

Sustainable Development Indicators Under Analysis of European Union Member States and Ukraine

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ABSTRACT

Recently, the sustainable development concept became a crucial issue for every country of the world. Ukraine isn't exception. The main idea of sustainable development is to find a model that would balance the economic development, social sustainability and environmental challenges. In this study, we selected indicators and indexes to measure the achievement of sustainable development goals in Ukraine and the EU countries. These calculations allow to group countries and evaluate their effectiveness. The comparative analysis concludes that the level of sustainable development can be well described on the basis of a limited set of diagnostic features. Set of indicators must be individual for every country in order to obtain representative data.

Keywords: *sustainability indicators, European Union, GDP per capita based on purchasing power parity, social development, economic inequality, Gini index*

1. INTRODUCTION

Ukraine's course on rapprochement with Europe and accession to the European Union is impossible without significant economic growth and improvement of the human's life quality, especially in terms of preservation of natural resources. At the present time there is no scientifically grounded criteria for the objective evaluation of indicators that are meant to determine the real state and dynamics of state sustainable development. In Ukraine, as well as at the international level, there is no common system of indices and indicators, as they are in the stage of continuous improvement [1].

Considering the necessity of sustainable development in terms of building a system of indicators, it can be argued that implementation and depth of the need depends largely on the subjective factors in a particular country. To define the assessment instruments on national level, it requires continuous improvement through comparison with EU countries and implementation of national indicators in the overall sustainable development strategy. Indicators are being actively developed by international organizations such as WHO, UN, UNESCO, the World Bank, the Environmental Modeling Committee (ISEM), the European Commission, the OECD, the Scientific Committee on the Environment (SCOPE) [2].

Modern science identifies two approaches to build a system of sustainable development indicators: 1) building an indicator system that includes the following separate components: environmental: it defines the conditions and limits of restoration of ecological systems; economic:

formation of a sustainable economic system; social: human right to a high standard of life; 2) construction of integral indicators, which make a conclusion about the level of sustainability of socio-economic development [3].

It is important to take into account the national and regional specificity of particular economic system, when selecting indicators. The Sustainable Development Strategy for the European Union have been developed by the United Nations Department jointly with Eurostat. It includes the following categories of indicators: socio-economic development; sustainable consumption and production; social integration; demographic change; health care; climate change and energy; infrastructure development; natural resources; global partnership; effective management [4]. The second requirement for analysis of sustainable development is the availability and reliability of statistical information.

The selection and normalization of indicators include subjective and normative choices, with further important implications on the outcome [5]. As for the max-min conversion, it should be noticed, that high or low scores do not necessarily indicate good or bad development. However, since determining the maximum and minimum values of initial data included not only Ukraine, but also all EU countries, it is possible to interpret maximum value as a kind of best practice benchmark [6].

2. BACKGROUND

One of the many accessible indicators, that characterizes the social and economic development is the gross domestic

product; and GDP per capita characterizes average income of the abstract resident of the country. Certainly, the GDP rate is not equal proportionally to the level of wealth. However, in order to compare the life level in different countries, one can use GDP per capita rate, which is based on the purchasing power parity. International Dollar has as strong purchasing power to GDP as US Dollar in USA [7]. In 1991, our country had a good initial economic opportunities, for example, the GDP per capita was somewhat higher than in other Europe countries (\$ 6790 per person, 6176 in Poland, 5272 in Romania) [8]. Despite the permanent positive dynamics of GDP, (Figure 1) it is incorrectly to state the increase in development level of the country as far as this indicator should be compared to analogical indicators in other countries.

