

## SUSTAINABLE DEVELOPMENT INDICATORS IN INDUSTRIAL VALUE CHAINS

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**Introduction.** The destabilizing processes of globalization taking place in the modern world economy require economic, social and environmental changes. Sustainable development indicators help track these changes which are studied every year and used to better understand the state of the country and further development in the future. This article explores indicators to assist stakeholders in assessing collectively progress in industrial value chains.

**Presentation of the main research.** Indicators are calculated based on a set of data and used for the exchange of scientific and technical information, which is very important for the development of society. It is worth noting that the world is actively developing evaluation criteria and indicators of sustainable development.

Sustainable Development declared in Rio de Janeiro as a program of Human Development Goals for the near future, is interpreted differently by scientists who define their main components depending on the emphasis on its components. In our opinion, in the modern world the Sustainable Development Goals (SDGs) are increasingly related to the economic sphere which is closely related to the environment.

As is well known, sustainable development is managed development. In particular, O. V. Pyrikov noted that the basis of this manageability is a systematic approach and modern information technologies that allow us to quickly model various variants of development directions, predict their results with high accuracy and choose the most optimal one (Pyrikov, 2013). To do that, however, it is important to define what indicators of sustainable development are in order to better understand and effectively calculate the current state.

A sustainable development indicator is an indicator derived from primary data that usually cannot be used to interpret changes, that allows you to judge the state or changes of an economic, social, and environmental variable in general. The main purpose of

introducing indexes is to assess a situation or event, to predict the development of the current situation and develop its solution (Lukyanenko, Karaeva, 2012).

Also, appropriate information support should be quite important for calculating data because it must meet such requirements, namely, have integrity, reliability, be controlled, have protection against unauthorized access, be flexible, standardized and unified, have the ability to quickly adapt as well as mandatory minimization of information input and output (Pyrikov, 2013).

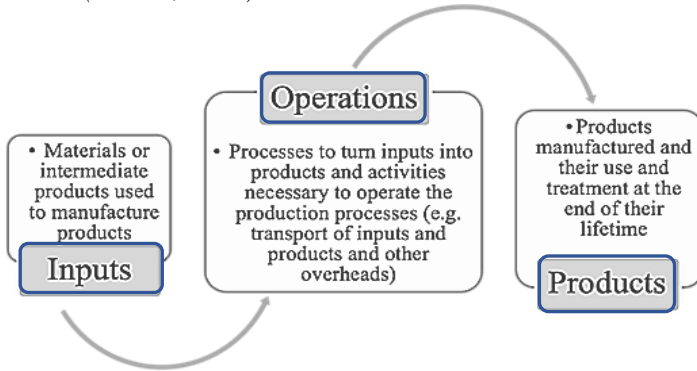
The need to develop indicators of Sustainable Development was noted in the «Agenda for the 21st century» adopted at the UN Conference. Including two main approaches to measuring the sustainability of development are shown. The first is to build a detailed program of indicators, each of which evaluates the solution of individual tasks in a set of Sustainable Development Goals. This approach has been implemented in the most common indicator systems of the Organisation for Economic Co-operation and Development (OECD) and the United Nations Commission on Sustainable Development (CSD). The second approach involves the use of a single integral index which according to a certain methodology, combines standardized indicators for assessing the state of various spheres of development (Palekhova, 2020).

However, it should be noted that integral indices are not so widely used for complex measurement of development constancy. As the experiences prove, the main difficulties of their construction consist in choosing a measurement system for quantitative and qualitative assessment as well as objectively determining the weight of indicators when aggregating them (Palekhova, 2020).

The Figure 1 indicates the basic interaction between a facility and the environment, and the impact it may have on the environment throughout the «lifecycle» of the products that it produces. Even though the actual production processes are far more sophisticated, environmental impacts are principally formed in the following three stages: inputs, operations, products (OECD, 2011). The OECD's sustainable production indicators are worth considering as the model presents and provides advice on eighteen of the most important and widespread quantitative environmental indicators in the three stages of production – input, operations and products.

