelişim, Sosyal Gelişim, İndeks, GSYH

1. INTRODUCTION

The Industrial Revolution has brought about significant changes to our economic and social environments, resulting in better living standards for most people. Access to healthcare systems and nutrition has improved, and advancements in vaccinations and medications have led to longer life expectancies (Deaton 2013, 71).

Despite these improvements, we still rely heavily on GDP and GDP per capita to categorize countries as developed, developing, or underdeveloped. However, this approach overlooks crucial factors such as unemployment, youth

* In this article, the principles of scientific research and publication ethics were followed. / Bu makalede bilimsel araştırma ve yayın etiği ilkelerine uyulmuştur.

[1] **Mahmut Zeki AKARSU**,
ORCID: 0000-0002-8140-4124
Ph.D. Candidate / Ress. Asst., University of Warsaw, Faculty of Economic Sciences, Economics and Finance, m.akarsu@uw.edu.pl
Doktor Adayı / Araştırma Görevlisi, Varşova Üniversitesi, İktisadi Bilimler Fakültesi, Ekonomi ve Finans, m.akarsu@uw.edu.pl

Geliş Tarihi/*Received* : 24.01.2023
Kabul Tarihi/*Accepted* : 17.05.2023
Çevrimiçi Yayın/*Published* : 18.05.2023

Makale Atıf Önerisi /Citation (APA):
Akarsu, M.Z. (2023). The Country Development Index: A Holistic Approach to Assessing Socioeconomic Progress. *İzmir Journal of Social Sciences*, 5(1), 44-57. DOI:10.47899/ijss.1241492

unemployment, the Gini index, and gender inequality, which are essential indicators of a country's overall health. Leamer's (2009, p. 19-20) suggestion that GDP is the sole indicator of a country's health is limiting.

Dynan and Sheiner (2018) support the need for alternative indicators to measure the development of social and economic welfare. It is clear that GDP alone cannot accurately reflect a country's overall well-being. Therefore, we need to consider a broader range of indicators and indexes to gain a more comprehensive understanding of a country's progress and development.

The prosperity of developed countries does not necessarily mean that they have better income distribution, lower unemployment rates, or gender equality than developing countries. For example, Poland and South Korea have better income distribution than the United States, despite the latter's economic dominance. Similarly, Sweden has better gender equality, life expectancy, and education levels than China, despite China being the second-largest economy globally. This raises the question: are GDP and economic growth sufficient indicators of a country's development?

David Pilling, a writer for the World Economic Forum, criticizes the limitations of GDP as a measure of development. GDP fails to consider social unrest costs, and it incentivizes natural disasters that increase government spending, thus boosting GDP growth. Moreover, GDP measurement in many countries is skewed, including heroin and prostitution while ignoring volunteer work, housework, and caring for aging relatives. He wrote in the World Economic Forum,

"*in Europe, GDP includes heroin and prostitution. However, volunteer work, housework, or looking after a relative aging count for nothing. GDP has skewed priorities"* (Pilling 2018).

The strength of a nation's economy is often measured by its GDP, and both the United States and China have impressive numbers in this regard. However, when it comes to poverty, income inequality, gender equality, and crime rates, neither of these countries can be considered the best. The COVID-19 pandemic has highlighted how inefficient these nations are in addressing issues such as healthcare, youth unemployment, democracy, and poverty (Deaton 2013, 254). In order to encourage countries to address these deep-rooted economic and social issues, a new index is needed - the Country Development Index.

Additionally, Covid-19 shows us that only economic size is not adequate to classify the countries. We have to consider many different economic and social categories to improve people's living standards while economic growth occurs (Schwab and Malleret 2020). Therefore, I introduce a new index to array the countries by using many different existing measurements. By this means, policymakers and governments will focus not only on economic growth but also on economic and social development. For example, youth unemployment, crime, and other measurements have been added to the index to prove that only GDP growth does not improve people's life quality.

Social and economic factors are closely intertwined. Inequalities can lead to unrest in communities, while high unemployment rates can contribute to increased criminal activity.(OECD Insights 2015, 67), or a high unemployment rate induces an enhancement in criminal activities across the community among desperate people (Raphael and Winter-Ember 2011, 281). It is, therefore, essential to address both economic and social issues together in order to uplift global communities. By using the Country Development Index, policymakers and governments can take a more comprehensive approach to improving people's lives and promoting sustainable economic growth.

2. COMPARISON

When it comes to measuring a country's economic and social development, there are several indexes available. The Human Development Index (HDI), Genuine Progress Indicator (GPI), and Better Life Index (BLI) are some of the most commonly used alternatives to Gross Domestic Product (GDP). However, these indexes have their limitations and often fail to address deep-rooted issues such as unemployment, inequality, and democracy.

The UN's HDI is widely used by scholars, but it has been criticized for not including certain indicators that are crucial for measuring a country's development. This is where the Country Development Index comes in. By focusing on a wider range of economic and social issues, such as democracy and youth unemployment, the Country Development Index provides a more comprehensive picture of a country's development.

The GPI is another index that divides indicators into three categories, but it has its own set of problems. Some indicators lack data in certain countries, and others are too general to be applied at the country level. Additionally, the GPI has not published a technical measurement or sorting list of countries. In contrast, the Country Development Index can be applied in any country without data problems.

By adopting a more nuanced approach to measuring a country's development, we can gain a better understanding of the issues that need to be addressed. The Country

Development Index provides a more complete picture of a country's economic and social development, helping to guide policymakers and promote sustainable growth.

Another advantage that the Country Development Index has is that many indicators of paramount importance take place in CDI, which calculates the development of countries and living standards of well-being. Therefore, CDI is a much more powerful measurement and tool than GDP itself. If institutions and governments start using CDI in order to estimate their economic and social development, then governments and policymakers will focus more on other social and economic areas rather than GDP growth.

