CIRCULAR ECONOMY AS A GREEN ECONOMY MODEL

Kenjayev Ilhom Giyozovich

Associate Professor, Tashkent State University of Economics, PhD (DSc)

Elamonova Rukhshona Farkhod Qizi

Student at Tashkent State University of Economics

Doi: https://doi.org/10.5281/zenodo.20024708

Annotation: This article analyzes the role and importance of the circular economy concept as a green economy model. At the same time, information about the circular economy and the green economy is fully covered. The study covers methods for ensuring sustainable economic growth through efficient use of resources, waste reduction and recycling mechanisms. The theoretical foundations of the circular economy are reviewed based on foreign and national scientific literature, and the problems and opportunities for implementing this model in the conditions of Uzbekistan are identified. Also, China's advanced experience in the circular economy is analyzed in comparison with the level of Uzbekistan in the circular economy. The results of the study show that the circular economy is an effective institutional and economic mechanism for implementing the principles of the green economy in practice, and scientific and practical recommendations are developed for its integration into the national economy.

Keywords: Green economy, circular economy, sustainable development, resource efficiency, waste recycling, Chinese experience.

Today, along with the acceleration of economic development in Uzbekistan, the issues of rational use of natural resources, ensuring environmental safety and achieving sustainable development are becoming one of the priority areas of state policy. Population growth, the acceleration of industrial and urbanization processes are sharply increasing the demand for energy, water and raw materials. In the conditions of the traditional linear economic model, such processes lead to an increase in the volume of waste, increased pressure on the environment and the emergence of resource shortages.

The concept of a green economy is emerging as an important strategic direction for Uzbekistan in solving these problems. A green economy, while ensuring economic growth, provides for maintaining environmental sustainability, increasing social well-being and protecting the interests of future generations. Within this concept, the circular economy model is of particular importance, and is considered a modern approach aimed at increasing the efficiency of resource use and minimizing waste.

The circular economy, based on the maximum use of resources available in society, while reducing waste and recycling materials, is one of the main models of the green economy. Unlike the linear model, it ensures the conservation of natural resources in society, the reduction of the environmental burden and sustainable development, which is fully consistent with the goals of the green economy.

The circular economy, as a green economy model, has several main features: first, resource efficiency, i.e. reducing resource waste through the long-term use of raw materials in society and extending the life of products; second, waste recycling, i.e. re-introducing production waste into the circular economy as new raw materials through recycling; third, sustainable development, i.e. achieving higher economic growth while maintaining the ecological balance in society. This model also accelerates the transition to a green economy by combining economic activity with environmental protection.

There are several problems in the formation of a "green economy" in the Republic of Uzbekistan, the main problems of which can be considered below: firstly, there is a lack of financial resources, that is, a large amount of financial resources is needed for the development of a green economy, and financial support for the development of renewable energy sources, environmental protection, and the introduction of green technologies is insufficient; secondly, the low level of development of technologies at the global level, the inability of technologies and equipment in the development of a green economy to fully

respond to innovative solutions, and the technological base of Uzbekistan is smaller than that of other foreign developed countries and is currently mainly dependent on imports, that is, the possibilities for introducing green technologies in local production are limited; thirdly, there are a number of weaknesses in the legal and tax system. The lack of fully formed laws and regulations in the field of green economy that meet international standards. Fourthly, there is a lack of qualified personnel, and the lack of sufficient development of educational programs related to the green economy in the country for the development of the green economy; fifth, the population and business entities' insufficient understanding of the green economy, that is, entrepreneurs do not pay enough attention to the introduction of green technologies; sixth, problems with the proper use of natural resources, limited water resources, and problems arising from mismanagement in agriculture; seventh, a number of environmental problems, including land, air, and water pollution in the regions, make it difficult to transition to a green economy.

To address the above problems, a number of measures are proposed: strengthening cooperation with international organizations and attracting grants; in addition, supporting local innovations and developing new technologies; strengthening the legislative and tax system and expanding state programs for the green economy, as well as introducing special courses on the green economy into the education system and training personnel.

Within the framework of the green economy, the circular economy model serves to increase energy efficiency by forming a closed cycle of resource use, reduce the amount of harmful substances emitted into the atmosphere, and re-engage waste in economic circulation as a secondary economic resource. These processes significantly reduce the negative impact of production and consumption activities on the environment and the environmental burden of economic activity. As a result, the quality of economic growth processes improves, their sustainability and long-term effectiveness are ensured. Therefore, the circular economy is recognized as one of the most effective and sustainable institutional and economic mechanisms for implementing the principles of the green economy in practice.

