

Functioning of Economic Systems in the Context of Their Potential Development in the Conditions of Circular Economy

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Abstract

The purpose of the article is to analyze the functioning of economic systems in the context of the development of their potential in a circular economy.

It is determined that the functioning of economic systems to ensure their sustainability should meet modern challenges and provide for the formation of competitive institutional architecture, the introduction of structural and regulatory innovations, the transition to an innovative model of development. The specific principles of functioning of economic systems include openness, nonlinearity, multivectority, dynamism, emergence, uncertainty about the development of economic processes. It is substantiated that the linear nature of development and equilibrium are not dominant in the functioning of economic systems, and increasing the level of economic efficiency should go hand in hand with minimizing the activities of enterprises, which necessitates the use of circular economy. The main prerequisites for the transition to a circular economy are analyzed. It is determined that the basic concept of the circular economy involves the development of a system of production and consumption, which is based on processing, reuse, repair, product sharing, change of consumption patterns and new business models and systems.

The main elements of the circular economy include: a closed cycle, the use of renewable energy sources, systems thinking. The correlation of the principles of sustainable development and the peculiarities of the application of the circular economy is analyzed. It is determined that the circular economy contrasts with the traditional linear economic model, which is based on the model of "take-do-consume-throw away". The advantages and disadvantages due to the use of the principles of circular economy are given. Based on the study, steps are identified to accelerate the transition from a linear economy to a circular economy.

Key words:

economic system, potential, production model, circular economy, linear economy, closed cycle.

1. Introduction

The current stage of socio-economic development is characterized by instability in the economic, social and environmental spheres, which requires the formation of new paradigms for the study of economic processes. In this context, the functioning of the economic system,

which is an open dynamic system, the characteristic feature of which is to ensure its sustainable operation, which provides for the interdependence of all components aimed at achieving goals, requires the development of a new development model. Today, the issues of economic system development are relevant, which would provide a balanced integration of economic development and environmental management. Since economic growth in traditional economic conditions causes a significant burden on the environment, there is a need to study the principles of the circular economy in order to stimulate economic growth.

Analysis of recent research and publications. In modern conditions of transformation processes, the study of the peculiarities of the functioning of economic systems in a circular economy is extremely relevant, which is confirmed by the interest of many scientists. However, given the dynamism and adaptability of the economic environment, the analysis of the peculiarities of the functioning of economic systems in a circular economy requires further research to ensure high-quality innovative resource supply.

The purpose of the article is to analyze the functioning of economic systems in the context of the development of their potential in a circular economy.

2. Literature review

The study of the problems of the functioning of economic systems in a circular economy is becoming increasingly important. Among the scientists who have studied these issues should be noted: Arefieva O. (2021) [1]; Calicchio Berardi P. (2021) [2]; Chembessi C. (2021) [3]; Derhaliuk M. (2021) [4]; García-Muiña F. (2021) [5]; Ivanova N. (2016) [6]; Khanin S. (2021) [7]; Kurdyukov V. (2020) [8]; Londoño N.A.C. (2021) [9]; Malinin V. (2020) [10]; Papageorgiou A. (2021) [11]; Boiarynova K. (2021) [12]; Tkachenko T. (2021) [13]; Poryadina V. (2017) [14]; Shaporova O. (2018) [15]; Sharma H. (2021) [16]; Shkarlet S. (2020) [17]; Snellinx S. (2021) [18]; Tkachenko T. (2021)

[19]; Tulchynska S. (2021) [20]; Popelo O. (2021) [21]; Shevchuk N. (2021) [22]; Kravchyk Yu. (2021) [23]; Vanhuysse F. (2021) [24]; Vovk O. (2021) [25]; Yaremovich P. (2021) [26]; Zhukov R. (2020) [27]; Zimakova I.V. (2019) [28] and others.

The article [8] identifies the conditions for creating an effective system of internalization of economic damage from emissions, aimed at ensuring fairness and consistency of decisions, developing incentives for continuous improvement and achieving sustainable development goals. The authors argue that this will help reduce the limitations of traditional methods and overcome uncertainty in data analysis.

The purpose of the article [27] is to develop an author's approach that allows you to assess the functioning of hierarchical socio-economic systems and provide expert opinions on management decisions. The authors consider the possibility of taking into account the specific conditions of the state and influence of complex systems to be a scientific novelty, which will allow to build one's own standard.

In the study [10], scientists proposed a model for classifying the financial and economic crisis, which takes into account the nature and place of changes in the flows of the economic environment. The authors study the resource type of the crisis and analyze the main causes of its occurrence and potential consequences for the construction business. Scientists claim that the analysis of the economic condition of the enterprise using the developed indicators will allow to form rational management decisions.