3. CATEGORIES

Table 1. Indicators of Economy

GDP per Capita (PPP) – Current International Dollar
Unemployment – (% of the total labor force) (national estimate)
Youth Unemployment – (% of the total labor force) (national estimate)

Table 2. Indicators of Life Quality

Life Expectancy
Education Index
Gini Index (Income Inequality) (between 0 and 100)

Table 3. Indicators of Social

Gender Inequality Index
Democracy Index
Crime Index
Poverty

The CDI comprises three main categories: Economy, Life Quality, and Social. The index is analyzed between three categories due to the fact that every country has a different characteristic structure. Some countries are better in the economic structure, while others are better in the social structure. Thanks to dividing into three categories, we can easily observe the puissant and decrepit sides of the countries.

The Economy part includes three substantial economic factors. Every government measures the unemployment rate and youth unemployment rate, but indexes do not consider when they sort the countries by their economic level. Whereas unemployment and youth unemployment directly impact people's living standards and life qualities. Therefore, the Country Development Index comprises those economic factors as fundamental indicators.

Another critical indicator in the economy part is GDP per Capita (PPP). Economic growth and the size of GDP might be incomprehensibly marvelous in some countries. However, the vast majority of those countries may live in extreme poverty (i.e., India) (Katayama and Wadhwa 2019). In contrast to GDP growth, GDP per Capita (PPP) gives more hints on how prosperous or wealthy people are in countries.

The life Quality part includes life expectancy, education index, and Gini index. High life expectancy is indicative of economic development and a higher living standard (Cervellati and Sunde 2009). The life expectancy index helps us understand life, health care, and nutrition qualities in the countries. If mortality decreases with every passing year, then it can be assumed that people's living standards change for the better.

People gain abilities through education, which provides equal opportunities for the future. Education also helps human beings improve their analytical skills and cognitive abilities. Human capital (education) enables countries to have higher economic growth as well as educated labor forces, which mostly bring productivity to the market (Grant 2017). Moreover, education has a positive effect on democracy (Alemán and Kim 2015). That is why the education index (includes the expected years of schooling and the average of mean years of schooling) was added to Country Development Index to track their educational development.

The Gini index is an indispensable indicator that clarifies how a country's income is allocated amongst citizens. The Gini index points out whether income in a given country is distributed fairly or minority collects an ample amount of income while the majority allocates a small amount of income amongst themselves (Farris 2010). Even if the states and nations are wealthy in the sense of GDP, income could be allocated unfairly among people (i.e., the United States of America). People dislike inequality because people feel disrespected, feel left behind, and feel like they deserve better (Jetten and Peters 2020). In Country Development Index, the paper uses income inequality because consumption inequality numbers are not available for enough countries.

Gender inequality is the most vital issue recently in many countries. The gap between men and women is now unavoidably large in many developed and developing countries. Governments should fight for a much more equal society and regulate the market to level the playing field. Women have lower social and economic status than men in many fields (Ponthieux and Meurs 2015). Women, even in some countries, do not have the right to work. Therefore, without the gender equality index, we cannot create a development index to measure countries' improvement.

Firstly, democracy and development are mutually reinforcing. Acemoglu et al. (2019) declare in their research

paper that democracy positively affects economic growth. Secondly, in democratic countries, people have freedom of speech, the right to vote, the right to criticize politicians, and nobody is above the law. In short, democracy brings economic and social development into the community.

The crime index is one of the indicators that influence the social and economic life in a country. In a country with a high crime rate, people are willing to move, house value is low, and life satisfaction is ultralow. Diminishing house values and rent values reduce the government's property tax revenue, which influences government expenditure (Taylor 1995). Besides, high criminal activity in a country lowers economic development. Therefore, the crime index is one of the indicators that is needed to incorporate into development measurement indexes.

The final one is the poverty indicator. Poverty is a deep-rooted issue that almost every country has. Even if human beings live with better living standards than their ancestors did, some people still earn under 2 dollars per day. Škare and Druzeta (2015) searched for the causal link between economic growth and poverty, and they indicated that economic growth reduces poverty, yet economic growth alone is not adequate to eradicate poverty. Therefore, policymakers had better work on eradicating extreme poverty while economic growth continues to rise.

Briefly, each and every indicator incorporated into the Country Development Index is indispensable for achieving comprehensive economic and social development. It is vital to acknowledge the underlying social and economic challenges that exist in order to address and improve upon them. Neglecting these deep-rooted issues can impede progress and hinder the pursuit of economic and social betterment. Therefore, it is imperative that we take a holistic approach towards development and prioritize the inclusion of all relevant indicators in the Country Development Index.

4. INFORMATION ON THE INDICATORS

Table 4. GDP per Capita (PPP)

Source of Data: The World Bank – (PPP) Current International U.S. Dollar
Definition: GDP per capita enables to the measurement of economic performance and economic well-being. Total GDP might be high, yet GDP per Capita may be lower than many other countries due to the population size (i.e., Brazil and India) (OECD, GDP per capita 2013). However, GDP per capita alone is not a reliable indicator. The exchange rate may misguide the result. Thence, we use GDP per capita (PPP) in the Country Development Index to clarify the people's living standards. Purchasing Power Parity (PPP) illustrates that if all countries used the U.S. dollar to purchase goods and services and how much cost people would pay. Thus, we can measure the real economic well-being in countries (Lafrance and Schembri 2002). **Formula:** **1. Y = C+I+G+NX** (Williamson 2002) GDP – Gross Domestic Product C- Consumption I- Investment G- Government Expenditure N.X.- Net Export **2. GDP Per Capita = The Total GDP/ Population** **3. Purchasing Power Parity (PPP)** (Lafrance and Schembri 2002) $\boldsymbol{Pi = EP^{*}i}$ *Pi*= domestic currency price of commodity *i*; P^{*} = foreign currency price of commodity *i*; *E*= exchange rate *"Domestic and Foreign price levels constructed by taking a weighted average of prices of n commodities in the consumption basket"*: $\boldsymbol{Pi = \sum_{i=i}^{n} WiPi}$, $\boldsymbol{P^{*}i = \sum_{i=i}^{n} W^{*}iP^{*}i}$ *Wi* and *W*i*= weights of commodity *i* in the basket. $\boldsymbol{EP^{*}/P = 1}$ $\boldsymbol{E = k.\frac{P}{P^{*}}}$ *k*= Trade Friction (relatively constant) $\boldsymbol{\frac{Et}{Eo} = \frac{Pt/Po}{P^{*}t/P^{*}o}}$ *t* and *o* = time

