

Implementation of the Concept of Circular Economy as an Integral Component of Sustainable Development of the Region: Problems and Prospects

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Abstract: Depleting natural resources, climate change, and pollution of the environment are the processes that make it necessary to implement the concept of a circular economy in every country. The article's purpose is to research the concept of "circular economy" but also to identify problems on the way to its implementation and search for prospects for its performance. The research was conducted based on statistical data from the Black Sea region. The following research methods were used: the method of analyzing statistical data, the method of analyzing scientific sources, the method of information search, the method of analytical review etc. The article examines the experience of developed countries in implementing the concept of circular economy in such countries, as well as the works of Ukrainian authors devoted to this topic. As a result of the analysis of the Decisions of the Regional Councils of the Black Sea Region found that the regulatory documents do not pay enough attention to the development and functioning of the regional industrial waste management system. An analysis of statistical data of the Black Sea region was made. Based on the analysis results, it was found that despite the high level of environmental pollution in the area by industrial enterprises, the volume of capital investments directed at protecting the natural environment is insufficient. Prospects for implementing circular economy principles in the Black Sea region are considered. The results of the research are of practical significance.

Keywords: Globalization; Resource Efficiency; Environmental Policy; Rational Use; Circular Economy; Circular Business Models.

JEL Codes: P25; P48; R58.

1. INTRODUCTION

Thirty years have passed since the first mention of the possibility of introducing the circular economy. Still, its popularity increased after its official introduction in the European Union (EU) (Pearce and Turner, 1990; Communication from the Commission..., 2015). World leaders are becoming aware of the importance of implementing a circular economy to achieve sustainable development in countries. Currently, the global circular economy market is one trillion United States dollars (Dhaske, 2021). The public and private sectors are joining forces to transition to this type of economy. Favorable conditions are being created for removing obstacles and developing new solutions that accelerate the implementation of the circular economy. Developed countries (USA and China), which occupy the first places in the ranking of natural resource consumption and environmental pollution,

have also recently recognized the need to implement a "green" economy model in their countries (Anisimova and Kopytsia, 2021; Baideldinov et al., 2013). In the countries of the European Union, a plan for the transition to a circular economy has already been approved. Its purpose is not only to preserve the environment and valuable natural resources but also to strengthen competitiveness. Such an action plan is aimed at ensuring the sustainable development of countries. Goods produced by enterprises of EU countries should have a longer useful life, and their reuse and recycling should be provided (Kazak, 2017).

Many works of Western economists and ecologists are devoted to considering the prospects and problems of implementing a "green" economy in their countries (Dhaske, 2021; Bora, 2020). The work of G. Dhaske (2021) is devoted to searching for ways to introduce the concept of circular economy in agriculture in the USA. A study of stakeholders' interests in implementing the circular economy concept in South Asia and Finland was conducted by M. Marjamaa (2021). The role of institutions in creating circular economy paths for the regional development of Paraguay was consid-

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ered by M. Henrysson (2021). Currently, Ukraine is in such a position that it cannot catch up with the world leaders regarding most goods' quality and environmental friendliness. In a difficult economic situation, military aggression by a neighboring state negatively affects the possibilities of implementation, including the "green" economy (Bora, 2020; Yi, 2019). Regardless of the problematic situation in which the country found itself, it is necessary to adapt to current realities to look for ways to implement effective mechanisms for the transition from a linear (traditional) economy to a circular (circular) economy (Piila, 2022; Cuomo, 2021). Taking into account the experience of developed countries in this matter and the realities of today, Ukraine can find its own ways to implement the circular economy concept because the transition from the exhausted traditional model to the "green" economy model will contribute to the improvement of the economic situation in the country, the creation of promising market niches (processing, remanufacturing, service, engineering), the increase of investments and the introduction of new business models (Sandul et al., 2018; Stankevičius et al., 2020).

Several works by Ukrainian scientists (Andrusiv et al., 2021; Cuomo, 2021) are devoted to finding ways to implement the concept of circular economy effectively. Zh.V. Deriy and K.O. Vinnychenko (Deriy, and Vinnychenko, 2018) suggest using environmental policy tools to solve the problems of sustainable development. In the work of Zh. Deriy, T. Zosymenko, N. Shadura-Nykyporets (2019) considered the possibility of sectoral cooperation between the countries of the European Union and Ukraine using the principles of the circular economy. O. Shkurenko (2021) considers the possibility of introducing the concept of a circular economy as a way for Ukraine in the process of globalization. It is appropriate to consider the prospects of an individual region of Ukraine before introducing the circular economy. Since the capabilities of each area of the country are different, it is necessary to search for sources of solutions to the environmental and economic problems of a particular region. The Black Sea region of Ukraine was chosen for the study as it is one of the most polluted regions of Ukraine.