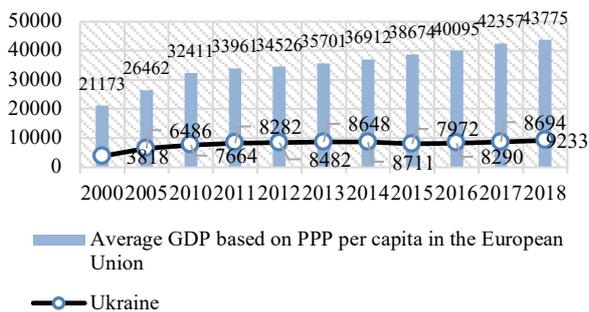


Figure 1 The dynamics of GDP per capita based on purchasing power parity [8]

Generally, in European Union, the average GDP per capita was \$ 43775 in 2018. Statistics (Eurostat) shows that GDP per capita ranges from 30% in Greece to 259% in Luxembourg in 2018. This measure was calculated from the average value in Eurozone countries. The majority of EU population has a higher GDP than the European average, among them: Ireland - 190%, Netherlands - 129%, Germany - 121%, Austria - 127%, Sweden - 122%, Denmark - 127%, Belgium - 117 %, Finland - 111%, United Kingdom - 105%, France - 104%. As for Ukraine, GDP per capita amounted to \$ 9,233 in the estimated period. This, therefore, is 21.09% of EU GDP per capita compared to the European average. It should be noted that the lowest indicator from the considered European countries was demonstrated by Greece - 30%, with an absolute indicator of \$ 13291.

The countries of European Union (2018 est.) were grouped by the share of the average GDP per capita through the use of Statistica program. Namely the number of intervals (groups) and the size of the interval in the group were defined (2).

The program has formed six groups that differ in size and value relative to the average GDP per capita. Thus, according to 2018 data, Ukraine and Greece belong to the first group with a share from 0 to 40%; eight countries (Bulgaria, Latvia, Poland, Portugal, Romania, Slovakia, Hungary, Croatia) belong to second group with a share of 41-80%; the third group with a share of 81-120% is formed by twelve countries (Belgium, Great Britain, Estonia, Spain, Italy, Lithuania, Germany, Slovenia,

Finland, France, Czech Republic, Cyprus, Malta); the fourth group with a share of 121-160% is formed by Austria, Denmark, the Netherlands, Sweden; the fifth group with a share of 161-200% is represented by Ireland, and Luxembourg belongs to the sixth group with a share of more than 201%.

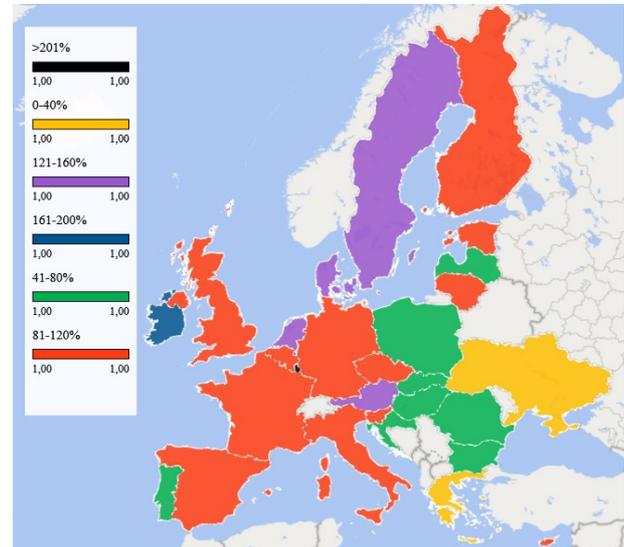


Figure 2 Groups of EU countries and Ukraine by the share to the average GDP per capita based on purchasing power parity

Ensuring sustainable development requires reducing inequality and equal access to wealth, power and fame - the three fundamental benefits of any country. However, international organizations studies suggest the opposite: almost half of the world's wealth in the hands of only 1% of population, and the world's 8 richest people owning the same amount of money as the world's poorest part [9]. The problem of social inequality deepens the division of the world into the opposite developmental groups and provokes even greater economic, political and cultural differences between countries. It requires a comprehensive analysis of the real state of property stratification with further evaluations the forecast results.

In L M Grigoriev research [10] there is a relative indicator of the calculation of inequality. It is referred to as ratio of the highest value of one country's GDP per capita in purchasing power parity to the lowest value of the same criterion of another country:

$$K_i = \frac{Q_{max}}{Q_i} (1)$$

K_i – inequality index;

Q_{max} – the highest value of GDP per capita in purchasing power parity, USD

Q_i - the value of GDP per capita in purchasing power parity of the country for comparison, USD

This technique reflects the disparity between the income levels in different countries, regions, zones and it makes possible further comparison in dynamics in order to

identify common features and differences between the objects of study.