Table 5. Unemployment

Source of Data: The World Bank – Total (% of Total Labor Force) (modeled ILO estimate)
Definition: Unemployed individuals are out of work and are willing to work and actively looking for work (Williamson 2002).
Formula: ***(Unemployed People/Total Labor Force) x 100*** (Williamson 2002)

Table 6. Youth Unemployment

Source of Data: The World Bank – Youth Total (% of Total Labor Force ages 15 – 24) (modeled ILO estimate)
Definition: The number of the unemployed young labor force between the ages of 15 and 24ho are without jobs reports that they are available for work (OECD, OECD Data 2021).
Formula: ***(No. of young unemployed people/no. of young people in the labor market) x 100*** (O'Higgins 2015)**.**

Table 7. Life Expectancy

Source of Data: United Nations Development Programme Human Development Index
Definition: Life expectancy is a measurement to find the expected life cycle of people in given countries. Life expectancy is correlated with economic and social development. Even though life expectancy is influenced by people's eating habits, lifestyle, and healthcare system, it is a synthetic indicator to assess countries' economic and social development (Girum, Muktar and Shegaze 2018).
Formula: $\lambda x = \mu x / (\Phi x + (\mu x/2))$ (European Commission 2020) μx = the number of death at aged x to under x+1 (in the reported period) Φx = the average population aged x to under x+1 (in the base period) λx = death probability from age x to x+1

Table 8. Education Index

Source of Data: United Nations Development Programme Human Development Index
Definition: The education index is a measurement that calculates two significant indicators: Mean years of schooling and expected years of schooling (Saisana 2014, 1816).
Formula: (Human Development Report 2015) ***Mean Years of Schooling Index =*** $\frac{MYS}{15}$ ***Expected Years of Schooling =*** $\frac{EYS}{18}$ ***Education Index =*** $\frac{MYS+EYS}{2}$ *MYS*= 25 years old and older people in their lifetime receive the average number of mean years of education. *EYS= T*he number of years children and adolescents are expected to attend school and university.

Table 9. Gini Index

Source of Data: The World Bank (World Bank estimate) (between 0 and 100)
Definition: Gini index calculates the area between the perfect equality line and the Lorenz curve to find the income distribution between the different social groups of society in a given country. The Gini coefficient is sometimes between 0 and 1, sometimes between 0 and 100. 0 (zero) is perfect equality, 1 and 100 are perfect inequality (Giovanni and Liberati 2006).
Formula: $\frac{A}{(A+B)}$ (Taban 2014, 14) *A= The area above the Lorenz curve* *B= The area below the Lorenz curve*

Table 10. Gender Inequality Index

Source of Data: United Nations Development Programme Human Development Index
Definition: The gender inequality index is an inequality index that measures the gap between men and women in many different fields. According to the United Nations, the gender inequality index includes "*reproductive health, measured by maternal mortality ratio and adolescent birth rates; empowerment, measured by the proportion of parliamentary seats occupied by females*

and proportion of adult females and males aged 25 years and older with at least some secondary education; and economic status, expressed as labor market participation and measured by labor force participation rate of female and male populations aged 15 years and older." (The United Nations Development Program 2020).

Formula: (United Nations Development Program, Technical Notes of Human Development Index 2020, 8 - 9)

Aggregating across dimensions with each gender group, using geometric means

For women;

$$G_F = \sqrt[3]{\left(\frac{10}{MMR} \cdot \frac{1}{ABR}\right)^{½} \cdot (PR_F \cdot SE_F)^{½} \cdot LFPR_F}$$

For men;

$$G_M = \sqrt[3]{1 \cdot (PR_M \cdot SE_M)^{½} \cdot LFPR_M}$$

Aggregating across gender groups, using a harmonic mean

$$HARM\,(G_F, G_M) = \left[\frac{(G_F)^{-1} + (G_M)^{-1}}{2}\right]^{-1}$$

The geometric mean of the arithmetic means for each indicator

$$G_{F,M} = \sqrt[3]{\overline{Health} \cdot \overline{Empowerment} \cdot \overline{LFPR}}$$

$$\text{where } \overline{Health} = \left(\sqrt{\frac{10}{MMR} \cdot \frac{1}{ABR}} + 1\right)/2,$$

$$\overline{Empowerment} = \left(\sqrt{PR_F \cdot SE_F} + \sqrt{PR_M \cdot SE_M}\right)/2 \text{ and}$$

$$\overline{LFPR} = \frac{LFPR_F + LFPR_M}{2}.$$

and the Gender Inequality Index;

$$\text{GII: } 1 - \frac{HARM\,(G_F, G_M)}{G_{\overline{F},\overline{M}}}.$$

MMR = Maternal mortality ratio
ABR = Adolescent birth rate
P.R. = Share of parliamentary seats held by sex
S.E. = Population with at least some secondary education
LFPR = Labor force participation rate

Table 11. Democracy Index

Source of Data: The Economist – Intelligence Unit / Democracy Index 2019
Definition: The Economist, since 2006, has been monitoring the regimes of independent countries to gather the data, which constitutes the Democracy Index. The democracy index aims to sort the countries from "fully democracy" to "authoritarian regimes" by checking civil liberties, political culture, political participation, electoral process, and the functioning of government (The Economist Intelligence Unit 2020).
Formula: The Economist Intelligence Unit uses unique methodological technic to calculate the democracy index of 165 countries. Every category has many different questions and answers to grade the countries' political systems. (please see The Economist Intelligence Unit, 2020)

Table 12. Crime Index

Source of Data: Crime Index
Definition: The Crime Index measures the overall level of crime in a city or country. Crime levels below 20 are considered extremely low, crime levels between 20 and 40 are considered low, crime levels between 40 and 60 are considered moderate, crime levels between 60 and 80 are considered high, and crime levels above 80 are considered very high (NUMBEO 2021).