The article of scientists [28] is based on the systematic modernization of scientific ideas about the essential factors and conditions of functioning and development of regional socio-economic systems. Scientists have developed proposals for overcoming the socio-economic stagnation and economic downturn in the region. To achieve this, it is proposed to use modern agglomerative technologies and methods through the modernization of research tools and management of local and regional socio-economic processes.

In scientific work [14] it is proved that to increase the efficiency of production in a planned economy it is necessary to develop mechanisms of functioning that encourage enterprises to take into account the maximum reserves of all reserves to increase production efficiency. The authors of the article developed a model of the competitive mechanism of functioning of active systems.

The authors of the article [15] analyze the conditions and factors of development of regional socio-economic systems through modeling of these processes in accordance with the requirements of their functioning. The result of the researchers' research is to create a model for the development of regional socio-economic systems.

The scientists of the article [18] investigate how waste recycling companies make decisions related to the economy

of the cycle. Researchers use a high-quality research approach with 10 companies and experts from across the EU across four interconnected markets. The authors argue that the circular economy will increase competition in the markets, which creates difficulties for both public and private waste management companies. Scientists have identified institutional contradictions that arise due to the backlog of support mechanisms, which creates significant uncertainty regarding the transfer of processes to a circular economy.

The circular economy, according to the authors [2], is a viable alternative to replace the current linear model, which causes resource depletion. The authors have developed proposals for the inclusion of social and managerial opportunities in the process of transition and further improvement of the circular economy.

The aim of the article [16] is to study the impact of COVID-19 on the goals of sustainable development and provides an idea of how the promotion of green recovery, managed by a solid waste management system based on a circular economy, can help achieve the goals of the UN SDGs. In the study, the authors recommend implementing a policy that prioritizes investment in decentralization of solid waste systems, localization of supply chains, recycling and green recovery, information exchange and international cooperation to achieve the UN SDGs.

The research of scientists [5] proves that the digitization of production processes not only allows to assess the impact on the environment, but can also play a key role in understanding the social efficiency of the production organization and identifying the hidden social dimension of the circular economy.

3. Results

The functioning of economic systems to ensure their sustainability must meet modern challenges and provide for the formation of competitive institutional architecture, the introduction of structural and regulatory innovations, the transition to an innovative model of development.

Sustainability should include:

- harmonization of the goals of functioning of ecological and economic potential with natural laws;
- rational use of natural resources necessary for development;
- the absence of sharp changes in the functioning of production, social and environmental subsystems;
- compliance with accepted environmental standards.

The specific principles of functioning of economic systems include: multivectority, nonequilibrium of economic processes, openness, nonlinearity (Fig. 1).

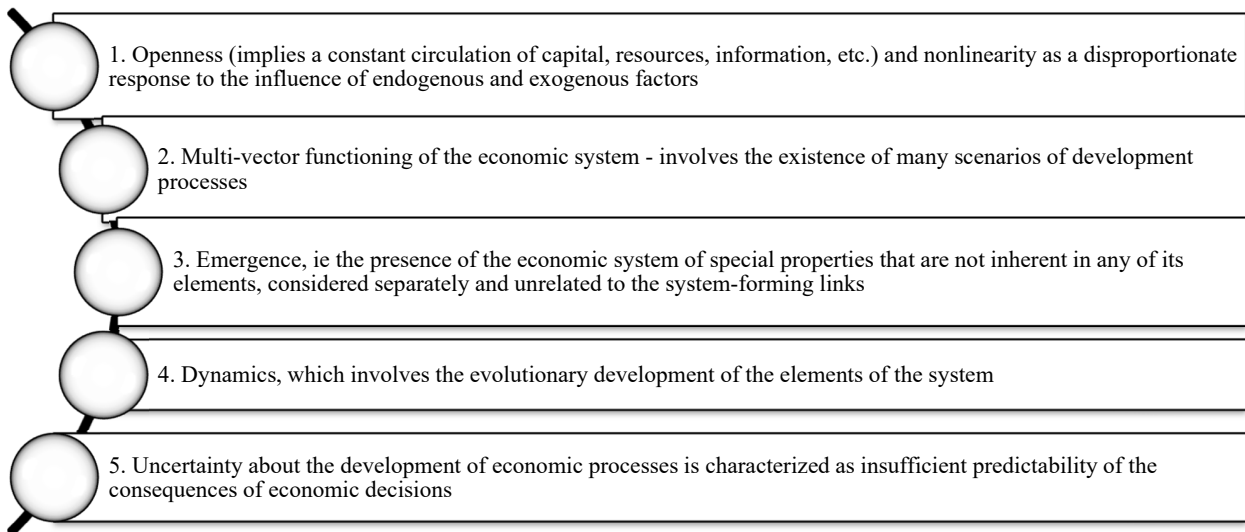


Fig. 1 Specific principles of economic systems.
(Source: summarized by the authors.)