Let's estimate inequality in case of the European Union and Ukraine for the period from 1990 to 2018 according to the methodology presented. The maximum value of GDP per capita on the basis of purchasing power parity during the whole analyzed period is observed in Luxembourg with a constant upward trend from 29665 to 113337 USD per person [8]. It should be noted that the lowest value is 4.4 observed in 1990, the highest peak is 14.5 in 2000, and 13.0 value was observed during 2015-2016. In 2018, the gap between the richest country in Europe and Ukraine accounts for 12.3 times. If we compare the average GDP per capita in terms of purchasing power of the European Union countries with Ukraine, it can be concluded that the gap ranges from 2.3 in 1999 to 4.8 in 2018 with a declining trend.

One of the most common inequality measuring methods is the Gini coefficient, which determines the degree of inequality in population and households' income distribution within the country. The value of this coefficient can be taken in the range from 1 to 100%, that is, the higher its value, the higher the inequality in the income distribution [11]. We group the EU countries and Ukraine by Ginny coefficient level. Thus, in Ukraine the value of this indicator is 26.3% as of 2018 [8], that means, that Ukraine is a leader among the EU countries and is in the first group (0-26.9) together with such developed countries as Belgium, Denmark, the Netherlands, Slovakia, Slovenia, Finland, Czech Republic, Sweden. The second group (27-28.9) includes Austria, Luxembourg, Hungary, France, Croatia; Ireland, Germany, Malta refer to the third group (29-30.9); Great Britain, Greece, Poland is the fourth group (31-32.9); the fifth group (33-34.9) consist of Bulgaria, Estonia, Spain, Italy, Lithuania, Portugal, Romania, Cyprus; sixth group (more than 35) is for Latvia. Such research results are not objective for Ukraine. Actually, Ukrainian society is very stratified and the value of the indicator is explained by the low quality of national statistics on the richest and poorest people income level. In other words, a high rate of shadow economy was not taken into account and therefore results does not reflect the real picture. Secondly, in Ukraine, there is virtually no middle class between the wealthy (few) and the poor (many), that would balance the situation. Considering these findings, the Ginny coefficient cannot be taken into account when assessing the country's sustainable development in terms of quality of life.

Social indicators are intended to determine the basic needs of a person and the extent of their satisfaction. Some social indicators are associated with particular indicators of national economic performance, while others reflect mostly spiritual issues. The level of needs satisfaction of the most people depends on the economic system functioning, political rule and interaction between them. A large number of social indicators are based on the interpretation of basic human needs [12].

The combined indicator of the international research project The Social Progress Imperative, which measures the achievements of countries around the world in terms of

social well-being and social progress, is The Social Progress Index. The index does not include indicators of the economic development of countries in the world (such as GDP and GNI), but is designed to assess public well-being in a particular country, and studies more deeply the relationship between economic and social development. 50 indicators are combined into three main groups: 1) basic human needs indicators (nutrition, access to medical care, housing, access to water, personal safety); 2) human well-being needs indicators (access to education and literacy, access to information and communication, health, environmental sustainability); 3) possibility of human development indicators (the level of personal and civil liberties, ensuring human rights and opportunities to make decisions and realize their potential). The index measures country's achievement on a scale from 0 (the lowest degree of social stability) to 100 (the highest degree of social stability). It is based on the data obtained in the three above mentioned basic categories [13]. The grouping of EU countries and Ukraine by The Social Progress Index is clearly illustrated in Figure 3.