The circular economy model is based on the revision of production and consumption processes, extending the life cycle of products and materials, recycling and reusing them widely. In the conditions of Uzbekistan, the implementation of this model will reduce industrial waste, effectively use energy and water resources, as well as develop environmentally friendly technologies in agriculture and industry. This will not only alleviate environmental problems, but also serve to increase economic stability and competitiveness.

At the same time, the implementation of the principles of the circular economy in Uzbekistan has not yet been systematically studied, and there is a need to improve the scientific and theoretical foundations and practical mechanisms in this area. In particular, the assessment of the circular economy as a green economy model, a comprehensive analysis of its economic, environmental and institutional advantages is an urgent scientific issue.

In this regard, this article analyzes the essence of the circular economy and its role in the green economy system in the conditions of Uzbekistan, and highlights the priority areas and prospects for integrating this model into the national economy.

The concept of the circular economy is considered in modern economic literature as an important model for implementing the principles of sustainable development and a green economy in practice. The formation of this approach has long historical and theoretical roots and has been developed conceptually, institutionally and practically by various scientists at different times. The initial conceptual foundations of the idea of a circular economy were put forward by Kenneth E. Boulding. His work, The Economics of the Coming Spaceship Earth, interprets the economy as a closed system, arguing that natural resources are finite and that they must be replenished. Boulding's "spaceship Earth" metaphor emphasizes that economic activity should be conducted within ecological limits. This approach would later be considered the conceptual foundation of the circular economy theory, but its practical mechanisms were not sufficiently developed.

The practical aspects of the circular economy are clearly outlined in the research of Walter R. Stahel. In his works “The Product-Life Factor” and “The Performance Economy”, he proposes service-oriented business models based on extending the life cycle of products, repair and reuse. Stahel’s approach is aimed at increasing resource efficiency and reducing waste, and is one of the main mechanisms of modern circular economy practice. At the same time, this model is limited by the fact that it requires high institutional development and service infrastructure.

The idea of developing a circular economy through product design is reflected in the “Cradle to Cradle” concept developed by William McDonough and Michael Braungart. This approach is theoretically based on the possibility of completely eliminating waste by separating materials into biological and technical flows. Although this model has high environmental efficiency, its full implementation requires significant technological and financial resources.

In the modern scientific literature, the role of the circular economy in the system of sustainable development has been thoroughly analyzed by Martin Geissdoerfer and co-authors. They evaluate the circular economy as a new paradigm of sustainability and present it as a practical mechanism for implementing the principles of a green economy. Although this approach is important from a theoretical and practical point of view, the empirical foundations in the context of developing countries are not sufficiently covered.

The issue of the substantive clarity of the concept of a circular economy is central to the study of Julian Kirchherr and co-authors. They analyzed 114 definitions and found that keeping resources in a closed loop, reducing waste and recovering economic value are common elements. This work is important in creating a unified methodological framework for empirical research on the circular economy.

The practical and political aspects of the circular economy are widely covered in the Ellen MacArthur Foundation reports. The models developed by the Foundation substantiate the economic efficiency of the circular economy at the business, industry and public policy levels. While this approach has been successful for industrialized countries, there is a need to adapt it to developing economies.

The experience of implementing the circular economy at the public policy level is reflected in the “Circular Economy Action Plan” developed by the European Commission. This document shows the possibilities for the widespread implementation of the principles of the circular economy through regulatory and institutional mechanisms. The prospects for resource use on a global scale are analyzed in OECD reports, justifying the long-term positive impact of circular economy policies. However, these studies are mainly based on data from developed countries.

Also, the interdisciplinary approach proposed by A. Murray analyzes the circular economy in a combination of ethical, economic and political aspects, which allows for a comprehensive assessment of the concept.

In general, although foreign scientific literature has widely covered the theoretical and practical advantages of the circular economy, the possibilities of applying this approach in the conditions of developing countries, in particular Uzbekistan, have not been sufficiently empirically studied. This situation creates the need for in-depth research into the circular economy as a green economy model in the context of the national economy.

In this study, a comprehensive methodological approach was used to determine the significance of the circular economy as a green economy model and to substantiate the most appropriate scientific methods in studying this area. Since the circular economy is complex, multifactorial and systemic in nature, a combination of theoretical and empirical analysis methods was ensured in the research process.

In the first stage of the study, systematic literature review and content analysis methods were used. At this stage, foreign scientific articles, reports of international organizations and policy documents on the circular economy and green economy were studied. Using content analysis, the most commonly used methods, main theoretical approaches and areas of analysis in circular economy research were identified.