Since modern realities prove that the linear nature of development and equilibrium are not dominant in the functioning of economic systems, and increasing the level of economic efficiency should go hand in hand with minimizing the harmful activities of enterprises, it is necessary to use circular economy tools. The main prerequisites for the transition to a circular economy are shown in Fig. 2.

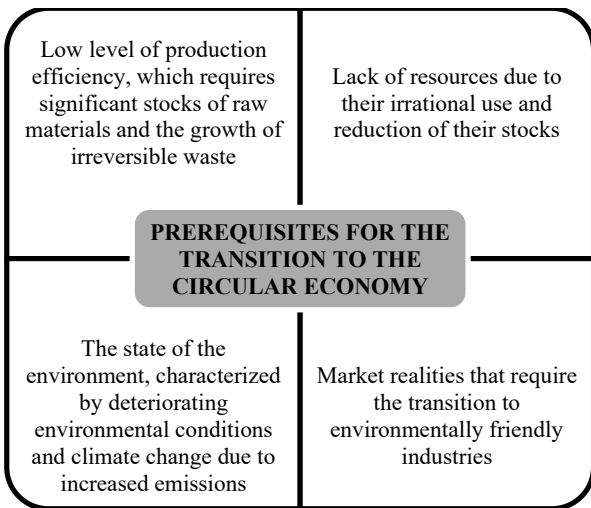


Fig. 2 Prerequisites for the transition to a circular economy. (Source: developed by the authors)

The basic concept of the circular economy involves the development of a system of production and consumption, which is based on processing, reuse, repair, product sharing, change of consumption patterns and new business models and systems. It is based on the 3 R model (Fig. 3).

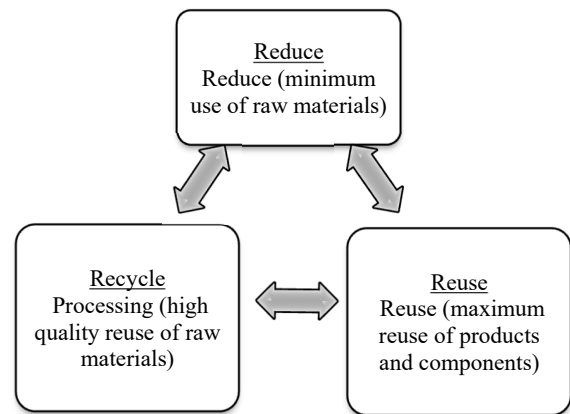


Fig.3 Principles of circular economy.
(Source: developed by the author of the data [29].)

In some scientific publications, the circular economy is identified with the sustainable development of the country. The ratio of the principles of sustainable development and the peculiarities of the circular economy is shown in Table 1.

Table 1: Principles of sustainable development and the impact of the circular economy

The principle of sustainable development	The impact of the circular economy
Sustainable and long-term development with encouragement of the needs of the population	Good health due to reduced emissions, improved sanitation, improved water performance
Establishing restrictions on the use of natural resources, taking into account the level of technical security and the ability to restore the biosphere	Sorting of processed raw materials and responsible consumption, preservation of ecosystems of the sea and land
Providing opportunities and incentives to meet the needs of the population, taking into account living standards	Absence of poor sections of society, decent work, economic development
Taking into account environmental opportunities, according to the energy used	Renewable energy, conservation of marine and terrestrial ecosystems
Dependence of changes in demographic indicators and the potential of the global ecosystem	Reduction of non-processing resources, reduction of emissions

Source: compiled by the authors.

The circular economy contrasts with the traditional linear economic model, which is based on the take-do-consume-throw away model. In practice, the circular

economy minimizes waste through reuse, repair, re-equipment and recycling of existing materials and products (Fig. 4).



Linear production model



Cyclical production model

Fig.4 Traditional linear economic model of production and cyclical model of production. (Source: developed by the author of the data [30].)

That is, the circular economy involves the presence of three elements [9]:

First, Closed cycles. In a circular economy, material cycles are closed following the example of an ecosystem. There is no such thing as waste, because each residual stream can be used to create a new product.

