

VIKTOR IEVDOKYMOV*, OKSANA OLIINYK**,
VALENTYNA KSENDZUK***, LARYSA SERGIENKO****

Circular Economy as an Alternative Environment Oriented Economic Concept for Ukraine

Introduction

The end of 2015 in the field of environmental economics was a significant turning point, which has set its mark in the history of fight against climate problems and the launch of new economic concepts. This is due to the Climate Summit in Paris on December 11, 2015, which has further encouraged the use of green technologies as well as new environmental and economic concepts developed by many international conferences with the participation of the heads of states (Rio de Janeiro – the conference “Agenda for the 21st Century” (1992), Kyoto (Japan) – Kyoto Protocol (1997), Monterrey (Mexico) – Development Finance Conference (2002), Johannesburg – World Summit on Sustainable Development (Earth Summit 2002, Rio + 10) (2002). In particular, the main purpose of the Climate Summit in Paris was “to slow down global warming within 2 degrees Celsius by the end of the century as well as to help poor countries to adapt to climate change” (Euronews 2015). Such attention to climate problems is due to the fact that humanity must be responsible for its survival and must adjust its own economic activity to the needs of protecting natural resources and natural environment.

* Viktor Ievdokymov, Professor, Rector at the Zhytomyr State Technological University; e-mail: rector@ztu.edu.ua

** Oksana Oliinyk, Professor, Vice-rector at the Zhytomyr State Technological University; e-mail: oov76@ukr.net

*** Valentyna Ksendzuk, Ph.D., Associate Professor at the Zhytomyr State Technological University, the Department of International Economic Relations; e-mail: valentyna_ksiedzuk@ukr.net

**** Larysa Sergiienko, Ph.D., Associate Professor at the Zhytomyr State Technological University, the Department of Economic Safety, Public Management and Administration; e-mail: sergiienko.lv@gmail.com

The above mentioned issues actualize the problem of the introduction of circular economy as a new concept for the development of such economic relations in the world that will enable to reduce the negative impact of economic activity on the environment. Circular economy has become the object of research by many scientists. In particular, their works are devoted to the following problems: (1) development of the very concept of circular economy (eg. Carson 1962, Boulding 1966, Vitousek et al. 1997, Stahel 2010); (2) formation of the conceptual and categorical apparatus for a circular economy (Demin 2004, Stahel 2010, Preston 2012, MacArthur 2013, Di Wu 2014); (3) development of theoretical and methodological provisions of circular economy and their promotion (Robinson 2004, Demin 2004, Mabee 2011, Winkler 2011, Preston 2012). Unfortunately, there has been no study of this issue by Ukrainian scholars as yet.

Conducting reforms in the public sector of Ukraine today requires the application of new concepts and approaches which will speed up the country's entry into the group of countries that promote sustainable development and try to create an environmental-oriented society. This calls for starting our own research on the subject.

The purpose of the study is to present theoretical principles of the circular economy as a leading environment-oriented economic concept in order to build a theoretical basis for reforming state policy according to these principles, which may increase the competitiveness of the Ukrainian economy, provide environmental sustainability, and facilitate social consensus.

1. The essence of the concept of circular economy

One of the biggest problems in the modern global society is climate change. However, traditional business and management methods, despite the considerable amount of scientific works dealing with the rational use of resources and social and environmental responsibility of business, continue to rely on the existing resource management systems. This calls us for rethinking of how resources could be used to ensure sustainable development in various sectors of the economy. Some positive changes have taken place in this direction. However, given that the traditional economic model is linear, and it continues to function, the practical results remain still almost invisible. All this indicates the need to introduce new models of the economy, notably a circular economy that is designed to provide economic growth without harming the environment, by reducing waste through its reuse.

As already mentioned, the problem of circular economy is largely ignored in Ukrainian sources, its provisions are not applied in practice by many business entities. Ukrainian scholars do not provide their own interpretation of the category of circular economy. But there are also different views among the foreign authors who try to define the term "circular economy".

For instance, Di Wu (2014) states that circular economy is a “model of economic and environmental development”. Indeed, circular economy is aimed at harmonizing both the individual as well as the society as a whole with nature.

Chen Demin (2004) states that circular economy is a pattern of resource exploitation, which is reasonable and acceptable from the production standpoint. The author indicates an essential difference between this category and the concepts of linear economy. Namely, according to the concept of a circular economy, and unlike in the linear economy, “material resources can be used in a circle, that is, they are re-incorporated into production”. Thus, the author interprets this concept in terms of saving of resources, considering the circular economy as “ensuring endless use of material resources”.