Therefore, the purpose of this article is to study the concept of "circular economy", identify problems, and search for prospects on the way to implement the circular economy in the example of the Black Sea region.

2. MATERIALS AND METHODS

The following research methods were used in the work: procedure of analysis of scientific sources, method of information search, the process of analytical review, method of calculation of regulatory documentation on the subject of circular economy implementation, method of functional analysis, method of finding the leading cause, way of statistical data analysis. Analysis and generalization of the experience of developed countries in introducing the concept of the circular economy were carried out. Applying the calculation method of scientific sources made it possible to search and systematize scientific materials and identify areas for further analysis. The information search method was used to find and select the practical experience of implementing the cir-

cular economy in developed countries, regulatory documents, and modern research.

The method of analysis of regulatory documentation on the subject of the study – Decisions of regional councils of the Black Sea region of Ukraine (Decision of the regional..., 2019; Decision of the regional..., 2020), made it possible to search for earlier normative legal acts relating to the same area of study. The method makes it possible to find all normative legal acts regulating the development of the circular economy in developed countries and Ukraine for a particular historical period in one direction. Allows you to expand the range of document searches for specific search directions. Functional analysis was used to identify obstacles to introducing the circular economy concept in developed countries and Ukraine to establish a cause-and-effect relationship between the identified barriers in implementing the principles of the "green" economy and the negative impact these "gaps" can have. Applying the method of finding the leading cause in scientific research made it possible to identify the leading causes of the problems among the specified issues on implementing the circular economy concept and determine the measures necessary for their elimination. Combining the aforementioned scientific research methods allowed us to find, systematize, and analyze the required information and identify the main trends in introducing a "green" economy.

Three stages of problem research can be distinguished. In the first stage, information was collected for further analysis. Sources of information describing the international experience of implementing the circular economy concept in developed countries were selected using the information search method. Information sources with statistical data from the Black Sea region were also determined. A list of normative documents relevant to the subject of the study was selected.

In the second stage, the experience of implementing the circular economy concept in developed countries and Ukraine were analyzed and summarized. The methods of analysis of scientific and normative sources of information made it possible to systematize knowledge about the experience of implementing the circular economy concept to determine the main ways of developing this direction.

In the third stage, the cause-and-effect relationship of the identified obstacles on the way to the implementation of the circular economy concept as an integral component of the sustainable development of the Black Sea region and the negative impact that these obstacles can create was established. For this purpose, functional analysis was applied. The method of statistical data analysis was also used to evaluate the data obtained from the data of the State Statistics Service of Ukraine (Statistical Collection..., 2020). The root cause analysis method made it possible to identify the main obstacles among the specified blocks and to determine the measures necessary to eliminate them.

3. RESULTS

Climatic changes, limited natural resources, and their irrational use led to the need to change economic models. Current socio-economic and political conditions require the fastest transition to a new economic model. It is the circular economy model that has received the most significant sup-

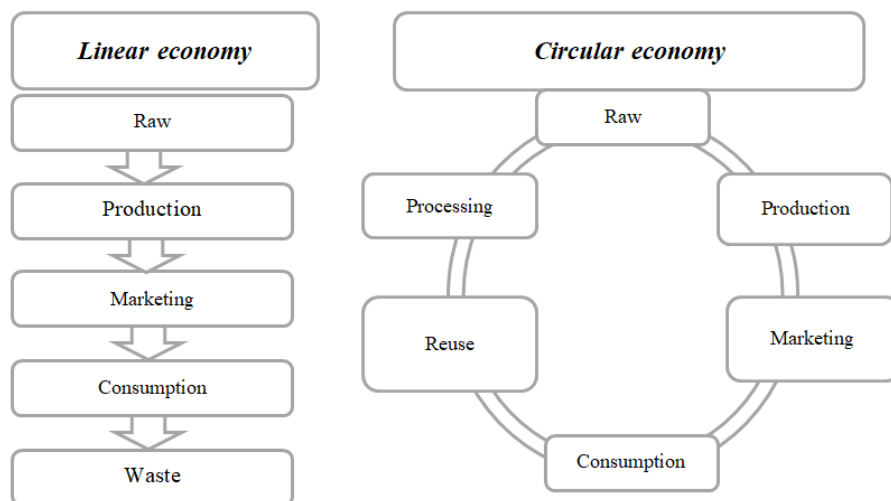


Fig. (1). The difference between the linear model and the circular economy.
Source: compiled by the authors.