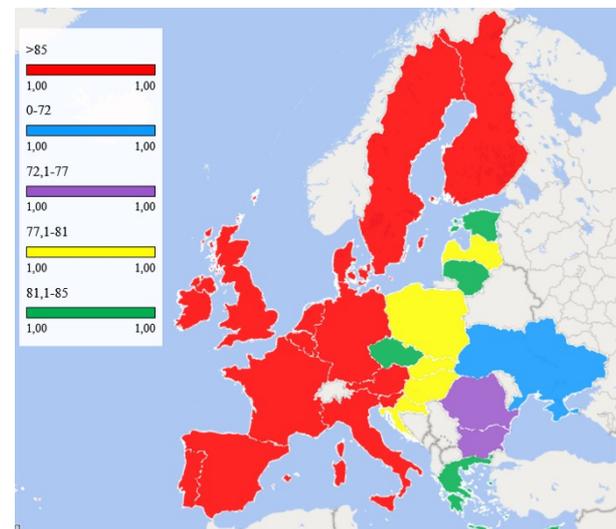


Figure 3 Groups of EU countries and Ukraine by the level of The Social Progress Index

When calculating the number of groups, the special statistical distribution feature was taken into account, as far as SPI range of the selected group of countries is too wide, and therefore the distribution is uneven. The entire panel was divided into five intervals from the worst index value to the best one, in order of increasing. Thus, the first group includes Ukraine with an indicator value of 66,78 (2018 est.); the second group (72.1-77) included Bulgaria and Romania; Latvia, Slovakia, Hungary, Croatia and Poland refer to the third group (77.1-81); the fourth group consists of Greece, Estonia, Lithuania, Czech Republic, Cyprus, Malta. The fifth group differs from all the others by including the most of EU countries (Austria, Belgium, United Kingdom, Denmark, Ireland, Spain, Italy, Luxembourg, Netherlands, Germany, Portugal, Slovenia,

Finland, France, Sweden). The results show that the highest level of social progress is demonstrated by the EU countries compared to the other countries of the world. Denmark with The Social Progress Index of 89.55 holds the first position in the ranking among EU countries, and second position among 148 countries of the world. In comparison to the EU countries Ukraine's position is low in the ranking and confirms the small achievements in public welfare.

To date, Vernadsky's noosphere doctrine has become necessary platform for the concept of sustainable ecological, social and economic development [14]. The idea of global goals, accompanied by specific indicators, was first proposed by the Governments of Colombia and Guatemala and formally presented at the Rio + 20 Conference [15]. At the 2015 United Nations Sustainable Development Summit approved 17 Sustainable Development Goals (SDG) and 169 tasks for implementation. The agenda for Sustainable Development by 2030 was adopted at this Summit and became a universal collective responsibility covering all levels: global, national and territorial (regional and local). The main principle of SDG implementation is the principle of "leaving no one alone". It provides that in the process of the implementation of SDG, there must be both a direct and inverse relationship between the global challenges facing humanity and the problems of everyday life of every person, wherever they are and wherever they may be. The SDG has been included in the programs of many governments, included in the agendas of large international financial, charitable organizations [16].

The Sustainable Development Index (SDI) measures the ecological efficiency of human development, recognizing that development must be achieved within planetary boundaries. It was created to update the Human Development Index (HDI) for the ecological realities of the Anthropocene. The SDI starts with each nation's human development score (life expectancy, education and income) and divides it by their ecological overshoot: the extent to which consumption-based CO₂ emissions and material footprint exceed per-capita shares of planetary boundaries. Countries that achieve relatively high human development while remaining within or near planetary boundaries rise to the top [17]. The results of the EU and Ukraine grouping by SDI indicator are shown in Figure 4.

The general trends concerning the indicator can be summarized as follows: Ukraine has the lowest value of the indicator and it is in the first group together with such countries as Greece, Cyprus and Romania. The second group with a SDI of 72.6 to 75.1 include Bulgaria, Italy, Latvia, Lithuania, Poland, Portugal, Hungary, Malta. The middle level of sustainable development in the EU countries is shown within the third (75.2-77.7) and fourth (77.8-80.3) groups that are consist of Ireland, Spain, Luxembourg, Slovakia, Croatia, Austria, Belgium, The United Kingdom, Estonia, the Netherlands, Slovenia, the Czech Republic. The highest level of sustainable development is observed in the fifth and sixth groups, which include Germany, France and Denmark, Finland, Sweden.

It should be noted that Ukraine takes 39th place among 156 countries in the world SDI ranking as of 2018. Ukraine relinquished to the all EU countries except Greece (48th position) and Cyprus (50th position) [18]. Sweden, with a value of 85 out of 100, has the highest level of SDI, both among the countries of the European Union and globally.