Felix Preston (2012) sees the category of circular economy as an “approach that transforms the function of resources in the economy”. He notes the benefits of this approach from the standpoint of the utilization of the waste that, under the linear economy, had no purpose, but according to the provisions of the circular economy, „becomes a valuable input into another process, and thus products can be restored or re-upgraded rather than thrown away”.

Walter Stahel (2010) interprets the circular economy as “a model that can potentially help to solve the sustainability challenge and support sustainable development of enterprises by reducing the extraction of natural resources and, in turn, the amount of waste that leads to the reduction of environmental pressures on the environment”.

Ellen MacArthur (2013) states that “circular economy is a system of reconstruction of linear processes in the flow of materials, energy, labor and information to more circular, thereby restoring natural and social capitals”.

According to the Global Environment Forum, circular economy is defined as “a new concept aimed at eliminating the material loop and extending the service life of materials through their prolonged use and wider use of secondary raw materials” (OECD 2014).

The issue of circular economy is today extensively discussed in China, where the problem is being addressed not only by scholars and researchers, but also by politicians. In particular, the Chinese statesman Ma Kai, under the category of a circular economy, understands “the model of economic growth that supports the provisions of sustainable development, and involves the use of resources in a circle” and, unlike other authors, he notes that the way of using resources in a circle should be “in the process of implementing the principle 3R” (Xupeng, Shuiwei, Jie 2005). Li Jian and Qiu Licheng (2004) state that the circular economy is based on the 3R principle, emphasizing that, due to this principle, “each R is binding and interconnected”.

However, the concept of circular economy, for today, is not comprehensively defined. In addition, when studying these issues, it is necessary to understand the limits of the application of economic theories and concepts in order to avoid methodological mistakes as well as to obtain reliable scientific results. Since the concept of circular economy can be applied and is applied at different levels of economic systems, there is a need to recognize the limits and constraints to the use of this category in the development of socio-economic relations in Ukraine.

2. Levels of implementation of the circular economy

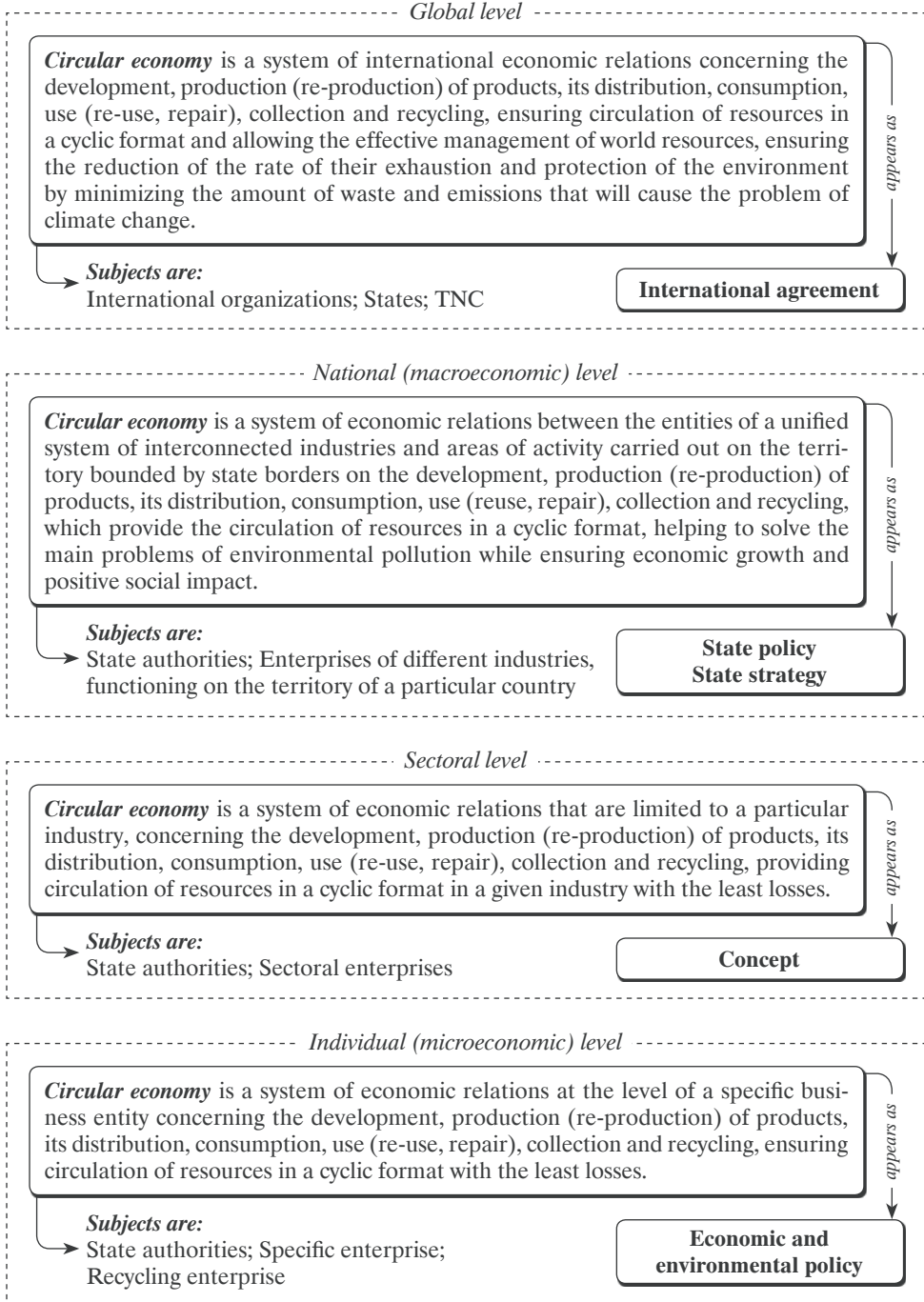
It is advisable to distinguish various levels of manifestation of the circular economy. Researchers usually define the circular economy at the micro level, meso level, and macro level. At the micro or individual level, the main objective of circular economy is to produce environmentally friendly products and to apply eco-technology. At the meso level creating environmentally orientem industrial networks, regional production systems as well as environmental protection are expected. At the macro level, “eco-city” or “eco-province” development is expected. An example of a circular economy introduced at three levels is the experience of China, where successfully operate, “fifty six enterprises, thirteen industrial parks, seven provinces, five places, and one city” (Yuan, Bi, Moriguichi 2006).

