

Closed cycle economy is an effective model of country development

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Abstract. A circular economy is a system in which resources are redistributed or reused and waste becomes raw material for further production. This is due to urbanization, climate change, soil pollution, progress, and the use of limited natural resources. To meet growing needs, intensive support and the political development of business remain priority goals for countries around the world. The goal of scientific research is a “closed loop” economic model. In the study, the authors reveal its essence, characteristics, properties, and relevance in the present. The model is closely related to the ecosystem. The article analyzes the interaction between environmental protection and economic efficiency, drawing an analogy with other countries. The objects of the study are the features of the implementation of the circular economy at the macro, meso, and micro levels. The need for and prerequisites for the transition to closed-cycle technologies are studied. In their conclusions and proposals, the authors describe the possibilities of practical use that have a positive effect on the country’s economy.

1 Introduction

The transition from a linear economy to a circular economy is of great interest, not only from environmentalists but also from the public, business, government, etc.

The concept of “circular economy” arose relatively recently and gained popularity in the late 2000s. The circular economy, otherwise known as the circular economy, is a model of production and consumption based on the renewal of resources. For the first time, this model was used by countries such as China, France, Holland, and Germany to achieve the goal of sustainable development and consider the urgency of such problems as global warming, increasing world population, consumption, waste, poverty, etc. This circular economy institute is a new economic model based on the principle of an ecosystem with the further acquisition of independence of economic growth from the problems of depletion of natural resources through the creation of innovative products, services, business models, and innovative public policies. One of the main tasks of the circular economy model is to change the linear model of the economy and its principles.

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Figure 1 shows a diagram of the change from a linear economic model to a closed-cycle model. As can be seen from the diagram, it is necessary to consume fewer natural resources and energy sources and use them more rationally. In this situation, waste becomes new resources for creating a closed cycle. (fig.1).

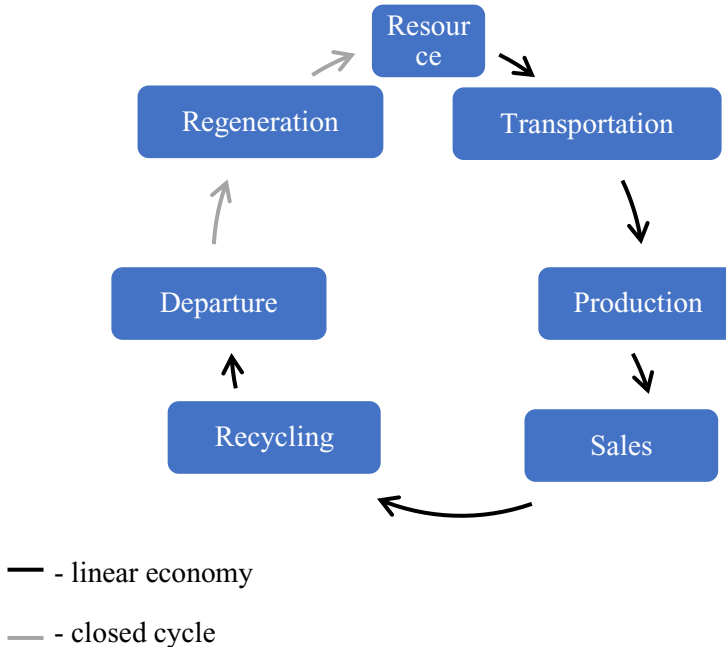


Fig. 1. Transition to a closed loop model.

The characteristics of a circular economy are:

- 1-use of renewable energy.
- 2-creation of circular production cycles, without waste accumulation (resources are transformed into new goods without leaving the production cycle);
- 3-increasing the service life of technical products through maintenance, modernization, reuse or repair.

The objectives of the circular economy are:

- 1) searching for a rational method of using resources, optimizing business entities.
- 2) ensuring a stable production cycle for efficient use of existing capacities.
- 3) maintaining the rate of economic growth.
- 4) development of other sectors of the economy (GDP volume, filling the labor market, etc.)

2 Literature review

The circular economy as a concept began to emerge in the 1960s and 1970s. One of the first scientists to focus on the importance of rational environmental management was M. Gandhi and J. Kumarappa. In 1948, they put forward the ideas of a binomial economy, which meant the economy of constancy and peace, environmental protection, and the efficient use of natural resources without disrupting natural cycles [1].

The followers of this theory were G. Hardin (“The Tragedy of the Commons”), P. Ehrlich (“Population Bomb”), N. Georgescu-Rogen (“The Law of Entropy and the Economic Process”), M. Bookchin (“Ecological Sociology”), and D. Meadows (“Limits to Growth”).