Table 13. Poverty

Source of Data: United Nations Development Programme Human Development Index and the World Bank – Poverty Headcount Ratio at $ 1.90 a day (2011 PPP) (% of Population)
Definition: The poverty index has many different measurement methods. Every method approaches poverty from other perspectives, such as "*Population living below the income poverty line, PPP $ 1.90 a day", "Population living below the income poverty line, the national poverty line,"* or *"Multidimensional poverty index."* However, eventually, all poverty indexes aim to draw governments and international organizations' attention to poverty. In the wake of sustainable development goals, Impoverishment has taken attention. Therefore, both aim to reach sustainable development goals and to aim to sort the countries in the Country Development Index

in accordance with 21. century (Deonandan 2019), (United Nations Development Program and Oxford Poverty and Human Development Initiative , Global Multidimensional Poverty Index 2020)
Formula: $PI=\frac{\alpha}{\delta}$ *P.I.* = Poverty Index α = the percentage of the population who live below the international poverty line of $ 1.90 (PPP) a day δ = Total Population of a country

5. METHODOLOGY

As mentioned above, the Country Development Index comprises three different main categories and ten indicators. The aim of dividing into three main categories is that every country is successful in various subjects and categories. With the divided categorical method, the Country Development Index will help policymakers and economists readily investigate their economies' weak and strong sides.

Some basic mathematical techniques are applied to plug the indicators into the Country Development Index. Those mathematical techniques will be elucidated in the coming paragraph to make the index understandable. This process will enable us to use many different indicators together in the Country Development Index.

5.1 Economy

Table 14. The basic mathematical technique for the indicators in the part of Economy.

GDP Per Capita (PPP) - *G*	log(G) = g	
Unemployment - *U*	$1-(\frac{U}{100})$ = u	Value is between 1 and 0.
Youth Unemployment - *YU*	$1-(\frac{YU}{100})$ = yu	Value is between 1 and 0.

Note: Logarithm – log

$$Economy = \sqrt[3]{(g) \,.\, (u) \,.\, (yu)} \quad (1)$$

As can be seen in Table 14, the mathematical methods, which will be implemented in the Economy part of the Country Development Index, are illustrated. GDP per capita (PPP), unemployment, and youth unemployment constitute the Economy part. The economy index is designed to find the real economic health of countries due to the fact that some countries, which are regarded as developed countries (i.e., Italy and Spain), have high total GDP, yet millions of young people struggle with unemployment issues. Therefore, without unemployment and youth unemployment, economic development could not be sleekly calculated. However, we should ask this question: Should something as narrow as youth unemployment have the same weight as the GDP per capita of the entire population? Youth unemployment does not have the same weight as GDP per capita or unemployment, but it is still worthwhile and vital. Youth unemployment is extremely high in some countries, even if unemployment is low. Therefore, it should be in the index.

After calculating the indicators, the Economy index is calculated by taking the square root with power four after multiplying the indicators (equation 1).

5.2 Life Quality

Table 15. The basic mathematical technique for the indicators in the part of Life Quality.

Life Expectancy - *LE*	log(*LE*) = le	
Education Index - *E.I.*	$EI=\frac{MYS+EYS}{2}$ = ei	$\frac{MYS}{15}$, $\frac{EYS}{18}$
Gini Index - *G.I.*	log(100 - *GI*) = gi	

$$Life\ Quality = \sqrt[3]{(le) \,.\, (ei) \,.\, (gi)} \quad (2)$$

The primary logarithm method is used for life expectancy and the Gini index, as shown in Table 15. Gini index data is collected in the value between 0 and 100. The mathematical method (log (100 – G.I.)) is designed to advance the countries with a low Gini index. For instance, Norway's Gini coefficient is 27 (2017), whilst the Gini of the United States coefficient is 41.1 (2016). Hereunder in the Country Development Index, Norway gets 1.8633 from the Index part, as the United States receives 1.7701 from the Gini index part.

After calculating the indicators, the Life Quality index is calculated by taking the square root with power three after multiplying the indicators (equation 2).

5.3 Social

Table 16. The basic mathematical technique for the indicators in the part of Social.

Gender Inequality Index - *GII*	log(100 – (100 x GII)) = gii	
Democracy Index - *DI*	log(DI) = di	
Crime Index - *CI*	log(100 – CI) = ci	
Poverty Index - *P.I.*	log (100 – P.I.) = pi	

Note: Logarithm – log

$$Social = \sqrt[4]{(gii) \,.\, (di) \,.\, (ci) \,.\, (pi)} \quad (3)$$

As illustrated in Table 16, all indicators are calculated by taking the logarithm. In the gender inequality index, some mathematical adjustment is taken place to have decent numbers. In the crime index, smaller numbers mean countries have lower criminal activity rates, and in the index, values are between 0 and 100. Therefore, minor adjustments are made to give high scores to countries with low crime rates. Likewise, the poverty index is adjusted to give high scores to countries with a low poverty rate.

After calculating the indicators, the Social index is calculated by taking the square root with power four after multiplying the indicators (equation 3).

Country Development Index =

$$\sqrt[3]{(Economy)\,.\,(Life\ Quality)\,.\,(Social)} \qquad (4)$$

After obtaining the number of the Economy index, Life Quality index, and Social index, the calculation of the Country Development Index is implemented. The square root with power three is taken after multiplying those three indexes (Economy, Life Quality, and Social).

6. IMPLEMENTATION

The Country Development Index will be applied to the United States and Japan for exemplification. Subsequently, G-20 countries will be sorted by the Country Development Index.