We believe that it expedient to consider the circular economy at four levels, namely: at the global, national, sectoral levels as well as at the level of a particular enterprise, that is, at an individual level. Such a division allows to reveal manifestations of the circular economy at each of the levels. Each level is marked by the appropriate system of economic relations and different subjects participating in their implementation. The scheme of our classification is given in Fig. 1.

At the global level, circular economy is a system of international economic relations that allows to effectively manage world resources, ensuring a reduction in the rate of their exhaustion and environmental protection by minimizing the amount of waste and emissions, thereby contributing to the solution of climate change problems. The circular economy at the global level manifests itself as an international agreement, which is an instrument for solving global environmental problems. By signing an agreement on the transition to a circular economy, countries are obliged to change national models of the economy. However, due to varying degree of economic development of individual countries, their geographical location, population, mentality of peoples, etc., it is impossible to determine equal conditions and provisions for all countries of the world. An international agreement should become a pivotal guide to the international division of labor to ensure the the implementation of the provisions of a circular economy.

At the national (macroeconomic) level, circular economy is a system of economic relations between the entities of a unified system of interconnected industries and areas of activity carried out on the territory bounded by state borders, and is an instrument for solving the main problems of environmental pollution while ensuring economic growth and giving positive social effects. The transition to a circular economy at the national level can yield substantial benefits of economic, environmental and social character. a circular economy at the national level manifests itself as a deliberate state policy and state strategy. Obviously, if circular economy is adopted globally in the form of an international agreement, it will have a significant impact on the formation of public policy and state strategy in all the countries concerned.

Figure 1
Manifestation of the circular economy at different levels



Formation of the state policy and strategy regarding circular economy can be carried out despite the absence of an international agreement on this issue, the more so because preparing and signing of such a document at the global level is an extremely difficult and time-consuming process, if not a peculiar utopia. Therefore, we believe that it is more expedient to begin with transforming the economic system from lower levels and gradually introduce some provisions at the highest level, i.e. to proceed from the bottom to the top.

At the sectoral level, circular economy is a system of economic relations that are limited to a specific industry, which provide the circulation of resources in a cyclic format within the given industry with the least losses. The functioning of the circular economy can be limited to one industry if all phases of the circular economy (development, production (re-production) of products, distribution, consumption, use (reuse, repair), collection and recycling) are carried out within a specific industry (e.g. food industry, agriculture, etc.). At the sectoral level, circular economy manifests itself as a concept characterized by a single understanding of its provisions, which must be formally adopted in the industry.