port in many developed countries of the world. It is built on the example of the closed principle of metabolism in nature. Its purpose is to preserve the value of products and raw materials until the end of their use. The implementation of the circular economy model will have an ecological and economic effect due to cost savings and the creation of new jobs. The United Nations (UN) seven sustainable development goals solve developed countries' environmental problems. Owners of transport and logistics companies in 85 countries of the world are concerned about the ecological consequences which cause the growth of their business because the expansion of transport connections, as a result of the use of a large number of vehicles, leads to environmental pollution. Therefore, implementing the circular economy concept is an integral part of the sustainable development of every country. The concept of circular economy is a relatively new idea. Therefore, authors (Unruh, 2018; Shkurenko, 2021) studying this issue do not have a unanimous opinion on the definition of this concept.

The concept of circular economy was first mentioned in the sixties of the last century. The scientific work of D.H. Meadows, D.L. Meadows, J. Randers, W.W. Behrens (1972) emphasized that it is necessary to implement such a production method of products that will allow them to be used effectively in the future. Scientists G. Unruh (2018), P. Hopkinson (2018), and D. Andrews (2015) emphasize that the implementation of circular economy principles will contribute to the development of an inclusive green economy. In the nineties, the last century, famous environmental economists D. Pearce and R. Turner (1990) joined the attempts to define the concept of "circular economy". It contributed to the modern understanding of this concept. M. Hill (2020) emphasizes that the circular economy is regenerative by design and aims to ensure that products, raw materials, and materials always have the highest utility and value. Scientists S. Morath (2022) and D. Bora (2020) note that the principles of the "green" economy are the non-use of harmful and scarce resources in production and everyday life, which allows for reducing the negative impact on the environment, and also contributes to the fact that companies that use circular economy principles become more innovative and competitive.

Ukrainian scientists also considered circular economy models in their works (Andrusiv et al., 2021). In the work of the economist O. Shkurenko (2021), four steps in the formation of a closed cycle model are defined:

- the concept of "green growth" (the 80s) – the transition to ecological production and consumption;
- the new sustainable development strategy (the 90s) – the principles of the circular economy consisted of 3R: reduce, reuse (repeated use), recycle (recycling);
- transformation of the principles of green growth (the 2000s) – the principles of the green economy were optimal for the goals formulated in the Millennium Declaration (2000-2015);
- global green economy (2008-present) – the UN launched the Green Economy Initiative, which aims to stimulate economic growth and create new jobs in the economy.

In the scientific literature, many definitions of the concept of "circular economy" are given. Very often, scientists consider the terms "cyclical economy", "green economy", "cyclical economy", "circular economy", "renewable economy", "closed-loop economy" as synonyms. H. Dzwigol, N. Trushkina, A. Kwilinski (2021) in their work generalized the terminological apparatus of this concept and proposed to consider it as "an innovative approach to the organization of logistics processes, based on the closed movement of resources with their minimal losses in the form of waste and maximum involvement of secondary resources in production in order to achieve sustainable development of logistics systems". Thus, the transition to a circular economy is caused by an increase in the burden on the environment and the inefficiency of business models operating within a linear economy's framework for many years. Such models have several significant differences among themselves. The "green" economy model differs in how it creates values (Fig. 1).

Fig. (1) shows new links "reuse," and "recycling" appear in the circular economy model. It is these links that allow you

to save primary resources. But the "waste" link is absent, in contrast to the linear economy model. The linear economy model is aimed at increasing sales and consumption. The circular economy model aims to improve the entire system's value by reducing its cost and preserving valuable resources. In the practical plane of comparative models, the concepts of ecological efficiency also differ. In the linear economy model, in the case of recycling, as a rule, a product of lower quality is produced, which reduces the value of the material. In the circular economy, material flows create closed cycles that work according to the example of ecosystems. There is no concept of waste because all the offset products can be used to develop new products. After removing toxic components, the residues move in technical and biological cycles. After the products have been used, the manufacturers remove them and put them back on sale due to repairs. Fewer steps in processing material for reuse can improve the quality of the original products.

