

ASPECTS OF THE SUSTAINABLE DEVELOPMENT INDICATORS SYSTEM FORMATION

Nataliia Tymoshyk

Ternopil Ivan Puluj National Technical University, Ukraine

Yevheniia Semchyshyn

Technical College of Ternopil Ivan Puluj National Technical University, Ukraine

Annotation

In the article there are used indices and indicators based on key components of sustainable development – environmental, economic and social. There was made comparison of the competitiveness of Ukraine in the global system. The basic directions of transition of Ukraine to sustainable development were marked.

Key words: *indices, indicators, sustainable development, competitiveness.*

Introduction

Sustainable development of Ukraine is possible only by overcoming certain contradictions between the rational use of natural resources, level of economic growth and improving living standards of population. This requires the use of appropriate indicators and indices, their comprehensive evaluation and further improvement and reasoning.

Research actuality and investigation goal

The study of sustainable development concept was performed at the scientific studies of Bryzhan I.A., Verbitska I.I., Grinevska S.M., Ishchenko O.V., Marynenko V.O., Morozyuk N.V., Smachylo I.I. and other foreign and national authors. In particular, Bryzhan I.A. (2013) analyzes the legal and regulatory aspects of environmental safety. Verbitska I.I. (2013) pays her attention to the balanced, sustainable development of agro-ecosystems. Ishchenko O.V. (2014) focuses on environmental safety in Ukraine, conducts a complete analysis and examines trends of public policy on rating improvement. Smachylo I.I. (2012) covers issues of economic governance, its importance and place in the structure of the sustainable economy development. Grinevska S.M. (2015), and Marynenko V.O. (2014) examine the cause of the irrational result in the methodology by which ecological problems were trying to be solved during the certain period within the limits of rational use of the resources, while economic and social factors remained unaddressed.

The result of the research was reasoning the methodology of sustainable development management, development of appropriate mathematical tools, and determination of socio-economic context of administrative activity under the current globalization conditions.

However, the problem of adapting the concept of sustainable development to the practical needs in the public administration process was left unaddressed.

For this purpose it is necessary to systematize the theoretical base of indicators and indices of the balanced growth, analyse the prerequisites for sustainable development in Ukraine, and make comparative characteristics of sustainable development in other countries.

Research techniques

Sustainable one is development that meets needs of present generation without compromising the future one.

Sustainable development can be described as one in which a person does not cause too much damage with his actions to the natural systems and they regenerate themselves. In other words, it is a development that is not only supported, but also one that supports.

Sustainable development contains the following main aspects:

- environmental – preserving the environment;
- economical – development of high-tech production and productive forces;
- social – constant quality improvement of peoples' life, levelling-off, improvement of social conditions.

This perception of sustainable development is capable to ensure its understanding by all nations. However, it is expedient to note that in this relationship environmental component is the key element. Without quality provision of the environment for human habitation all others are meaningless.

Because of the negative aspects of human activities the nature suffers a lot; it becomes dependent on human and cannot exist without it. That is, at present, not only a person depends on nature and its resources, but also the nature mostly depends on the person. Such an environmental aspect is paramount for sustainable development, but not the only one.

It should be noted that the current relationship between human and nature have a certain feature. Direct human contact with the natural environment may be replaced by indirect one. Clothing, dwelling, food, air (wet, purified), drinking water are used by a person through appropriate intermediaries. Such order of contact with the natural environment helps to solve environmental problems. However, they seemed to be removed little, their acuity is reduced and visual impression of a person safety is formed that complicates the situation.

Another dangerous side of "indirect" contacts between human and nature is that the person becomes stronger than nature. Modern technologies, equipment provide some advantages. The biggest problems occur when modern human did not calculate the negative effects in sufficient level and takes wrong decisions (reclamation, deforestation and construction of homes in the mountains, use of pesticides). This can lead to various types of environmental disasters.

To avoid them energy potential, which is used by a human, and the feasibility of information should be coordinated.

When implementing the concept of sustainable development, a significant problem is determination of the measuring system with the purpose of qualitative and quantitative evaluation of this rather complex process. Here, the main requirements are information completeness and its accuracy. Formation of sustainable development indicators is difficult, complex and quite costly procedure. A large number of indicators, included in this system, causes difficulties to use them not only in Ukraine due to lack of necessary statistical data.

The sustainable development indicator is a quantitative indicator that is able to reflect environmental, social and economic development in a particular region or country and includes characteristics such as sensitivity to changes, ease of interpretation, quantitative certainty and allows time to make forecasts and notice trends in time. Control on achievement of sustainable development, management of the process, decision-making, evaluating the effectiveness of the means use, motivate to develop appropriate criteria and indicators, i.e. sustainable development indicators.