At the individual (microeconomic) level, circular economy should be interpreted as a system of economic relations at the level of a specific economic unit, concerning economic and environmental policy of a particular enterprise. It should be noted that the introduction of the provisions of the circular economy completely transforms the way of conducting business activities of a particular enterprise, because, as regards the main purpose of business functioning, that is to generate profits, circular economy changes significantly the way of obtaining this benefit in comparison with the linear economy. For example, in China, the first step for the transition to a circular economy at the enterprise level was the adoption of the law on the promotion of clean production and the law on energy saving (Xupeng, Shuiwei, Jie 2005).

3. Features and consequences of the introduction of the circular economy

Let us recall the basic provisions of the circular economy, which significantly differentiate it from the linear economy. First of all, in the circular economy, the consumer, after acquiring the product, in essence has no ownership of it, and only acquires the right to use the product. This means that the consumer does not throw out the product after use, but returns it to production. Such relationships are completely different from the situation existing in the linear economy, but they resemble the relations arising from the lease. Let us give just one example: “A number of such big companies as Rollse Royce, Caterpillar, Toyota, Philips are already working on this scheme. For example, you do not need to buy a car – you can just take it for rent. Servicing and utilization of parts that have used their resource – will be engaged by the manufacturer himself” (New Policy 2015). In this way, it is possible to reduce

the amount of pollutant emissions, thus providing both a social benefit (in the form of creating new jobs) and an economic gain (ensuring economic growth not only at the national level, but also at the individual (enterprise) level). Another significant characteristic of the circular economy is the change in the form of profit, which will apply to business entities that are able to conduct activities on the basis of lease, e.g. manufacturers of cars, appliances, clothing, etc.

It should be noted that Chinese researchers (Xupeng, Shuiwei, Jie 2005, Di Wu 2014, Jian Licheng 2004) use the principle of “3R” as the basis of the circular economy. However, based on the 3R principle, another concept, namely “C2C” (or “Cradle to Cradle”), was developed by William McDonough and Michael Braungart (2002) in the United States. The authors used the term “Cradle to Cradle”, which was first introduced by Walter R. Stahel in 1970. It should be noted that “R” has not changed for more than half a century. So, the “3R” principle, as Di Wu states, “is to reduce resource consumption, reuse and recycle” (Di Wu 2014).

The “3R” principle essentially includes three interconnected principles, namely: the principle of reducing (reduction in the cost of material resources used for production and consumption), the principle of reusing (ensuring the longest term of product use), and the principle of recycling (provision of reuse, recovery of products or waste in order to continue their useful existence).

The circular economy is based on the concept of “Cradle to Cradle”, but it also includes principles from other areas, for example, as noted by John Robinson, “the principle of biomimeticism that adapts or copies natural processes in the design of new industrial approaches and technologies” (Robinson 2004). Knowledge accumulated by nature over a significant period of time is actually used by humankind to solve their problems, in particular finding alternative approaches to conducting economic activity without harming the environment, which is, in essence, the principle of biomimetic. From the point of view of the processing of material in natural ecosystems, circular economy is intended to change the one-sided model: „consumption of resources – products – waste” into a cyclic model: „consumption of resources – products – renewable resources” (Di Wu 2014). In fact, since the cycle of substances in nature is carried out in this way, that is in a circle, economic activity must also be carried out in the same way. There is a set of basic characteristics of the circular economy, which Chen Demin (Demin 2004) lists as follows:

Table 1
Main characteristics of the circular economy

Characteristics	Content
Objectivity	The emergence of a circular economy is an inevitable choice for human society, which is designed to solve the problem of resource depletion and limited environmental capacity.
Formality	The emergence and development of circular economy as a science and technology. Along with the advancement of technology more efficient use of resources and the development of a new resources are possible.

tab. 1 cont.