Table 17. Calculation of Indicators of Economy

	The United States		Japan	
	Date of Data	Calculation	Date of Data	Calculation
GDP per capita (PPP)	2019	log(65,297.518) =4.8149	2019	log(43,235.718)= 4.6358
Unemployment	2019	1-($\frac{3.669}{100}$) = 0.96331	2019	1-($\frac{2.4}{100}$) = 0.976
Youth Unemployment	2019	1-($\frac{8.392}{100}$) = 0.9973	2019	1-($\frac{3.8}{100}$) = 0.9971

Economy Index of the United States = $\sqrt[3]{(4.8149)\,.\,(0.96331)\,.\,(0.9973)} = \mathbf{1.6816}$

Economy Index of Japan = $\sqrt[3]{(4.6358)\,.\,(0.976)\,.\,(0.9971)} = \mathbf{1.6604}$

Table 18. Calculation of Indicators of Life Quality

	United States		Japan	
	Date of Data	Calculation	Date of Data	Calculation
Life Expectancy	2019	log(78.9) = 1.8971	2019	log(84.6) = 1.9274
Education Index	2019	$\frac{(\frac{13.4}{15}+\frac{16.3}{18})}{2}$ = 0.8994	2019	$\frac{(\frac{12.8}{15}+\frac{15.2}{18})}{2}$ = 0.8488
Gini Index	2016	log(100 - 41.1) = 1.7701	2013	log(100 – 32.9) = 1.8267

Life Quality Index of the United States = $\sqrt[3]{(1.8971)\,.\,(0.8994)\,.\,(1.7701)} = \mathbf{1.4455}$

Life Quality Index of Japan = $\sqrt[3]{(1.9274)\,.\,(0.8488)\,.\,(1.8267)} = \mathbf{1.4404}$

Table 19. Calculation of Indicators of Social

	The United States		Japan	
	Date of Data	Calculation	Date of Data	Calculation
Gender Inequality Index	2019	log(100 – (100 x 0.204)) = 1.9009	2019	log(100 – (100 x 0.094)) = 1.9571
Democracy Index	2019	log(7.96) = 0.9009	2019	log(7.99) = 0.9025
Crime	2021	log(100 – 47.81) = 1.7176	2017	log(100 – 22.19) = 1.8910
Poverty Index	2008 - 2018	log(100 – 1.2) = 1.9948	2008 - 2018	log(100 – 0.7) = 1.9969

Social Index of the United States = $\sqrt[4]{(1.9009)\,.\,(0.9009)\,.\,(1.7176)\,.(1.9948)} = \mathbf{1.4668}$

Social Index of Japan = $\sqrt[4]{(1.9571)\,.\,(0.9025)\,.\,(1.8910)\,.(1.9969)} = \mathbf{1.6674}$

CDI of the U.S. = $\sqrt[3]{(1.6816)\,.\,(1.4455)\,.(1.4668)}$ = **1.5580**

CDI of Japan = $\sqrt[3]{(1.6604)\,.\,(1.4404)\,.\,(1.6674)}$ = **1.5660**

In the Economy index, Japan is much better at unemployment and youth unemployment. The United States has a relatively high youth unemployment rate. Young American people are less lucky in the labor market than their Japanese peers. It may well be that even if the American economy in GDP and GDP per capita terms is much stronger than the Japanese economy, with the inclusion of GDP per capita (PPP), unemployment, and youth unemployment, the Japanese economy has a much better condition than the American economy.

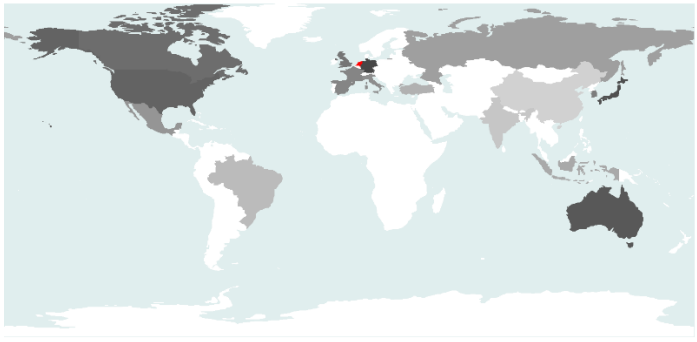
In the Life Quality Index, the United States prominently in education is one step ahead of Japan. However, the United States has a much worse Gini index and lower life expectancy than Japan. Consequently, the United States gets a slightly higher point in Life Quality thanks to the higher educational score.

In the Social index, Japan is overwhelmingly surpassing. Except for the Crime index part, the United States had a little bit lower than Japan. Nevertheless, in the Crime index, the United States is hugely lower than Japan, and it is understood that the United States has a significant crime issue, which might affect economic and social activities.

As a result, according to the Country Development Index, Japan has a higher ranking than the United States. In the sense of GDP ranked lists, the United States is apparently about four times higher than Japan, but obviously, Japan is a more developed country than the United States, by Country Development Index, when other indicators are included.

6.1 G20 Countries

Figure 1. G20 countries from most developed to less developed



***Note**: The Netherlands, the most developed country, is red, and the color goes from jet black to light gray with the development level of the country. Germany (jet black) is the second most developed country, Australia (dark black) is the third most developed country, and Japan is the fourth most developed country. China (light gray) is the least developed country among G20 countries, according to the Country Development Index.*

As can be seen in Table 20, countries have an entirely different place on the new development list than the GDP list. Even if the United States and China have massive production-oriented economies, they are not at the top of the list. It is because tremendous economic-producing activities do not bring democracy, equal society, full employment, and better educational improvement. The United States and China would leap upward readily by reforming the areas that pose an obstacle to development. The Netherlands, Germany, and Australia are the most developed first three nations within G20. That proves that many countries should focus on the must-reform field to improve their economic and social standards in order to catch up with countries with high development standards.

Table 20. List of G20 countries by Country Development Index

Netherland	1.587
Germany	1.582
Australia	1.576
Japan	1.566
Canada	1.564
United Kingdom	1.562
South Korea	1.558
United States	1.558
France	1.526
Spain	1.520
Italy	1.508
Mexico	1.459
Russia	1.445
Indonesia	1.435
Turkey	1.430
Brazil	1.413
India	1.396
China	1.371
Saudi Arabia	0.000

***Note:** Saudi Arabia has a lack of data on the Gini index and poverty index. Therefore, the calculation of the Saudi Arabian economic development rate failed.*

Table 21. List of G20 countries by **Human Development Index**

Germany	0.947
Netherland	0.944
Australia	0.944
United Kingdom	0.932
Canada	0.929
United States	0.926
Japan	0.919
South Korea	0.916
Spain	0.904
France	0.901
Italy	0.892
Russia	0.824
Turkey	0.820
Mexico	0.779
Brazil	0.765
China	0.761
Indonesia	0.718
India	0.645
Saudi Arabia	

Note: *Saudi Arabia is not included since it is not calculated in Country Development Index.*

It is because HDI does not include many vital indicators in calculations. However, the Country Development Index takes many different social and economic indicators into account and computes them to ascertain the countries' weaknesses and strengthen economic and social points[2].