The works of these scientists described demographic balance, rational use of natural resources, and the development of methods for analyzing the global environmental crisis. Their studies stated that overpopulation leads to global environmental problems and has negative impacts on the environment, such as deforestation, degradation of agricultural land, increased production and consumption waste, etc.

In 1960, V. Papanek was the first to point out that product design can be used as an economic tool. Product design, he said, should include social, ethnic, and environmental aspects. This approach gave impetus to the development of eco-design, which solves two main goals: preventing waste generation and improving material management [2].

1. Schumacher, a Western scientist, noted in his work “Small is Beautiful” that “we must fully understand the problem and see the possibilities of developing a new way of life—a way of life designed for constancy.” By this, he meant increasing soil fertility, producing environmentally friendly products, and having minimal negative impact on the natural environment. He categorically rejected inorganic economic growth, saying that this trend threatened nature and “the ability of the environment to cope with the expected degree of interference” [3].

The first to formulate the term “cyclic ecological system” was K. Boulding. In his work “The Economics of the Future Spaceship Earth,” he stated that planet Earth has limited resources and nature cannot completely absorb pollution, thereby calling on humanity to develop measures to prevent shortages of raw materials. Boulding envisioned the world economy as an open linear system that is aimed at constant production and consumption of waste [4].

Already at the beginning of the 21st century, the developments of scientists, theories, and methods of the “circular economy” began to be introduced into the country’s politics. Based on the work of scientists, the European Commission in 2015 introduced the concept of the circular economy, which is an economy where the value of products, materials, and resources is preserved for as long as possible and waste generation is minimized [5-23].

3 Methodology

General scientific methods and methods were taken as the basis for the research. Empirical, practical, and statistical methods of analysis were used. One of the effective methods was the method of comparison with other foreign countries, which allows us to most clearly see the entire overview and difficulties of the transition to a circular economy.

4 Result and Discussion

There are four tools to achieve the goals of the circular economy:

- Eco-design draws attention to environmental protection when creating design throughout the entire life cycle of a product. This mainly applies to packaging and industry.
- Functional Economics: This concept of economics emphasizes the sale of a limited set of property rights to a product. This economic concept is based on two principles: searching for new ways to optimize the resources used and selling services. By optimizing the long-term use of a product, it is possible to increase revenue.
- Industrial symbiosis implies the relationship between enterprises to optimize production costs using waste and by-products by a partner enterprise, as well as the joint consumption of information, energy, water, and other resources.
- The green economy is aimed at preserving the well-being of society through the rational use of natural resources and, primarily, through the rational distribution of exhaustible resources.

The principles of the circular economy are:

1. Reduce waste generation. This step must be taken when creating a product, considering the amount of waste when the product is released. This step will reduce environmental pollution.

2. Maximum extraction of valuable properties from the used product. It's worth thinking about how to make the most of waste and put it to good use. This refers to the concept of the 3 R: Reduce (waste reduction); reuse (reuse); recycle (recycling).

3. Development of a separate waste collection system. It is worth paying due attention to the separate collection and transportation of waste. This step will minimize costs at the sorting station.

- 4-Ecosystem restoration. Don't forget about natural capital; for example, switching to a closed water cycle is more effective than taking water from natural sources and then discharging wastewater into water bodies, using scrap metal in production, or using food waste as organic fertilizer.

4.1 Foreign experience in implementing the "Circular Economy"

Netherlands. The Dutch government has a project called "Circular Economy in the Netherlands by 2050," according to which the use of resources will be reduced by 50% by 2030 and, by 2050, completely transition to a waste-free circular economy. Since 2018, government buildings have been built to be zero-emission and contain large amounts of recycled materials and resources. In 2019, the Het business support network project was launched. Versnellingshuis Nederland Circular 6 is based on cooperation between government agencies and business agencies. Participants share experience and knowledge in the field of the circular economy and work on industry transitions.

France. In 2018, France approved the Circular Economy Roadmap, which included 50 measures for a 100% circular economy on the main priorities: better production, better consumption, better waste management, and inclusion of all stakeholders. In 2020, the Waste Control Law was adopted, the purpose of which is to eliminate waste and pollution and transform the production and consumption distribution system from a linear economic model to a circular model. One important step is to phase out plastic packaging, thereby completing the phase by 2040.