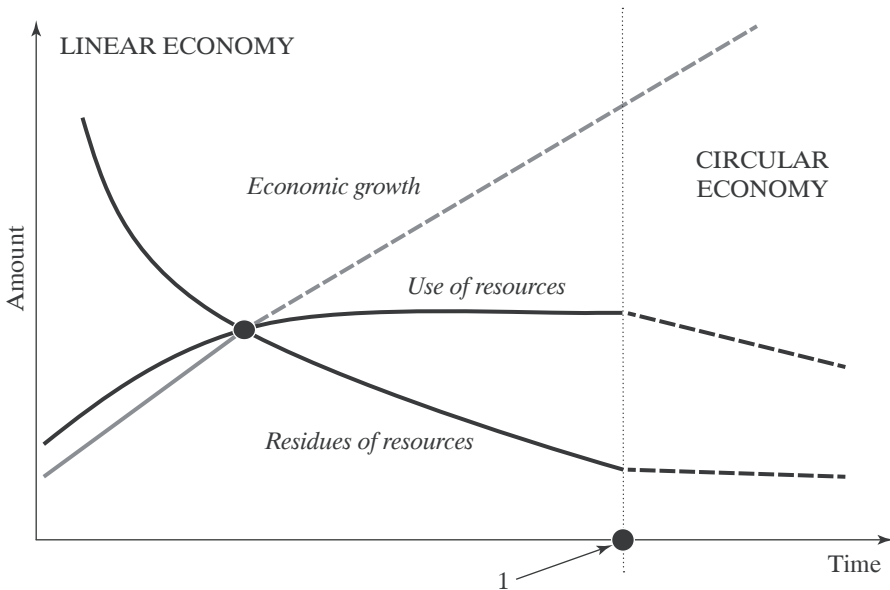
Schematicism	The circular economy is associated with every aspect of the re-production system. Only through the coordination of the whole system, the purpose of the circular economy can be realized.
Unity	The circular economy provides a combination of environmental protection and social development.
Reactive ability	The circular economy is the product of its rational analysis.

Source: Demin 2004, pp. 12–15.

In general, these characteristics can serve as principles for a circular economy, since they are fundamental to its formation. These principles reflect the essential characteristics that are responsible for a proper functioning of the economic system (Sakir-Molochko 2013).

Circular economy is an alternative tool for solving economic and environmental problems. That is also confirmed by the principle of unity, which includes, on the one hand, protection of the environment, and, on the other hand, the provision of an adequate social welfare. To the content of the principle of unity, it is expedient to add an economic component, because the consequence of the transition to the circular economy brings not only environmental and social effects (Fig. 2).

Figure 2
Economic and environmental effect of the circular economy



Note: 1 is the point of transition to the circular economy.

Source: own elaboration.

Hence, the transition to a circular economy, taking into account the principles on which this concept is based, will have a positive consequence. In particular, from the environmental point of view, this will reduce the environmental pressure by reducing the amount of waste. From the standpoint of the economy, this will reduce the rate of depletion of resources, while not hampering economic development. The transition to a circular model of the economy will also have a positive social effect. After all, reducing the harmful effects of environmental pollution caused by the linear economy, with its significant amounts of waste and high rate of resource use will lead to a reduction in air pollution, increased supply of drinking water, etc., which is essential for people's health and human development. It should be noted that the supporters of this economic model argue that thanks to it 100,000 new jobs could be created in Europe within 5 years, and by 2030 – 2,000,000 jobs (New Policy 2015).

When characterizing the circular economy, Warren Mabee (2011) states that “materials must be used in such a way that they can be reused (as raw material for a new series of materials) and ultimately return to the natural environment”, stressing at the same time the role of re-processing. Felix Preston (2012) also noted the reuse, while pointing out the closed cycle of such an economic model. In turn, H. Winkler (2011) states that “the closed circuit of the circular economy requires that companies restructure their supply chains, and also consider the effects of each production from the point of view of the environment”. Warren Mabee (2011) points to “the production of long or permanent products, which at the end of their useful life could be decomposed and used as inputs for the new product, or returned to natural ecosystem”. The return of products back to production or to the environment, after the term of their useful use, will allow to reorient production systems and ensure the proper level of economic and environmental safety, which is one of the requirements of the circular economy. W. Stahel and G. Reday-Mulvey (1981) describe multiple benefits of the circular economy. Most researchers emphasize the importance of certain characteristics of the circular economy, such as the development of products for long-term use, reuse of materials, and the reduction of waste, which can be very beneficial for the society and economy.

An important characteristic of the circular economy is also the organization of production from the standpoint of the needs of the population (Mabee 2011). In fact, such an approach is rational and economically justified, because when it comes to the production of goods based on the true needs of the population at the local or national level, there will be a reduction in production of unnecessary goods or a reorientation of those sectors of the economy that are functioning ineffectively in terms of consumption of products. Thus, circular economy may be a peculiar purifier of the country's economy from superfluous or excessive sectors and branches, which do not contribute much to social well-being.