7. CONCLUSION REMARKS

For decades, GDP has been lauded as a pioneering approach to gauging a country's economic might. Yet, as history has repeatedly shown, GDP growth alone cannot guarantee social and economic advancement. Even nations boasting impressive GDPs may exhibit shortcomings in areas such as democracy, equality, and social justice. Meanwhile, countries with flourishing economies may still grapple with high youth unemployment rates. These limitations have spurred me to create the Country Development Index, a novel calculation methodology that merges economic and social indicators to offer a more sweeping evaluation of national progress.

The Country Development Index (CDI) presents a dynamic platform of measurement, affording the inclusion of a diverse spectrum of economic and social indicators to provide a nuanced insight into a nation's progress. The CDI serves as a potent tool in detecting areas of deficiency and implementing targeted solutions by considering a broad range of factors. For instance, the high levels of youth unemployment in the ostensibly developed nations of Italy and Spain gain more comprehensive comprehension by examining indicators beyond Gross Domestic Product (GDP). When analyzed through the CDI, Italy trails behind South Korea in terms of development, underscoring the necessity for focused job creation initiatives. Correspondingly, the United States, considered a developed nation by conventional measures due to its elevated GDP per capita, trails behind many others in the CDI with respect to gender equality, income inequality, poverty rates, and crime rates, signifying an urgent need for remedial action in these areas.

In the pursuit of national progress, policymakers have long fixated on economic growth and GDP as the primary measures of success. However, these metrics alone fail to capture the multifaceted nature of a nation's development and well-being. The Country Development Index offers a transformative shift in perspective, centering attention on a broader range of social and economic factors that are critical to achieving sustainable and inclusive growth. By embracing a more holistic approach, policymakers can better address complex challenges and promote a society where all individuals can flourish. Ultimately, the CDI represents a powerful tool for advancing human progress and creating a brighter future for all.

The implementation of the Country Development Index has yielded promising results in countries around the world. By taking a more comprehensive approach to measuring progress, policymakers have been able to identify areas of deficiency and implement targeted solutions to improve the lives of their citizens. For instance, in South Korea, the CDI has helped drive significant improvements in areas such as education, healthcare, and environmental sustainability, leading to a higher quality of life for its citizens. Similarly, in Brazil, the CDI has been instrumental in reducing poverty rates and improving access to basic services, such as clean water and sanitation. These success stories demonstrate the power of the CDI in promoting sustainable and inclusive development, and serve as a call to action for policymakers around the world to adopt this transformative approach to measuring progress.

[2] We cannot compare the Country Development Index with other indexes due to the fact that other indexes BLI and GPI, do not have data or detailed information as to how they calculate the indicators.

ACKNOWLEDGMENT

I would like to thank Professor Erdem Secilmis (Hacettepe University) and Professor Ian Hudson (University of Manitoba) for their priceless feedback.

FUNDING, COMPETING INTEREST, AND DECLARATIONS

This study was funded by the Faculty of Economic Sciences at University of Warsaw.

The author has no relevant financial or non-financial interests to disclose.

The author declares that there is no conflict of interest.

REFERENCES

Acemoglu, D., Naidu, S., Restrepo, P., & Robinson, J. A. (2019). Democracy does cause growth. Journal of political economy, 127(1), 47-100.

Alemán, E., & Kim, Y. (2015). The democratizing effect of education. Sage Research and Politics (Sage Research and Politics), 2(4), 1-7. 2053168015613360.

Cervellati, M., & Sunde, U. (2009). Life expectancy and economic growth: the role of the demographic transition. IZA Paper No: 4160.

Deaton, A. (2013). The great escape: health, wealth, and the origins of inequality. New Jersey: Princeton University Press.

Deonandan, R. (2019). Defining poverty: a summary of competing models. The Asian Institute of Research Journal of Social and Political Sciences, 2(1), 17-21.

Dynan, K., & Sheiner, L. (2018). GDP as a measure of economic well-being. Hutchins Center Working Paper #43 https://www.brookings.edu/wp-content/uploads/2018/08/WP43-8.23.18.pdf.

European Commission (2020). Life expectancy. European Commission website. Accessed Jan 09, 2021. https://ec.europa.eu/health/indicators/docs/echi_10_ds_en.pdf.

Farris, F. A. (2010). The Gini index and measures of inequality. The American Mathematical Monthly, 117(10), 851-864.

Giovanni, L., & Liberati, P. (2006). Inequality Analysis The Gini Index. Italy: Food and Agriculture Organization of the United Nations.

Girum, T., Muktar, E., & Shegaze, M. (2018). Determinants of life expectancy in low and medium human development index countries. Medical Studies 34 (3): 218–225.

Grant, C. (2017). The contribution of education to economic growth. the U.K. Government: K4D helpdesk service.

Human Development Report (2015). Training Material for Producing National Human Development Reports. OCCASIONAL PAPER, UNDP Human Development Report Office.

Katayama, R., & Divyanshi W. (2019). World Bank Blogs. January 09. Accessed January 05, 2021. https://blogs.worldbank.org/opendata/half-world-spoor-live-just-5-countries

Lafrance, R., & Schembri, L. L. (2002). Purchasing Power Parity; Definition, Measurment, and Interpretation. Bank of Canada Review 27-33.

Leamer, E. E. (2009). Macroeconomic Patterns and Stories: A Guide for MBAs. Berlin: Springer.

NUMBEO (2021). Crime Indices. Accessed 11 30, 2021. https://www.numbeo.com/crime/rankings_by_country.jsp.

