

CIRCULAR ECONOMY AS A BASIS FOR THE TRANSITION  
TO SUSTAINABLE DEVELOPMENT

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The article is devoted to the circular economy as an alternative to the linear economy in the implementation of the concept of sustainable development. The main business models that meet the principles of the circular economy are considered. The evolution of views on the theoretical foundations of the circular economy is shown. The best practices of companies implementing the principles and goals of sustainable development are highlighted.

The implementation of the UN Sustainable Development Goals is aimed at replacing the outdated model of production and consumption with a new sustainable model – a circular economy, or a closed-loop economy. The circular economy is based on the principles of rational use of resources and limitation of harmful effects of production and consumption on the environment. When studying the circular economy, the key concepts are biogeochemical cycles and cycles of secondary use of products and waste.

The idea of a secondary The use of products is related to the circulation of resources. The concept of «waste as food» has become the basis of the circular economy, in which waste from one production process is used as raw materials in another production process. Today, the circular economy is considered as an

alternative to the classical linear economy, which operates on the principle of «production – use – utilization». There are the following types of business models that meet the principles of the circular economy:

a model of circular value chains in which limited resources are available they are replaced by fully renewable ones;

restoration and recycling – a model in which technological innovations allow the restoration and reuse of natural resources;

a model for extending the life cycle of a product through repair, restoration or remarketing, which is based on the transition from selling things to providing services for their use;

shared consumption and use – a sharing model based on providing access to goods or assets with a low utilization rate;

product as a service – a service model in which customers pay companies rental of goods or property with payment upon use.

The very idea of the need to switch to a circular economy is not new. Back in the nineteenth century, the idea of industrial metabolism was put forward, in which the economy was considered as a single large «organism» for which food is waste. Later, these ideas were developed in the works of other scientists. The emergence of the modern concept of a circular economy is associated with K. Boulding, who wrote in 1966: «The Earth has turned into the only spaceship on which there are no unlimited reservoirs, so man must find his place in a cyclical ecological system» [1] In the 1970s of the 20th century, Walter Stahel and Genevieve Rede were the first to scientifically formulate the idea of «transition to a «cyclical» (circular) economy and saw it as an alternative to the existing linear model of constant resource-consuming development [2].

In the 80s, industrial ecology developed rapidly, studying the impact of industrial production on the biosphere, the foundations of which were laid by Robert Ayres in the article «Industrial Metabolism» (1989) and developed By Robert Frosh and Nicholas Gallopoulos in their article «Production Strategies» (1989) [3, 4].

At the same time, a scientific school began to form, giving priority to the social

factors of the transition to a circular economy, considering that the social aspects of sustainability have not been sufficiently studied. This is how the socio-ecological direction in the closed-loop economy appeared. In 1999, the book by P. Hawkin and A. and L. Lovins «Natural Capitalism: Creating the Next Industrial Revolution» (Natural Capitalism: Creating the Next Industrial Revolution), in which the authors criticize traditional industrial capitalism, justifying its inconsistency by the fact that this concept neglects the values of the largest reserves that it uses – natural resources and living systems [5].

Michael Braungart and William McDonagh in the book «Cradle to Cradle: Remaking the Way We Make Things» develops the principles of circular economy, calling them «Cradle-to –cradle» (Cradle-to-Cradle) [6].

Since that time, the book has been considered a kind of instruction on the implementation of the C2C model, and the term has become a trademark of McDonough Braungart Design Chemistry (MBDC). MBDC later patented a product certification system based on the C2C principle. The idea of the Cradle-to-Cradle principle is a biomimicric approach to production, which considers the safe circulation of natural and industrial resources within the entire natural system, perceiving all its elements as nutrients. According to the C2C principle, all resources involved in the production process must have a continuous life cycle.

The next stage in the development of the theory of circular economy is considered to be the appearance in 2010 the year of the book «Blue Economy» (Blue Economy) by Gunther Pauli, dedicated to the problems of the state and future of the World Ocean [7].

The strengthening of the role of social factors, changes in consumer behavior and psychology of the new generation Z, led in the first decade of the 21st century to the formation of a shared consumption economy within the framework of the development of the idea of a closed-loop economy. The stages of the formation of the theory of circular economy confirm the commonality of the idea linking all the above-mentioned teachings, and show at what stage the previously missing link appeared in this concept, which is based on rational behavior and social responsibility

not only of business, but also of consumers.

According to a report by the Ellen MacArthur Foundation and the Stockholm-based Material company Economics, 45% of emissions are related to the production of products, while actions for The achievements of carbon neutrality are often aimed only at «green» energy, which is already insufficient today. The report says that the application of cyclical principles in only five key areas – the production of cement, aluminum, steel, plastic and food products can eliminate almost half of emissions – 9.3 billion tons of equivalent by 2050, which is equivalent to reducing existing emissions from all transport to zero.

The Ellen MacArthur Foundation recommends that international organizations include the transition to a closed-loop economy in the agenda, and countries in national strategies, form the necessary infrastructure, create appropriate innovations, use political levers and tax incentives to extend the life cycle of goods.

Today, the market share of cyclical business models is small, they have become most widespread only in some narrow economic niches. For example, the principle of reuse of raw materials is widely used in the steel industry and in the automotive sector. Many elements produced at automotive enterprises are made of universal materials that can be successfully reused. It is worth noting that the manufacturing industry, including the automotive industry, is responsible for the emission of about 19% of all greenhouse gases into the atmosphere. According to a report by Accenture, the automotive industry is at the beginning of the transition to a circular economy, but by 2035, leading automotive giants are setting goals to implement the principles of a closed-loop economy. As a result, carbon dioxide emissions in this sector could be reduced by as much as 75%.

## References

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