4. A conceptual model for the introduction of circular economy in Ukraine

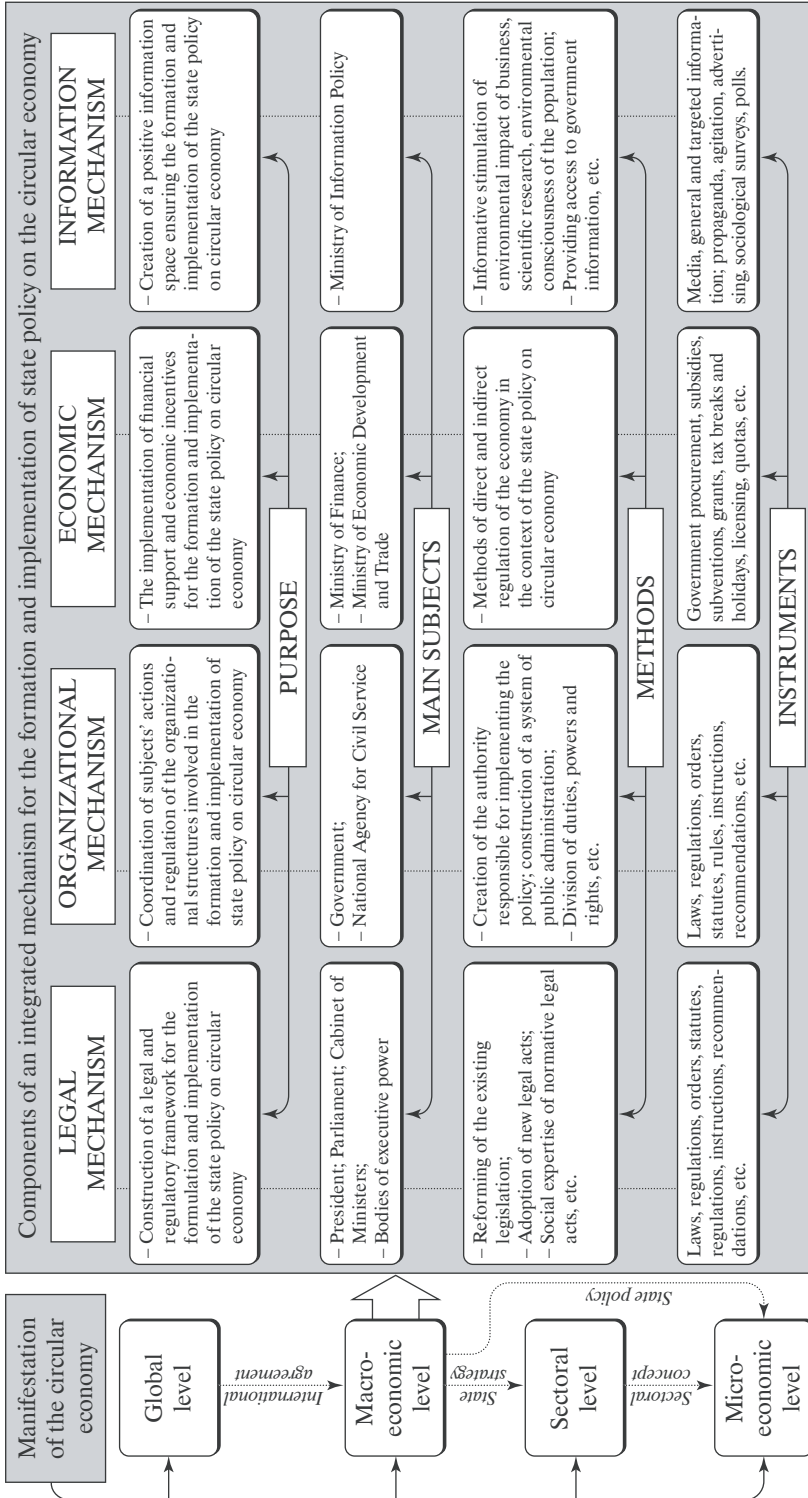
Today, economic science must provide the whole complex of organizational and methodological provisions for the transition to a circular economy and the effective use of its fundamental principles. Given the fact that the main object of the circular economy is the waste management system, and its subjects are acting on various levels of the economic system, there is a need to consider their interaction. Therefore, we prefer to use a systematic approach, which will allow to establish all possible connections and build a theoretical model of circular economy, which can become the basis for its practical implementation. Such a model is shown in Fig. 3.