Germany. Germany was one of the first to take the path of a circular economy. In 1996, the "Closed Cycle Substances and Waste Management Act" was passed, the basic principle of which was "prevention, then recovery, then disposal." In 2012, the Program for the Efficient Use of Resources was adopted, which highlighted the main areas: supply of raw materials, production, consumption, construction, information and communication technologies, cross-cutting tools including research, innovation, education, and legal framework. National was adopted in the 2016 Program for Sustainable Consumption, and in 2017 the Competence Center for Sustainable Consumption was created. All this has a positive impact on sustainable consumption and stimulates discussion about lifestyles and changing values.

Italy. Italy has been complying with the Green Deal since 2020, which provides for the creation of an investment fund to promote innovative projects in the fields of sustainable development, circular economy, and sustainable tourism. Italy has a high level of environmental management and auditing and ranks second in ecolabels in the European Union. Also, since 2020, strict environmental labeling standards have been introduced, and manufacturers use codes to indicate the type and quantity of packaging materials used to facilitate identification and classification, reuse, disposal, and recycling of packaging,

providing consumers with information on the correct treatment of waste after the expiration date.

Japan. In 2000, the government adopted the “Basic Law on the Establishment of a Circular Society,” and in 2003, the Fundamental Plan for the Establishment of a Sustainable Material Cycle Society was adopted, all of which formed the basis for the development of a regulatory framework for a circular economy. The main levers are complete recycling of resources throughout the entire life cycle, regional activation through the formation of circular and ecological systems, recycling, and restoration of resources and the environment. In 2020, the Circular Economy Concept was announced, stimulating the development of digital technologies, the transition to new business models with high circularity, and increasing the efficiency of resource use. A strategy for the circulation of resources for plastics was also developed, which was aimed at solving the problems of waste from single-use plastics.

China. In 2021, the Circular Economy Development Plan for the period 2021–2025 was approved, the main goal of which is to increase resource productivity by 20% through the construction of a municipal waste disposal system, the development of a recycling park, the fight against plastic pollution, the recycling of used batteries, etc. The most striking example of a circular economy is a battery recycling company. The company recycles more than 10% of all used batteries, extracting nickel and cobalt to create chemicals that can be used to make new electric vehicle batteries.

Uzbekistan. Uzbekistan is on the path to developing a circular economy. In 2019, the “Strategy for the Management of Municipal Solid Waste in the Republic of Uzbekistan for the Period 2019–2028” was approved, the goal of which is to create a productive and modern system for processing municipal solid waste. The strategy provides for achieving target indicators, ensuring the recycling of at least 60% of generated solid waste, increasing the volume of processing of specific solid waste to 25%, and reducing the volume of solid waste sent for disposal to landfills to 60%.

Today, in the Republic of Uzbekistan, there are more than 183 enterprises processing solid household waste, with a total processing capacity of 894 thousand tons per year. In nine cities of the Republic, clusters with a processing capacity of more than a million tons per year have been formed based on the sorting of incoming solid waste to extract secondary material resources and their processing. Since March 2021, a system of separate waste collection has appeared in the city of Tashkent, in accordance with the decree of the President of the Republic of Uzbekistan dated December 15, 2020, “On measures to improve activities in the field of handling household and construction waste in the city of Tashkent.”

On August 11, 2022, the Decree of the President of the Republic of Uzbekistan “On priority measures to reform the waste management system” was adopted for business entities—sanitary cleaning enterprises. Deductions of 5% of the fee charged for the provision of sanitary cleaning services to the Republican Association of Specialized Sanitary Enterprises were cancelled. cleaning and to centers for organizing sanitary cleaning services. And, for enterprises operating in the field of handling household, construction, and medical waste, benefits have been extended until August 1, 2025, providing for exemption from customs duties on imported special equipment, technological equipment, and components imported from outside the country.

The transition to a circular economy is a very responsible and serious step. During the transition, rely on political and economic instruments.

5 Conclusion

In conclusion, it can be noted that the circular economy is a new economic model that provides for the rational use of natural resources, waste recycling, etc.

Country policies should be aimed at providing comprehensive support for participants in the economic sector, complying with all requirements for the rules of transition, and maintaining a circular economy. It is necessary to introduce benefits that motivate organizations to achieve a common global goal.

Based on the results of the study, the following conclusions were drawn:

1) Approaches to sustainable development of the agricultural sector are constantly in motion, in the conditions of modern scientific and technological progress, to improve people's living standards, achieve environmental improvements, and preserve the ecosystem and its resources.

2) It is necessary to smoothly transition from the traditional model, which is resource-intensive and environmentally destructive.

3) The circular economy will create not only new products but also jobs and provide new economic opportunities that can become the social basis of sustainable development.

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