O'Higgins, N. (2015). Youth unemployment. IZA Policy Paper No. 103. 1-21. Institute for the Study of Labour.

OECD (2013). GDP per capita. In National Accounts at a Glance 2013, 20 - 23. Paris: OECD Publishing.

OECD Insights (2015). HOW DOES INCOME INEQUALITY AFFECT OUR LIVES? https://www.oecd ilibrary.org/docserver/9789264246010-6-en.pdf?expires=1611686229&id=id&accname=guest&checksum=007049BC1AA38F1459C2B00C2B1C9882, OECD Insights.

OECD (2021). OECD Data. Accessed Jan 10, 2021. https://data.oecd.org/unemp/youth unemployment-rate.htm.

Oner, C. (2010). What is inflation. IMF Finance & Development, 47(1), 44-45.

Pilling, D. (2018). 5 ways GDP gets it totally wrong as a measure of our success. Jan 17. Accessed 01 04, 2021. https://www.weforum.org/agenda/2018/01/gdpfrog-matchbox-david-pilling-growth-delusion/.

Ponthieux, S., & Dominique M. (2015). Gender Inequality. Handbook of Income Distribution Volume 2A, 983-1119.

Raphael, S., & Winter-Ebmer, R. (2001). Identifying the effect of unemployment on crime. The journal of law and economics, 44(1), 259-283.

Saisana, M. (2014). Education Index. In A. Michalos (Ed.), Encyclopedia of Quality of Life and Well-Being Research, (pp. 1816-1819). Dordrecht: Springer.

Schwab, K., & Malleret, T. (2020). The great reset. Geneva: Forum Publishing.

Škare, M., & Družeta, R. P. (2015). POVERTY AND ECONOMIC GROWTH: A REVIEW. TECHNOLOGICAL AND ECONOMIC DEVELOPMENT OF ECONOMY 22(1): 156–175. Taban, Sami. 2014. Economic Growth: Notions and Models. Ankara: Nobel.

Taylor, R. B. (1995). The Impact of Crime on Communities. Annals of the American Academy of Political and Social Science 539: 28-45. https://www.jstor.org/stable/1048394?seq=1#metadata_info_tab_contents.

The Economist Intelligence Unit (2020). Democracy Index 2019: A year of democratic setbacks and popular protest. Annual Report, London: The Economist. cs, vol. XLIV 259-283.

The United Nations Development Program (2020). Human Development Report. Accessed Jan 08, 2021. http://hdr.undp.org/en/content/gender-inequalityindex-gii.

United Nations Development Program (2020). Technical Notes of Human Development Index. United Nations Development Program, Gender Inequality Index. Accessed Jan 09, 2021. http://hdr.undp.org/sites/default/files/hdr2020_technical_notes.pdf.

United Nations Development Program, & Oxford Poverty and Human Development Initiative (2020). Global Multidimensional Poverty Index. Annual Report, London: United Nations Development Programme and Oxford Poverty and Human Development Initiative.

Williamson, S. (2002). Macroeconomics. New Jersey: Pearson..

APPENDIX

***Table A1**. The year of the data of indicators used in the Country Development Index of G20 countries.*

	Crime Index	Gini Index	Poverty Index	Other Indicators
Canada	2021	2017	2008-2018	2019
Germany	2021	2016	2008-2018	2019
Netherland	2021	2017	2008-2018	2019
United Kingdom	2021	2016	2008-2018	2019
France	2021	2017	2008-2018	2019
Italy	2021	2017	2008-2018	2019
Japan	2021	2013	2008-2018	2019
South Korea	2021	2012	2008 -2018	2019
Spain	2021	2017	2008 -2018	2019
Australia	2021	2014	2008 -2018	2019
Mexico	2021	2018	2008 -2018	2019
Indonesia	2021	2018	2008 -2018	2019
Brazil	2021	2018	2008 -2018	2019
India	2021	2011	2008 -2018	2019
Turkey	2021	2018	2008 -2018	2019
Russia	2021	2018	2008 -2018	2019
United States	2021	2016	2008 -2018	2019
China	2021	2016	2008 -2018	2019
Saudi Arabia	2021	N/A	N/A	2019

Note: Saudi Arabia's Gini index data and poverty index data are missing.

***Table A2.** The Figure of Calculation Tables of Country Development Index of Countries.*

China		Turkey		Germany		India		United Kingdom		France	
GDP per capita PPP	4,226080684	GDP per capita PPP	4,44923841	GDP per capita PPP	4,75034058	GDP per capita PPP	3,84488438	GDP per capita PPP	4,68751231	GDP per capita PPP	4,69403612
Unemployment	0,9485	Unemployment	0,87059	Unemployment	0,96975	Unemployment	0,94661	Unemployment	0,95885	Unemployment	0,91662
Youth Unemployment	0,89479	Youth Unemployment	0,77345	Youth Unemployment	0,94711	Youth Unemployment	0,76247	Youth Unemployment	0,88362	Youth Unemployment	0,80497
Economy	1,53073054	Economy	1,44159699	Economy	1,63403612	Economy	1,40526764	Economy	1,58362692	Economy	1,51299845
Life Expectancy	1,88592634	Life Expectancy	1,89042102	Life Expectancy	1,90955603	Life Expectancy	1,84323278	Life Expectancy	1,91009055	Life Expectancy	1,91750551
Education	0,657	Education	0,731	Education	0,943	Education	0,555	Education	0,927	Education	0,817
Gini	1,788875116	Gini	1,76417613	Gini	1,83314711	Gini	1,80821097	Gini	1,8142476	Gini	1,8350561
Life Quality	1,303837215	Life Quality	1,3458788	Life Quality	1,48895123	Life Quality	1,22755442	Life Quality	1,47551427	Life Quality	1,42190094
Gender Ineqaulity	1,920123326	Gender Ineqaulity	1,84135947	Gender Ineqaulity	1,96189547	Gender Ineqaulity	1,70926996	Gender Ineqaulity	1,94546859	Gender Ineqaulity	1,97818052
Democracy	0,354108439	Democracy	0,61172331	Democracy	0,93851973	Democracy	0,83884909	Democracy	0,93043959	Democracy	0,90955603
Crime	1,844228581	Crime	1,78089311	Crime	1,80760267	Crime	1,7448404	Crime	1,73183042	Crime	1,68133171
Poverty	1,997823081	Poverty	1,99956549	Poverty	2	Poverty	1,89652622	Poverty	1,99913054	Poverty	2
Social	1,258083	Social	1,41519659	Social	1,6062497	Social	1,47588413	Social	1,58221221	Social	1,56835616
NDI	1,359180509	NDI	1,40030357	NDI	1,57513722	NDI	1,36547584	NDI	1,54627597	NDI	1,4998604