Our model includes four levels of the circular economy. At the global level, circular economy manifests itself as an international agreement that defines the main provisions of this economic model. In turn, the international agreement affects the formation of the provisions of the circular economy at the macroeconomic (national) level. At the macroeconomic level, circular economy can manifest itself as a state strategy and state policy. The state strategy will determine the main provisions of the circular economy and influence the introduction and regulation of this system at the sectoral level. The state policy regulates activities undertaken in introducing the requirements of a circular economy at the enterprise level, and the sectoral context defines its main provisions. At the microeconomic level, circular economy manifests itself as an economic and environmental policy affecting the composition, interaction and functioning of enterprises as components of the circular economy.

The mechanisms needed for the introduction of the circular economy, presented in Fig. 3, are interrelated, and only their simultaneous effective use will allow to achieve their goals. Each mechanism has its own function, which is revealed in the block describing its purpose. The next part of the scheme indicates the subjects responsible for the formation and implementation of state policy in the sphere of circular economy. The authorities involved have been defined as to provide legal, organizational, economic and information mechanisms needed for the introduction of the circular economy. They have been specified in the local context applicable to Ukraine. However, several other governmental bodies may also be involved, e.g.:

- The Ministry of Ecology and Natural Resources, whose activities affect the sphere of environmental protection, environmental safety, handling of hazardous waste, hazardous chemicals, pesticides and agrochemicals, as well as providing official environmental expertise;
- Ministry of Education and Science: in the implementation of policies aimed at stimulating scientific developments regarding circular economy and providing educational programs for raising environmental awareness;
- other central executive authorities: ministries and departments, services, agencies, inspections, etc., and local authorities whose functional activities are re-

Figure 3
Conceptual model for the introduction of circular economy in Ukraine



Source: own elaboration.

lated to the development of state policy in the sphere of circular economy (e.g., the State Treasury Service, the National Water Resources Agency, the State Ecological Inspection, etc.).

Concerning methods, techniques and tools to be used in implementing state policy in the sphere of circular economy, the following recommendations can be made:

1. As regards the legal mechanism, the main methods and techniques of its implementation are the reform of the existing legislation, the adoption of new legal acts, the social expertise of legal acts, etc.;
2. As regards the organizational mechanism, the main methods and techniques of its implementation are the creation of the authority responsible for implementing the policy; construction of the system of state management of circular economy, division of duties, powers and rights of subjects taking part in the management and implementation of state policy in the sphere of circular economy, etc.;
3. As regards the economic mechanism, the main methods of its provision will be methods of direct and indirect regulation of the economy, with the help of such instruments as government orders, subsidies, subventions, grants, tax breaks and holidays, licensing, quotas, etc.;
4. As regards the information mechanism, the means of securing it will be based on the dissemination of information on the environmental performance of business, stimulation of scientific research, raising the environmental consciousness of the population, providing access to government information, etc., and using the following tools: mass media, general and targeted information; propaganda, agitation, advertising, sociological surveys, polls, etc. The media, today, are considered as “fourth power”, which can create both a positive as well as a negative information space for any decisions and phenomena. In view of this, it is important to create an adequate information mechanism, given the possibility of its impact on the opinion of the public and business entities that are the target groups of state policy in the sphere of circular economy.

As we can see, the constructed conceptual model reveals the complexity of tasks involved in the formation and implementation of the state policy aimed at the promotion of circular economy, but it also shows how to coordinate the processes of developing such a policy and to optimize its functioning as a coherent system.

Conclusions

This study has explained the essence of circular economy on the global, national, sectoral and individual levels and its manifestation at each of the specified levels. The review of the selected literature and own considerations presented by the authors have served to reconstruct the principles of circular economy and its main

characteristics as well as to show the positive economic, social and environmental effects which can be obtained from the introduction of this economic model. The conceptual model for the introduction of a circular economy presented in the study shows the legal, organizational, economic and information mechanisms which must be established in order to introduce the principles of circular economy. The authors underline the role of the state strategy and policy in creating and functioning of these mechanisms, indicate the main state organs responsible for the formation of such a policy as well as methods and instruments to be used in its implementation. These proposals and recommendations are directly addressed to the Ukrainian economy and specified in its local and international context.