**Figure 1**

*Basic relationships between manufacturing and the environment (OECD, 2011)*



These indicators will mainly help internal management and decision-making and can be used for all types of production. The Figure 2 shows the indicators that track water and energy consumption processes as well as greenhouse gas emissions to more accurately measure the impact of recycling technologies in value chains. Consequently, the value chain method helps enterprises better analyze its state, identify and systematize production operations for competitiveness and optimization. Of course, only after the project is completed can the sustained impact be measured.

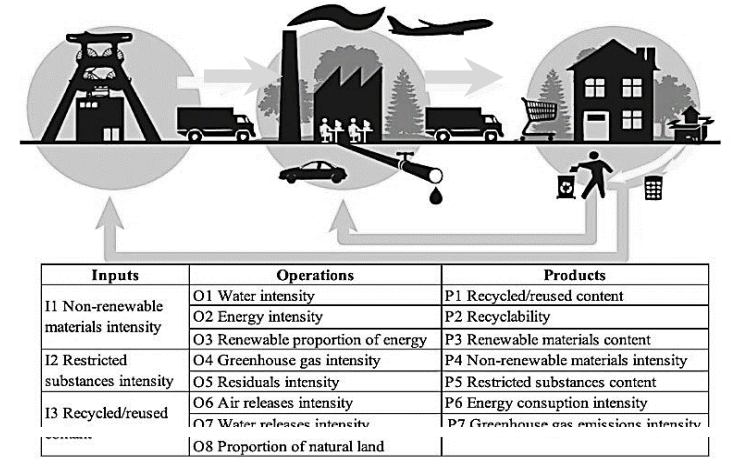
In addition, indicators are selected in such a way that they can characterize both long-term development results and current results and processes. The use of indicators allows you to track progress, identify and take measures to address the problems of the SDGs.

Businesses can assess what new business models to implement in order to advance towards the Sustainable Development Goals along the value chain. In manufacturing sustainable value creation plays an important role which is associated with economic, environmental and social obligations.

In addition, in order to identify policy choices, enterprises need to analyze what impact the external environment has and what gaps exist between the current state and the planned.

**Figure 2**

*Overview of the OECD Sustainable Manufacturing Indicators (Paliekhova, 2020)*



We agree with scientists (eg. Zajtzeva, 2018) who claim that the concept of sustainable development in its current form is largely a reflection of the complexity of society as a whole. Enterprise development is becoming more and more difficult to convert into profit indicators since it requires comprehensive problem solving in various areas within the economic, social, environmental challenges.

The turbulence of changes in the world leads to constant research and development of up-to-date indicators for effective calculation of the current state. After a certain period of time, analytical groups globally update information in accordance with the relevant targets and indicators for the achievement of the SDGs. For example, in March 2021, the 52-nd session of the UN static commission updated current information on the relevance of indicators and their level classification based on changes made by Inter-agency and Expert Group on Indicators SDGs for data transmission, tracking and other statistical purposes (SSDG Indicators, 2021).

**Conclusions.** The results of the theoretical study show that to diagnose the progress of the SDGs necessary to move on to the most

advanced and progressive measurement indicators with the help of which the work of sustainable development indicators in dynamics. The large number of indicators included in the system makes it difficult to use them in many countries due to the lack of necessary statistics. Despite this fact, it is the ease of use and transparency of indicators that helps to fully assess trends in the economic, social, and environmental development of society and outline positive stages on the way to sustainable development.

It has been shown that indicators of sustainable development are important guides for business development in value chains, including with regard to the choice of development strategies, products and markets. In order to consider the development of an enterprise as sustainable it is necessary to take into account not only the results of its economic activities and other benefits but also its role, mission, functions in certain value chains. The prospect of further research is a detailed analysis which should be based on publicly available indicators, and data from independent (private) centers for assessing sustainable development.

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