It is essential to process the material and preserve its quality in such a system. For a "cyclical" economy, the quality of flows in the system is critical. When planning a technological cycle or biocycle, it is necessary to design the product's most extended possible period of use. Thus, the circular economy is a set of business models aimed at minimizing resources for producing goods and services, using repairs to increase the useful life of goods and services, processing the final products of the production, and obtaining additional profit for the residual value of materials. It is necessary to understand that the economic growth that every country seeks to achieve requires more production, which requires more extraction of resources. This approach leads to the maximum development of anthropogenic load on nature. This forces us to rethink existing business models and move to a circular economy. The circular economy offers enterprises the frugal use of raw materials, the efficient consumption of available resources, and the reduction of waste generation. The so-called "3R" principle is to reduce, reuse, and recycle. The circular economy goes beyond the production process and is integrated into the country's economy as the primary strategy for finding synergies in creating a closed cycle of resource use. The implementation of such an economy requires the creation of new business models based on eco-design, repair, restoration, and replacement of manufactured products in order not to create a large amount of industrial waste. Summarizing the business models of the circular economy, five main components are distinguished:

1. Product design. This is the design of goods with a more extended period of use. The possibility of disassembly, repair, reuse, or remanufacturing is immediately established (Zhantasov et al., 2022).
2. Production processes in which all resources are used as efficiently as possible (Kalenska et al., 2021).
3. Resource consumption. Manufactured products are labeled with information on the impact on the environment, energy or water consumption, and the period of use of the products. This approach will contribute to the responsible choice of the consumer (Vystavna et al., 2018).

4. Waste management. It prioritizes the stages of handling them: prevention of formation, preparation for reuse, recycling, other recovery operations (including energy generation), and removal (Ibrayeva et al., 2018).
5. Transformation of waste into resources. Expands the market of secondary raw materials and reuse (Getman et al., 2019).

In Ukraine, energy- and resource-intensive industries significantly contribute to the gross domestic product. That is why there is a need to make effective decisions at the state level in front of these industries – optimization of the use of natural resources, reduction of energy intensity, effective waste management, minimization of harmful effects on the environment to use the concept of the circular economy. The introduction of European standards for managing production processes is a prerequisite for removing toxic substances from production processes and the subsequent use of products. The introduction of the concept of circular economy to the economy of Ukraine has several advantages of an economic, ecological, and social nature. The initial goal of the "green" economy is to positively impact the country's environmental system, which does not exhaust or overload it.

Significant saving of resources brings economic benefits to business entities. Resources are processed and returned to production, thus increasing their quantity and breaking the dependence of economic growth on the consumption of raw materials thanks to economic growth. The social benefit of increasing new jobs is the population's employment level. Create more comfortable conditions for the growth of the country's population by reducing the environmental burden. Environmental advantages include reducing the amount of waste and the number of harmful substances entering the environment (Getman, 2020). Analyzing the data of the State Statistics Service of Ukraine (Statistical Collection..., 2020), it can be concluded that the pollution level in the Black Sea region is relatively high compared to other areas of Ukraine. Let's consider the dynamics of emissions of pollutants into the atmospheric air from stationary sources of pollution (Fig. 2). A gradual increase in this indicator is possible in the period from 2016 to 2020. The "leader" in this indicator is the Odesa region; the maximum number of emissions of pollutants in atmospheric air in 2019 was 37.4 thousand tons.

Analyzing the waste generation indicator from 2016 to 2020, it can be concluded that the general trend toward an increase in the amount of waste in the region remains. Exceptionally high indicators are observed in the Kherson region (Fig. 3).

Thus, if economic entities of the Black Sea region produce more waste, they should also increase the waste disposal rate. According to the waste disposal schedules from 2016 to 2020, it can be concluded that there is also a negative trend here (Fig. 4). The peak year for the amount of disposed waste is 2018. Then this indicator decreases (except Mykolaiv region).