Secondly, Renewable energy sources. Like raw materials and products, energy is stored as long as possible in a circular economy. The circular economic system is fed by renewable energy sources.

Third, systems thinking. A cyclical economy requires not only closed material cycles and renewable energy, but also systems thinking. Each subject of the economy (company, person, organism) is connected with other subjects. Together, this forms a network in which the actions of one player affect other players. To take this into

account, the choice must take into account the effects of the short and long term, as well as the impact of the entire value chain.

The authors agree that social inclusion is also a necessary part of the circular economy.

Business models of the circular economy are divided into two groups:

first, reuse of resources (due to modernization, repair, re-equipment, reconstruction of existing enterprises);

secondly, the processing of materials. Formation of completely new enterprises that will recycle waste after linear enterprises.

The transition to a cyclical model has a number of advantages, in particular: reduction of pressure on the environment; increasing competitiveness, innovation,

increasing the number of jobs. The general system of advantages of circular economy is presented in Table 2.

Table 2: Principles of sustainable development and the impact of the circular economy

Circular economy		
Environmental effects	Economic effects	Social effects
Reduction of consumption of natural raw materials and materials	Reduction of costs for materials and raw materials	Opportunities to create new jobs in the processing industry
Reduction of harmful emissions into the environment	Reduction of environmental taxes and fines	Development of the economy of shared consumption
Preservation of natural ecosystems in their original state	Improving image positions, developing new markets	Accumulation of public goods
Use of renewable raw materials	Reducing the resource intensity of production	
	Opportunities to profit from the sale of waste	
	Reduce disposal costs	

(Source: compiled by the authors)

Thus, despite the increase in costs for sorting, collection and recycling of garbage, the overall application of the principles of the circular economy has a positive overall economic impact. Production that uses fewer resources (i.e. energy, water, land and materials) will have a positive impact on climate, marine pollution and biodiversity.

Risks associated with the supply of raw materials, such as price volatility, availability and dependence on imports, will be mitigated through secondary raw materials. Increasing resource productivity contributes to GDP growth and job creation.

However, there are also problems caused by the use of the principles of the circular economy:

firstly, the development of a mass market for radical innovation entails significant transition costs (eg, research and development, investment in assets, subsidies to promote new business models), for which there are no appropriate financial instruments.

secondly, the workforce currently lacks the technical skills to implement the principles of the circular economy.

thirdly, some materials cannot be recycled indefinitely due to the accumulation of impurities in recycled materials, such as metals and glass, or the destruction of fibers that occurs when paper is made from recycled material.

The experience of implementing the principles of the circular model of the economy in foreign countries sets trends in the formation of the Ukrainian strategy of economic development in the direction of accelerating the transition from a linear economy to a circular economy. In this direction in particular it is necessary:

1. changing the structure of public procurement in the direction of development of environmentally sound production, in particular the transition to "green" or sustainable procurement, which takes into account the criteria of environmental friendliness and energy efficiency;

2. using the experience of developed foreign countries with similar institutional and legal systems, development of effective legislative and regulatory framework for the functioning of the circular economy in Ukraine;

3. entrepreneurs must learn to anticipate changes in market conditions to respond quickly by modernizing production technologies and investing in recycling and reuse;

4. transition to new more efficient business models (reuse, eco design, repair, recovery and exchange of products and maximum prevention of waste generation);

5. development of financing programs for projects in the field of circular economy (including waste recycling projects, etc.);

6. raising consumer awareness of the concept of a circular economy;

7. it is necessary to educate a new eco-generation and systematic thinking on the implementation of the principles of the circular economy;

8. encouraging businesses and consumers to maximize waste recycling;

9. changing the method of production and consumption of products from short-term to long-term.

4. Conclusions

Thus, in a circular economy, the way forward is clear: reduce, reuse and recycle as much as possible. In practice, the circular economy minimizes waste through the reuse, repair, conversion and recycling of existing materials and products.

Thus, the complexity of the functioning of the economic system is due to the presence of a large number of elements and relationships between them that determine its internal structure. In turn, economic growth under the condition of using the traditional linear model of production causes a significant burden on the environment, which

necessitates the introduction of the principles of the circular economy in order to ensure high-quality innovative resource supply. In general, a circular economy is a model of production and consumption that involves the reuse, repair, reconstruction, and recycling of existing materials and products to preserve materials in the economy where possible. The circular economy assumes that waste itself will become a resource, which therefore minimizes the actual amount of waste. It is usually the opposite of the traditional linear economic model, which is based on the "take-do-consume-throw away" model.

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