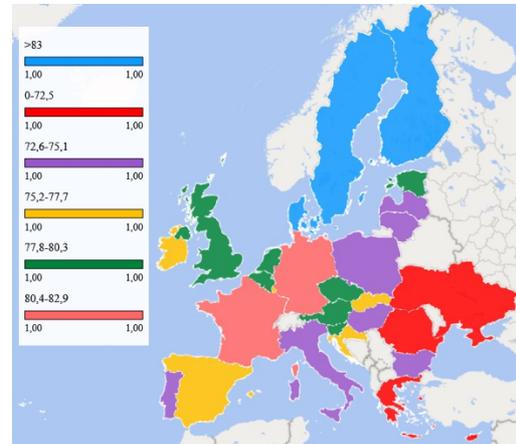


Figure 4 Groups of countries by the level of Sustainable Development Index

Among 17 possible indicators, Ukraine achieved the best results in such indicators as: no poverty, clean water and sanitation, reduced inequalities, worst - good health and well-being; industry, innovation and infrastructure; responsible consumption and production; life below water; peace, justice and strong institutions. Therefore, in our opinion, the initial conditions of sustainable development regarding Ukraine in the best indicators are not objective, since the problem of inequality, poverty, low purchasing power is urgent.

As for Ukraine, there was an increase in the national poverty level in 2015-2018 (75% of the median level of average cumulative cost) from 22.9% to 24.1%. Herewith the relative poverty line has increased the most in accordance to EU equivalence scale (average income per person below 60 percent of median per capita income) from 8,1% in 2015 to 10.2% in 2018. The officially approved subsistence rate as the absolute poverty line has increased by 8.8%, while actual subsistence rate has increased by 10.9%. The most influential factor of poverty risks is the presence of two or more children in the household, and the second place is occupied by an economic factor - the presence of an unemployed person in the household [19]. In addition to economic problems, poverty generates a number of negative socio-demographic consequences, particularly, affects negatively the country's human resources. Today, the average age of Ukrainian men is over 37, and women are almost 44. In general, this is in line with European demographic trends, but Ukrainians are also aging because of the threat of financial problems which constraint the birth rate [20]. The average Ukrainian spends more than 50% of his income on food and non-alcoholic beverages, 11-12% on housing and

utilities, 7-8% on clothing and footwear, 5% on medical treatment, 3% on communications. recreation and culture - 2%, and unfortunately 1.3% - for education [21]. Parents who are unable to invest in quality education for their children, automatically reduce their chances to improve their financial position and to rise from the social bottom. Therefore, Ukrainian Government actions should be focused on extreme poverty reduction policy, employment growth and self-employment opportunities through the quality education. [22].

The studies [23] prove the dependence among the human development index and the Gini coefficient, namely health problems and social problems are generally more common in countries with high levels of inequality. Thus, reducing inequality in the country will subsequently lead to a reduction in social problems, which will increase the country's ability to meet the basic needs of its residents.

From an environmental point of view, sustainable development must ensure the biological and physical systems integrity. One of the negative effects of industrial development and mass consumption is industrial and household waste production, that is difficult to recycle. In Ukraine, garbage management mainly involves the disposal, incineration and the specially designed places or objects of waste removal [24].

The waste management state and the quality of such treatment is much better in European Union than in Ukraine. In 2017, an average of 487 kg of household waste was generated per EU citizen. The most amount of waste per capita was generated in Denmark (781 kg), Cyprus (637), Germany (633 kg), Luxembourg (607 kg) and Malta (604 kg), the least amount was in Romania (272 kg), Poland (315 kg), the Czech Republic (344 kg) [25]. 265.3 kg per person was collected in Ukraine [21], which is the lowest index compared to the EU countries. However, the structure of waste recycling is very different (Figure 5).