Italy		Brazil		Canada		Russia		South Korea		Spain	
GDP per capita PPP	4,6458955	GDP per capita PPP	4,18469106	GDP per capita PPP	4,71047029	GDP per capita PPP	4,46510557	GDP per capita PPP	4,634910542	GDP per capita PPP	4,625262854
Unemployment	0,90164	Unemployment	0,88034	Unemployment	0,94588	Unemployment	0,95575	Unemployment	0,95852	Unemployment	0,86985
Youth Unemployment	0,70254	Youth Unemployment	0,73088	Youth Unemployment	0,89387	Youth Unemployment	0,84376	Youth Unemployment	0,8903	Youth Unemployment	0,68875
Economy	1,4330386	Economy	1,39119061	Economy	1,58510569	Economy	1,53272764	Economy	1,581465187	Economy	1,404583189
Life Expectancy	1,92168648	Life Expectancy	1,88024178	Life Expectancy	1,91592721	Life Expectancy	1,86093662	Life Expectancy	1,919078092	Life Expectancy	1,922206277
Education	0,793	Education	0,694	Education	0,894	Education	0,823	Education	0,865	Education	0,831
Gini	1,80685803	Gini	1,66370093	Gini	1,82412583	Gini	1,79588002	Gini	1,835056102	Gini	1,814913181
Life Quality	1,40160805	Life Quality	1,2948401	Life Quality	1,46192056	Life Quality	1,40110144	Life Quality	1,449615087	Life Quality	1,425888687
Gender Ineqaulity	1,96894968	Gender Ineqaulity	1,77232171	Gender Ineqaulity	1,96378783	Gender Ineqaulity	1,8893017	Gender Ineqaulity	1,971275849	Gender Ineqaulity	1,968482949
Democracy	0,87621784	Democracy	0,83632412	Democracy	0,96473092	Democracy	0,49276039	Democracy	0,903089987	Democracy	0,912753304
Crime	1,74154552	Crime	1,51201697	Crime	1,76425088	Crime	1,77822363	Crime	1,865222456	Crime	1,823995591
Poverty	1,99387691	Poverty	1,98045789	Poverty	1,99782308	Poverty	2	Poverty	1,999130541	Poverty	1,996949248
Social	1,56447984	Social	1,45147602	Social	1,60751314	Social	1,34892676	Social	1,605138658	Social	1,599443748
NDI	1,46470944	NDI	1,37764572	NDI	1,55016827	NDI	1,42552328	NDI	1,543861357	NDI	1,47412401

Table A2. *The Figure of Calculation Tables of Country Development Index of Countries (Continues).*

Australia		**Mexico**		**Indonesia**		**Netherland**		**Saudi Arabia**		**United States**	
GDP per capita PPP	4,7281026	GDP per capita PPP	4,3135	GDP per capita PPP	4,0911362	GDP per capita PPP	4,77491265	GDP per capita PPP	4,6905535	GDP per capita PPP	5
Unemployment	0,94672	Unemployment	0,96346	Unemployment	0,95165	Unemployment	0,97025	Unemployment	0,94142	Unemployment	0,9903669
Youth Unemployment	0,88038	Youth Unemployment	0,92421	Youth Unemploymentl	0,82363	Youth Unemployment	0,94145	Youth Unemployment	0,72106	Youth Unemployment	0,990839
Economy	1,5795239	Economy	1,56607	Economy	1,4746347	Economy	1,63386228	Economy	1,47115909	Economy	1,678013267
Life Expectancy	1,9211661	Life Expectancy	1,87506	Life Expectancy	1,8555192	Life Expectancy	1,91539984	Life Expectancy	1,87563994	Life Expectancy	1,897077003
Education	0,924	Education	0,703	Education	0,65	Education	0,914	Education	0,789	Education	0,8994
Gini	1,8169038	Gini	1,73719	Gini	1,7937904	Gini	1,85430604	Gini	0	Gini	1,770115295
Life Quality	1,4774845	Life Quality	1,31807	Life Quality	1,2933523	Life Quality	1,48068389	Life Quality	0	Life Quality	1,445483479
Gender Ineqaulity	1,9556878	Gender Ineqaulity	1,83123	Gender Ineqaulity	1,7160033	Gender Ineqaulity	1,98091194	Gender Ineqaulity	1,8739016	Gender Ineqaulity	1,900913068
Democracy	0,9585639	Democracy	0,78462	Democracy	0,811575	Democracy	0,95472479	Democracy	0,28555731	Democracy	0,900913068
Crime	1,871923	Crime	1,66096	Crime	1,7329564	Crime	1,86236994	Crime	1,87372738	Crime	1,717587297
Poverty	1,9978231	Poverty	1,99255	Poverty	1,9795484	Poverty	1,99913054	Poverty	0	Poverty	1,991270389
Social	1,6272017	Social	1,4767	Social	1,4784279	Social	1,62896825	Social	0	Social	1,555691753
NDI	1,5601398	NDI	1,449932	NDI	1,4127559	NDI	1,57953822	NDI	0	NDI	1,556840153

Japan	
GDP per capita PPP	4,635842
Unemployment	0,99024
Youth Unemployment	0,99038
Economy	1,656623
Life Expectancy	1,92737
Education	0,8488
Gini	1,826723
Life Quality	1,440393
Gender Ineqaulity	1,957128
Democracy	0,902547
Crime	1,891035
Poverty	1,991226
Social	1,605933
NDI	1,564867