Thus, the main goal of a comprehensive indicators system development is monitoring of the sustainable development of society.

The international community has developed and implemented several options to assess indicators of sustainable development, namely:

1. A System for Integrated Environmental and Economic Accounting (SEEA), which main objective is taking into account environmental factors in state statistics. The system describes the relationship between the state economy and the environment (interdependence is expressed by the UN through the adopted system of respective national accounts, in which environmental factors and natural resources are taken into account). Currently, there are methodological obstacles in SEEA usage, complexity of calculating environmental data in monetary equivalent, lack of information.

2. As a more effective indicator of sustainable development there can be used an indicator of "genuine savings", which was suggested by the World Bank. This indicator shows the gross domestic savings and contains more specific accounting of consumed natural resources. The content is simple: the prolonged low rates of genuine savings characterize an unstable type of development and ultimately will lead to a deterioration of living standards.

3. Human Development Index (HDI) helps to evaluate the average achievements level of the country by three trends regarding human development:

- longevity, which provides healthy lifestyle and is determined by the degree of life length expectancy of human at birth;
- knowledge, defined by measure of literacy of the whole adult population and gross combined ratio, which was received by primary, secondary and higher educational establishments;
- adequate standard of living, which is measured by gross domestic product per person of the state according to purchasing power parity (PPP) in US dollars.

Such composite index of human potential contributes to the conformity assessment of the current situation and is the benchmark, expressed by certain values of indicators of human development and changes over time.

4. In the world there are active attempts to define the integrated aggregate indices, which are primarily based on environmental indicators and are closely related to the conservation of biodiversity. High biodiversity causes stability and productivity of ecosystems. Different types, penetrating into certain ecological niches, lead to a more complete and efficient use of resources. Fuller use of natural resources is able to counteract biological invasion. Competition for natural resources between different types helps to achieve their more effective use.

This includes aggregated index of "living planet" (LPI) (Living Planet Index), which is used to evaluate the ecosystems of our planet and is calculated within the report of the World Wild Fund each year.

With Living Planet Index there is measured the natural state of forests, marine and aquatic ecosystems and the following indicators are defined as the average value: number of animals in the forests, marine and aquatic ecosystems, where each one reflects changes during the certain period of time.

5. An indicator “The Ecological Footprint” (EF) reflects pressure on the nature and measures extent of consumption of food and supplies by the population in terms of productive land area and sea areas. These areas are needed to produce these resources and to absorb waste. Energy consumption measuring is performed in equivalents of the area, which is necessary to limit CO2 emissions. Use of the EU method helps to compare the actual pressure on the nature by society and the level of available natural reserves. Scientists have calculated that today the actual pressure of the population of the whole planet is 30% larger than its potential opportunities [].

6. Scientists from Columbia and Yale Universities have offered environmental sustainability index (2005 Environmental Sustainability Index). The index is determined by 22 indicators. Each indicator is defined with average value of 2-5 variables of 67 total.

The authors believe that the index allows to:

- conduct performance of environmental policy evaluation results;
- compare the countries by the degree of environmental sustainability;
- provide information about the best results;
- correlate economic growth and nature protection level;
- promptly identify countries with high environmental risk.

7. An indicator “health of population” describes the spread of diseases, caused by ecology. The most expressed is the dependence between the environment, intestinal infections and respiratory diseases. Respiratory diseases affect mostly children, therefore there is provided an indicator of infant mortality, defining mortality according to the standard classifications of diseases on 100 thousand children of 0-14 years old. It should be noted that the mortality rate from various intestinal infections is calculated for the whole population.

8. Using the Genuine Progress Indicators and Index of Sustainable Economic Welfare there is established an adequate measure of the level of economic welfare, improved gross domestic product index on the basis of the external effects (Genuine Progress Indicator).

The aim of the Genuine Progress Indicator is to display those aspects of the economy that is beyond monetary processes. In particular, there was made an attempt to set the value of those functions that contribute to the economy development, but remain outside the monetary flow. Price is formed on costs in case of such function loss. However, quite subjective and controversial is aggregation of relevant functions into a single index.

Determination of international ranking is quite a convenient instrument for establishing the place of any state in the world system. The most important issue is the rating status for the new independent countries, including Ukraine. By assessing the competitiveness of Ukrainian economy there is applied methodology, which is designed to determine the Global Competitiveness Index (GCI).