It is also necessary to pay attention to the fact that the amount of waste is measured in millions of tons, and the amount of disposed waste is in tens of thousands. So, for example, 2,308.5 thousand tons of waste were generated in the Mykolayiv region, and only 55.8 thousand tons were

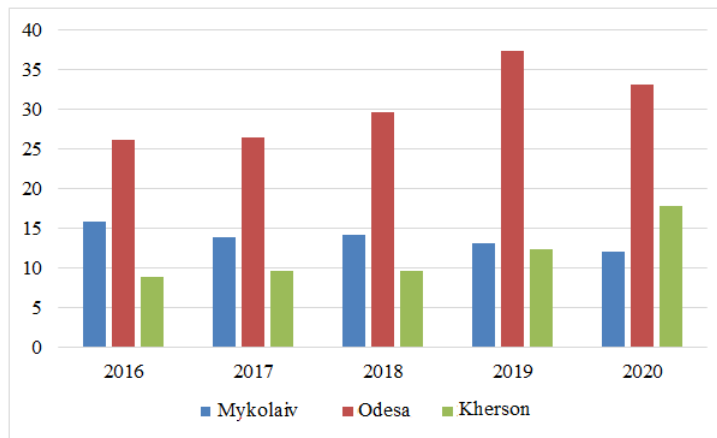


Fig. (2). Comparison of emissions of pollutants into atmospheric air from stationary sources of pollution (thousand tons)
Source: built by the authors based on data (2020).

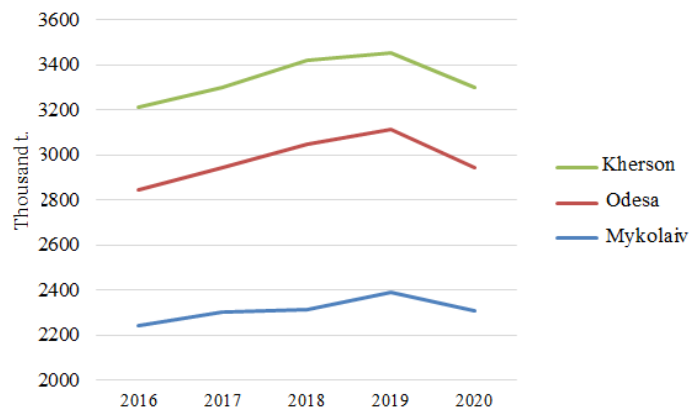


Fig. (3). Graphs of waste generation by regions of the Black Sea region, thousand tons
Source: built by the authors based on data (2020).

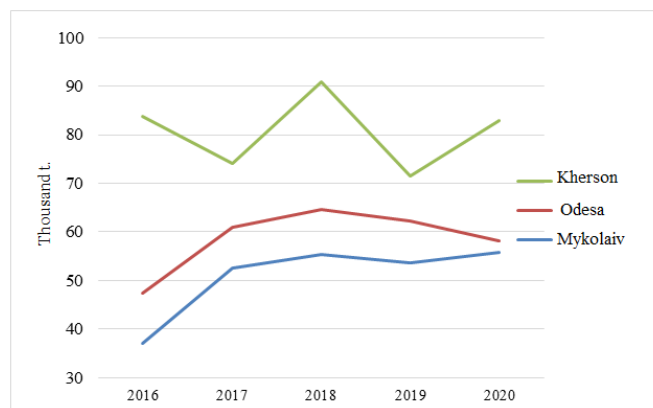


Fig. (4). Schedules of waste disposal by regions of the Black Sea region, thousand tons
Source: built by the authors based on data (2020).

disposed of. That is, less than 3% of waste was disposed of. Also, since 2019, there has been a decrease in capital investments directed at environmental protection. This also reflects a negative trend on the way to the introduction of the "green" economy (Fig. 5).

The introduction of sustainable development of the economy of the Black Sea region requires the introduction of innova-

tive business models and economic and organizational management technologies that will correspond to today's transformative transformations of the national economy and reduce the negative impact on the environment. The increase in the amount of production waste and emissions into the environment contributes to the deterioration of the ecological situation in the region.

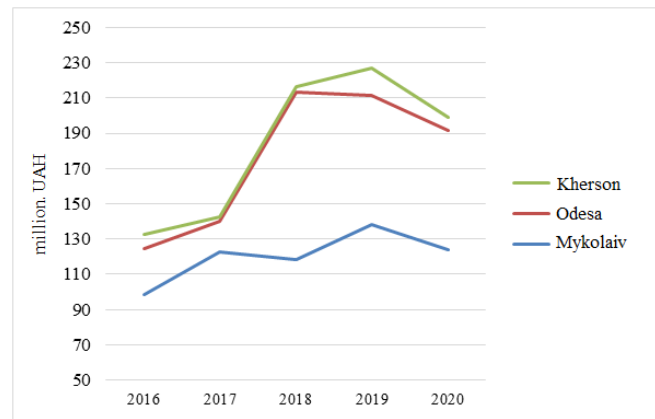


Fig. (5). Schedules of capital investments for environmental protection by regions of the Black Sea region, million UAH.