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GOSPODARKA O OBIĘGU ZAMKNIĘTYM JAKO ALTERNATYWNA KONCEPCJA EKOLOGICZNO-EKONOMICZNA DLA UKRAINY

Streszczenie

Procesy globalizacji i integracja europejska Ukrainy wymagają uwzględnienia złożonego zestawu norm międzynarodowych w rozwoju polityki państwa. Priorytetowym kierunkiem działalności organizacji międzynarodowych w sferze gospodarki jest rozwój zrównoważony. W celu zapewnienia takiego rozwoju konieczne jest wprowadzenie gospodarki o obiegu zamkniętym (*circular economy*). Polityka państwa w takim modelu gospodarki służy rozwiązywaniu problemów o charakterze gospodarczym i ekologicznym oraz ma na celu zapewnienie reorientacji systemu gospodarczego na warunki rozwoju zrównoważonego, a także wykorzystanie odpadów jako zasobów przyczyniających się do wzrostu gospodarczego. Zreformowanie systemu gospodarczego w kierunku zasad takiej gospodarki jest zadaniem administracji publicznej. Stworzenie skutecznej polityki państwa w tym zakresie oraz mechanizmów jej wdrażania pozwoli zwiększyć konkurencyjność gospodarki, zapew-

ni rozwój zrównoważony i osiągnięcie konsensusu społecznego. W artykule uzasadniono potrzebę wprowadzenia zasad takiego typu gospodarki na Ukrainie oraz przedstawiono model ilustrujący zadania stojące w tym zakresie przed polityką państwa i jego organami oraz sposoby i metody ich realizacji.

Słowa kluczowe: gospodarka o obiegu zamkniętym, rozwój zrównoważony, bezpieczeństwo ekologiczne i ekonomiczne, administracja publiczna, polityka państwa, Ukraina

JEL: Q28, Q38, E61, F02.

CIRCULAR ECONOMY AS AN ALTERNATIVE ENVIRONMENTAL ORIENTED ECONOMIC CONCEPT FOR UKRAINE

Summary

Globalization processes and European integration of Ukraine require the consideration of a complex system of international norms in the state policy development. The priority direction of international organizations' activity in the sphere of economy is sustainable development, in order to ensure the implementation of the goals of which there is a need for the introduction of a circular economy. State policy in such an economic model is an instrument for solving economic and environmental problems; it is intended to ensure the reorientation of economic systems to the conditions of sustainable development, as well as the use of waste as resources that promote economic growth. Reforming the economic system towards the provisions of such an economy is the duty of public administration. Formation of an effective state policy of the circular economy and mechanisms for its implementation will increase the competitiveness of the economy, provide environmental sustainability and help to achieve social consensus. The article substantiates the need for the introduction of the provisions of the circular economy in Ukraine. It also presents a conceptual model which specifies the tasks of the state policy aimed at the promotion of such an economic model as well as the way and methods of their implementation.

Key words: circular economy, sustainable development, environment and economic security, state administration, state policy, Ukraine

JEL: Q28, Q38, E61, F02

ЭКОНОМИКА ЗАМКНУТОГО ЦИКЛА КАК АЛЬТЕРНАТИВНАЯ ЭКОЛОГИЧЕСКАЯ И ЭКОНОМИЧЕСКАЯ КОНЦЕПЦИЯ ДЛЯ УКРАИНЫ

Резюме

Процессы глобализации и европейская интеграция Украины требуют от политиков учета сложного набора международных норм. Приоритетным направлением деятельности международных организаций в сфере экономики является уравновешенное развитие.

Для обеспечения такого развития необходимо внедрить модель экономики с замкнутым циклом («circular economy»). Политика государства в такой модели экономики служит решению проблем хозяйственного и экологического характера, а также преследует цель обеспечить переориентацию экономической системы в направлении уравновешенного развития и использования отходов в качестве ресурсов, способствующих экономическому росту. Задачей публичной администрации является осуществление реформы экономической системы и преобразование экономики страны в экономику замкнутого цикла. Создание эффективной политики государства в этой области и механизмов ее внедрения позволит повысить конкурентоспособность экономики, обеспечит уравновешенное развитие и достижение социального консенсуса. В статье обоснована необходимость введения принципов такой экономики в Украине, представлена модель, отображающая задачи, стоящие в этой области перед политикой государства и его органами, а также способы и методы их реализации.

Ключевые слова: экономика замкнутого цикла, уравновешенное развитие, экологическая и экономическая безопасность, публичная администрация, политика государства, Украина

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