This index contains 12 constituents of competitiveness, namely infrastructure, institutional environment, health and primary education, macroeconomic stability, higher education and training, level of the financial markets development, labour market efficiency, goods market efficiency, market size, technological readiness, innovations, complexity of business processes.

In order to calculate the GCI there are used statistical data, which are available to everyone, and the results of surveys and questionnaires of business leaders in the country.

Research results and recommendations

According to a study, recently published by the World Economic Forum (WEF), in 2015 Ukraine by the GCI took the 79th place out of 140 countries and lost three more positions during a year (in the previous ranking it took the 76th place) (Figure 1).

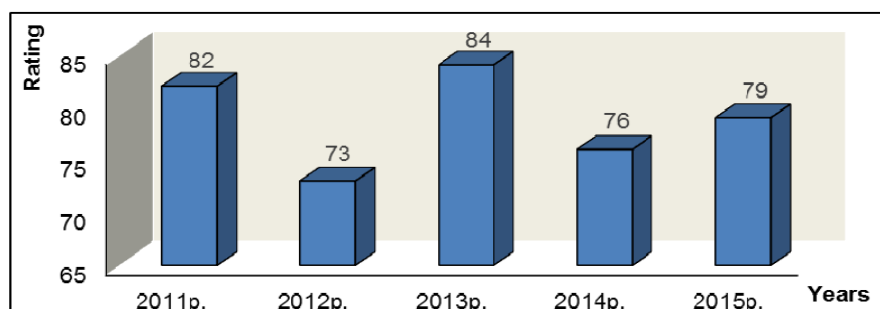


Fig.1. Dynamics of Ukraine's rating on the GCI in 2011-2015

This situation is explained by the complex social and economic processes of development and imperfect market mechanisms in all fields of national economy.

Based on the research it is advisable to outline the main directions of Ukraine's transition to sustainable development, namely:

- to match the legislative base;
- to strengthen the governance system at the regional level to implement decisions on sustainable development;
- to improve the monitoring system of sustainable development with scientific researches;
- to support innovation and high-tech sectors of economics;
- to ensure efficient production, focused on social needs;
- to carry out reforms in labour relations to resolve the issues of unemployment;
- to improve the level of social infrastructure: public health, culture and education;
- to ensure the functioning of the national economy in terms of greening, ensuring environmental protection;
- to access on global international cooperation.

In addition to the mentioned directions of sustainable development it is necessary to have good governance, public support and corruption liquidation.

Conclusions

Analysis of the indicators of sustainable development of Ukraine reveals the negative trends in key dimensions: ecological, economic and social. This situation leads to the necessity of development of new programs to overcome development challenges. In the process of sustainable development goals, objectives and indicators relevant for the future one must take into account global targets, principles of development, as well as public opinion. Especially, it is necessary to focus on intensification of work within the global partnership for economic growth.

References

1. Crouhy, M., Galai D., Mark R. (2012). *Risk Management*. New York: McGraw-Hill.
2. Dale, A., Newman, L. (2010). Social capital: a necessary and sufficient condition for sustainable community development? *Community Development Journal* Vol. 45, No 1. Oxford: Oxford University Press.
3. Arndt, Y. W. (1984). Economic Development: a semantic history. *Economic Development and Cultural Change*. Vol.29, No 3, pp. 457-466.
4. Аналіз сталого розвитку регіонів України. Світовий центр даних з геоінформатики та сталого розвитку. Retrieved from: <http://wdc.org.ua/uk/services>.
5. Брижань, І. А. (2013). Умови та чинники переходу України до моделі сталого розвитку. *Вісник Полтавської державної аграрної академії* 1, р. 128-133.
6. Вербіцька, І. І. (2013). Ризик-менеджмент як сучасна система управління ризиками підприємницьких структур. *Сталий розвиток економіки* 5, р. 282-291.
7. Гринеvsька, С. М. (2015). Перспективи сталого розвитку регіону. *Економіка промисловості* 4, р. 288 – 296.
8. Іщенко, О. В. (2014). Особливості країн-лідерів рейтингів сталого розвитку. *Вісник економічної науки України* 2, р. 27 – 31.
9. Мариненко, В. О. (2014). Вплив природних ресурсів України на сталий розвиток. *Науковий вісник Академії муніципального управління*. Серія: Управління. 3, р. 101-108.
10. Смачило, І. І. (2012). Методи управління сталим розвитком підприємства. *Економіка розвитку* 2, р. 115-120.

Received: 12 April 2017

Accepted: 11 October 2017