4. DISCUSSION

The history of humanity's relationship with the environment has a long and difficult history. The constantly growing number of planet's population also requires an increase in the number of resources it uses. Suppose we do not separate the rate of economic growth from the rate of resource use by 2050. In that case, humanity will consume more than 140 billion tons of ore, fossil fuels, minerals, and biomass annually (Novytska et al., 2020). Industrialization helped millions of people overcome poverty and improve their quality of life. But, at the same time, it created conditions in which humanity and the planet can no longer exist. It is necessary to create such a system in which environmental protection will go hand in hand with economic growth. The world needs fundamental transformations to ensure sustainable production and consumption and overcome the climate crisis by 2050, considering planet's potential (Kazak, 2018; Temirbekov et al., 2016). A change in the modern paradigm of ecological thinking is needed. Currently, the linear economy model prevails in most countries of the world. The process of generating waste that has no further use is gaining momentum. However, changes are still happening, and the circular economy is gradually gaining momentum.

Source: built by the authors based on data (2020). In the work of Zh. Deriy, T. Zosymenko, N. Shadura-Nykyporets (2019) it is emphasized that the national industrial enterprises of Ukraine consume natural resources to produce their products, mostly not caring about the further utilization of industrial waste. Constant extraction of resources is the cause of the depletion of the subsoil. The authors emphasize that Ukraine accumulates waste that pollutes the environment. Such a negative trend leads to a lack of natural resources and environmental disasters. The study of developed countries' economies in P. Hopkinson (2018) work shows that many developed countries are currently focusing their efforts on solving environmental and socioeconomic problems and achieving sustainable production and consumption. There is an urgent need to move to a circular economy model due to the apparent consequences of environmental degradation or lost economic opportunities for industries that do not reuse materials after their first life cycle. The circular economy is a self-renewing economic system that allows for the most efficient and ecological use of resources at all stages of produc-

tion and involves the entire value chain of goods and services to create a closed cycle. Methods of multiple benefits of products, parts, and materials are considered. All waste generated in the production process is reused in other value chain links, which avoids environmental pollution (Bobos et al., 2019; Tyliczszak and Pielichowski, 2013).

A new and more ecological model of the economy is not only a requirement of the modern world but also an excellent opportunity for Ukraine to increase economic indicators, improve the population's well-being, and reduce the negative environmental impact (Tkachuk et al., 2021). The research conducted by O. Shkurenko (2021) allows us to conclude that the ecological situation is deteriorating in Ukraine due to the fact that industrial development is proceeding at a stable pace. The industrial sector is the largest user of generated energy worldwide and accounts for a third of all carbon dioxide emissions. Authors Zh.V. Deriy and K.O. Vinnychenko (2018) emphasize that the industrial production systems existing in Ukraine inefficiently use natural resources. Only a small share of the volume of extracted resources is used to produce final products. Because factories still ignore advanced management systems and use outdated technologies, enterprises consume more resources than the production process requires. It is the increase in the efficiency of consumption of natural resources that will contribute to resource conservation. Effective use of raw materials helps reduce the demand for them and mitigate the impact on the environment caused by their extraction. Waste recycling reduces production's need to extract raw materials (Baideldinov and Iz-bassarov, 2013). Thus, it contributes to saving the part of the electricity used for its production, reduces the amount of waste and pollution, and reduces the number of capital investments directed to processing the final product.

As a result, increasing the efficiency of economic sectors can be achieved, including by improving environmental characteristics, due to increasing the profitability of production and creating jobs. One of the ways by which this can be achieved is the recovery of valuable materials from production waste, which will contribute to the release of new products to new sales markets. The efficiency of the enterprise's functioning is achieved due to: the use of a high-quality management system, qualified personnel, energy resources, raw materials, water, waste disposal, and reduced emissions of harmful impurities into the air (Aidosov et al., 2015; Baideldynov et

al., 2019). Currently, the following tasks are being solved within the framework of the implementation of an effective economic policy in the Black Sea region:

- development of a regional industrial waste management strategy;
- introduction of effective recycling technologies;
- implementation of an ecological system of nature management;
- use of partnership as an effective mechanism for reducing the negative impact on the environment, etc.