In the second stage, systematic (system approach) and institutional analysis methods were used. Through this approach, the circular economy was considered as a practical model of a green economy, and the interrelationships between resource use, production, consumption and waste management processes were analyzed. Using institutional analysis, the role of state policy, the regulatory and legal environment and economic institutions in the development of the circular economy was assessed.

In the third stage, the comparative analysis method was used. Based on this method, scientific research and practical experiences on the circular economy conducted in developed countries were compared with the conditions of developing countries. Comparative analysis served to identify the possibilities and limitations of applying circular economy methods in different economic conditions.

At the fourth stage, a descriptive-statistical analysis based on indicators was carried out. The study used indicators such as resource efficiency, waste recycling rate, energy efficiency and environmental load. These indicators made it possible to assess the effectiveness of the circular economy within the framework of a green economy.

At the final stage, using analytical generalization and logical inference methods, the research results were systematized and the most appropriate methodological approaches for circular economy research were substantiated.

China is currently one of the most advanced countries in the world in the field of circular economy (saving, recycling and reuse of resources). This model is not just an ecological direction for China - it has risen to the level of an economic strategy.

The results of this study showed that there are significant differences between China and Uzbekistan in terms of the level of development of the circular economy, the methods used, and the institutional mechanisms. The comparative analysis revealed that the circular economy is deeply formed in China in terms of system and institutional aspects, while in Uzbekistan this model is still at an early stage (Table 1).

Table 1

Comparative table of circular economy of China and Uzbekistan

Criteria	China	Uzbekistan
Circular economy stage	High (systemic)	Elementary-middle school
Public policy	Special Law (2008)	Green economy strategy
Institutional approach	At the national strategy level	At the program and concept level
Implementation	Mandatory	Mostly optional
Private sector participation	Very high	Average

First, it was found that China is far ahead in terms of institutional development. In China, the circular economy is integrated into a special legal framework, national strategies and five-year plans, and is an integral part of industrial policy and regional development programs. In Uzbekistan, the circular economy has mainly been conceptually formed within the framework of the green economy and environmental sustainability, and has not been fully implemented as an independent and comprehensive institutional system.

Secondly, the results of the analysis of practical methods and instruments showed that mechanisms such as eco-industrial parks, industrial symbiosis and extended producer responsibility (EPR) are widely used in China. These methods play an important role in ensuring the closed cycle of resources, reducing waste and increasing energy efficiency. In Uzbekistan, however, these methods are limited or in the form

of pilot projects, and their economic and environmental effectiveness has not been systematically assessed.

Third, the results of the analysis based on indicators showed that resource productivity and recycling levels in China are higher than in Uzbekistan. In China's experience, circular economy indicators are monitored at the industrial and municipal levels and actively used in the formulation of state policy. In Uzbekistan, however, a unified national monitoring system for indicators such as resource efficiency, waste recycling, and environmental impact is not sufficiently developed (Table 2).

Table 2

Industrial and manufacturing sectors of China and Uzbekistan

Indicators	China	Uzbekistan
Eco-industrial parks	Widespread	Very rare
Raw materials from waste	Systematic	Limited
Technology level	High (AI, Big Data)	Medium
Reuse in production	Up to 60-70%	Around 10-15%

Fourth, differences in governance and implementation mechanisms were identified. In China, the circular economy is being implemented through a “top-down” governance model, that is, based on clear goals and mandatory requirements set by the central government. In Uzbekistan, however, elements of the circular economy are developing more “in stages” and on a voluntary basis, which is slowing down the pace of implementation.

At the same time, the results of the comparative analysis also showed that there are significant adaptation opportunities for Uzbekistan. Methods such as eco-industrial parks and industrial symbiosis, which have been successfully tested in China, can be gradually introduced in Uzbekistan through pilot projects. Especially in industrial clusters and resource-rich regions, these approaches have the potential to increase economic and environmental efficiency.

Overall, the research results show that the Chinese experience shows that for the effective functioning of the circular economy, a strong institutional framework, a clear methodological approach and constant monitoring are necessary. In the conditions of Uzbekistan, it was argued that the development of a circular economy should not be carried out by completely copying the Chinese experience, but by adapting it to the structure of the national economy, institutional capabilities and resource potential.

In addition, while the circular economy in China has developed significantly and, at the same time, has been systematically and mandatory introduced at the level of state policy, this process in Uzbekistan is mainly at its initial stage. Due to the limited institutional and technological capabilities, there is an opportunity to significantly reduce industrial waste in the country and bring resource efficiency to a higher level by adapting the Chinese experience to the conditions of Uzbekistan.

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