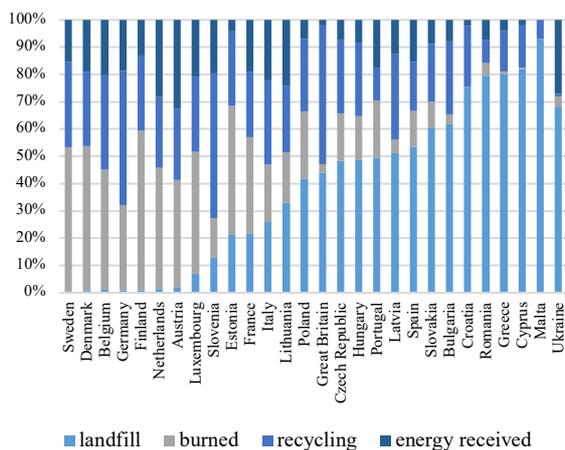


Figure 5 The directions and structure of waste management treatment in European Union countries and Ukraine, 2017 [21, 25]

In Belgium, Denmark, Germany, Finland and Sweden, less than 1% of household waste is landfilled, and in such countries as Malta, Greece, Croatia, Cyprus, Romania, this figure exceeds 75%. In Ukraine, 68.3% of waste is unproductive.

Therefore, EU countries with higher GDP per capita are implementing programs and household waste recycling projects. Sweden uses waste-to-energy technology. 99% of waste in the country is used as fuel for electric power stations or raw materials for production. At the same time, the country imports garbage from Norway, the United Kingdom, Germany, which pay extra for their waste. Austria has transformed the garbage-waste incinerator into a thermal power station, utilizing 265,000 tonnes of waste per year in order to produce thermal energy. Belgium has implemented the Ecolizer innovation. It allows estimation of waste production, its environmental impact and the transport and disposal costs. Poland has built over 100 refineries. Alternative fuel and secondary raw materials (plastic, metal, aluminum) are produced from the garbage. In the Netherlands, the introduction of circular economy principles has become a leading sustainable development strategy: saving € 7 billion annually and creating around 54,000 jobs [26].

In 2018, the World Economic Forum [27] introduced 10 Circular Economy Principles (10Rs), which include: Refuse (refuse to use some technologies and to produce some materials, alternative product offering), Rethink (reconsidering the ways of product utilization, exchange or mutual usage of the product), Reduce (reduction of the natural resources exploiting, the production or consumption efficiency increase), Reuse (secondary use of the product for intended purpose by another consumer), Repair (repairing and technical maintenance of defective product and its next use for intended purpose), Refurbish (re-treatment of an old product for its next consumption), Remanufacture (reprocessing of an old product or its part in a new product with next use for its primary purpose), Repurpose (re-orientation of a part of an old product for other functional purpose in a new product), Recycle (recycling of materials to obtain products of the same or lower quality), Recover (burning of materials with the recovery of energy consumed for their production).

The experience of introduction the circular economy in European countries sets new trends in formation of national development strategic priorities. The European countries practice allows to evaluate the potential changes in Ukraine, that will provide double benefits for economy. Particularly, the reduction of production costs, waste disposal, the environmental burden reduction will preserve the country's resource potential for future generations.

3. CONCLUSION

The transition to a sustainable economic growth model requires high-quality macro-indicators in order to assess the countries' achievements in this sphere. As well it needs global institutions that are able to influence those states that violate or ignore the conditions of international cooperation.

The Sustainable Development Indicators of the EU countries and Ukraine allow to conclude that none of the analyzed countries has achieved sustainable development. The GDP per capita on the basis of purchasing power parity and the Sustainable Development Index show similar results in classification of the countries positions from best to worst. The Social Progress Imperative illustrates clearly that Ukraine's lagging behind the most EU countries that demonstrate progress. It is proved that the multidimensional SDI and the Ginny coefficient do not reflect the real state of social component of sustainable development of Ukraine. That is explained by the low quality of domestic statistics on richest and poorest people income.

EU practice is an example of a balanced use of three sustainable development components. The interaction mechanism between the economic and social components is achieved through equitable distribution of income, assistance to vulnerable sections of the population. The interconnection of the economic and environmental components generates new ideas for production modernization, creating greater economic value with less natural resources. The social and environmental components connection shapes new thinking, alters consumer behavior, providing better health and safety for future generations.

The practical value of the study consists in the analysis of the European methodological base for sustainable development strategy assessment, the publication of statistical indicators, as well as demonstration of the importance of the best foreign practice implementation in Ukraine.

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