However, considering the statistical data (Figure 2-5), it can be concluded that the industrial waste management system is not functioning effectively enough in the Black Sea region. Inadequate provision of the waste management mechanism leads to a significant increase in the volume of their accumulation. Enterprises in the area have a low level of implementation of low-waste production technologies and insufficient investment in industrial waste recycling (Figure 5). Such factors negatively affect the state of the environment in the Black Sea region, which also increases the economic burden and the likelihood of environmental risks. Increasing the effectiveness of the Black Sea region's regional industrial waste management system in the context of circular economy concepts requires replacing modern ecological thinking, searching for new environmental and logistical solutions, and innovative technologies (Anisimova, 2020; Kazak and Hotsuliak, 2020).

In the Black Sea region, the share of capital investments aimed at waste processing in 2020 was a third of the total capital investments to finance environmental protection measures. The specific weight of capital investments increased to 5.4% of the all-Ukrainian volume of investments for this ecological protection measure. In Odesa Oblast, this share of assets decreased to 6% of the total volume of investments in the Black Sea Economic District. In the Mykolaiv region, it increased significantly – more than 90% of the total volume of regional assets. In the Kherson region, there is also a decrease – up to 2.5% of the total volume of investments. Let's analyze the tasks of the Regional Development Strategies of the Kherson (2019), Mykolaiv (2020), and Odesa regions (2020) for the period until 2027. It can be concluded that these normative documents do not pay enough attention to the development and functioning of the regional industrial waste management system, which could correspond to modern business requirements. Several obstacles to the implementation of the circular economy concept in the Black Sea region can be identified:

- lack of regional waste management programs;
- there is no comprehensive approach to waste recycling of enterprises in the region;
- low effectiveness of measures to prevent the formation, removal, disposal, disposal of waste;
- low indicators of the use of secondary raw materials in the context of the "green" economy;
- a morally and technically outdated waste disposal system at regional enterprises.

However, positive developments in introducing the concept of circular economy in the Black Sea region were also revealed. The priority areas of regional development include the preservation and development of territories in Mykolaiv Oblast, environmental safety and conservation of resources in Kherson Oblast, and eco-transformation in Odesa Oblast. The implementation of the concept of circular economy in the Black Sea region as an integral component of sustainable development will contribute to increasing the level of environmental safety in the area, developing ecological management, reducing the negative impact on the environment, solving waste management problems, significantly saving resources, increasing new jobs, reducing the number of waste and the number of harmful substances that pollute the environment. So, it can be concluded that the regional development of the Black Sea region depends on changing the perspective on the category "waste". Production waste management should be considered an economical category.

Thus, the regional authorities of the Black Sea region should focus on the development of comprehensive waste management programs with the involvement of interested parties. Thus, this study confirms the results of previous studies by scientists (Deriy, and Vinnychenko, 2018; Shkurenko, 2021). The rapid development of industry in Ukraine leads to a significant deterioration of the ecological situation (Shkurenko, 2021); also, inefficient production models are still used in production enterprises (Deriy and Vinnychenko, 2018). Scientific research confirms the opinion of Ukrainian scientists Zh. Deriy, T. Zosymenko, N. Shadura-Nykypporets (2019). Those national enterprises care little about the environment. The obtained results of the study, in comparison with the results of other studies on the topic (Deriy, and Vinnychenko, 2018; Shkurenko, 2021), have practical significance for the leadership of the Black Sea region since the survey was conducted based on statistical data of this region.

5. CONCLUSIONS

In today's world, approaches to the production and consumption process are changing. The circular economy is not just product recycling. It should act long before the end of the product's life cycle. The concept of a circular economy involves participation in all stages of the production of goods and their planning to extend their life cycle and increase the potential for further reuse. The motto of the circular economy is to ensure the maximum efficiency of each process in the life cycle of goods or services. When switching to such an economic model, the socio-economic sector of the country receives significant advantages at all stages: from the definition of raw materials used in production and the technology of manufacturing products to the use of waste from one production as raw materials for another. Thus, enterprises will not accumulate waste and lose the value of products. This will improve the ecological situation in the country. The processes of introducing innovations into production will be launched, and the number of jobs will increase. And this will help improve the competitiveness of the economy.

Ukraine took a "green" course, in which the main component is the circular economy. This will continue to stimulate the development of the economy and will ensure the improvement of people's health and well-being. It should be noted

that the concepts of "production waste" and "industrial waste" are not defined at the legislative level in Ukraine. Bringing these concepts to regulatory documents would facilitate separation from other types of waste and ensure more effective implementation of legislative norms in the field of industrial waste management and recycling. In the Black Sea region, to increase the efficiency of the industrial waste management system, it is necessary to: implement the implementation of reverse logistics from the standpoint of the "green" economy, develop and implement tools for economic simulation of waste disposal at financial facilities, create logistics infrastructure facilities for waste management, develop assistance tools partnerships based on the attraction of private investments in the field of waste management, to promote the use of waste recycling, to promote the introduction of new technologies for processing and disposal of waste taking into account European quality standards. In the future, there is a need to conduct a more in-depth analysis taking into account the indicators of environmental pollution, the size of capital investments aimed at its preservation, and other factors that affect the possibility of implementing the circular economy in Ukraine.

REFERENCES

- Aidosov, A.A., Aidosov, G.A., Zaurbekov, N.S., Baibolova, L.K., Admaeva, A.M. and Zaurbekova, N.D. (2015). The estimation of height of the mouth of the river of sources and influence of building of industrial facilities at the modelling of pollution of the atmosphere by the emissions. *Research Journal of Applied Sciences*, 10(2), 54-58.
- Andrews, D. (2015). The circular economy, design thinking, and education for sustainability. *Local Economy*, 30(3), 305-315.
- Andrusiv, U., Zelinska, H., Kupalova, H., Marynychak, L. and Dovgal, O. (2021). Optimization of balance components of fuel and energy resources for organizational and economic support of energy efficiency in Ukraine. *Ecological Engineering & Environmental Technology*, 22(6), 27-35.
- Anisimova, H. and Kopytsia, I. (2021). The role of courts in environmental rights protection in the context of the state policy of Ukraine. *Access to Justice in Eastern Europe*, 4(2), 164-176.
- Anisimova, H.V. (2020). Public environmental interests: Legal theory research. *Environmental Policy and Law*, 49(4-5), 292-299.
- Baideldinov, D., Kuderin, I. and Izbasarova, A. (2013). Problems of development of environmental policy and law in the Republic of Kazakhstan. *World Applied Sciences Journal*, 25(11), 1619-1623.
- Baideldinov, D.L. and Izbassarov, A.O. (2013). Specifics of the conservation area in the northern part of the Caspian sea. *Middle East Journal of Scientific Research*, 13(5), 658-664.
- Baideldynov, D., Jangabulova, A., Yerezhepyzy, R., Berdibayeva, A. and Khamit, A. (2019). Central Asian transboundary waters in the age of globalization: Problems of legal regulation and international cooperation. *Journal of Environmental Management and Tourism*, 10(5), 1060-1073.
- Bobos, I., Fedosy, I., Zavadzka, O., Tonha, O. and Olt, J. (2019). Optimization of plant densities of dolichos (*Dolichos lablab* l. var. *lignosus*) bean in the right-bank of forest-steppe of Ukraine. *Agronomy Research*, 17(6), 2195-2202.
- Bora, D. (2020). Rise of the sustainable circular economy platform from waste plastics: A biotechnological perspective. *MRS Energy & Sustainability*, 7, 28.
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions "Closing the Loop – An EU Action Plan for the Circular Economy". (2015). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614>.
- Cuomo, F. (2021). Living lab on sharing and circular economy: *The case of Turin Health Informatics Journal*, 27, 1-12.
- Decision of the regional council No. 1228-VII "On the approval of the development strategy of the Odesa region for the period 2021-2027". (2020). <https://oblrada.od.gov.ua/wp-content/uploads/1228-VIII.pdf>.
- Decision of the regional council No. 1511 "On the development strategy of the Kherson region for the period 2021-2027". (2019). <https://khoda.gov.ua/strateg%D1%96ja-rozvitku-2021-2027>.
- Decision of the regional council No. 2 "On the approval of the development strategy of the Mykolaiv region until 2027". (2020). <https://cutt.ly/qBLFtf3>.
- Deriy, Zh., Zosymenko, T. and Shadura-Nykyporets, N. (2019). Implementation of sustainable development as a key principle of sectoral cooperation between Ukraine and the EU. *Problems and Prospects of Economics and Management*, 4(20), 9-18.
- Deriy, Zh.V. and Vynnychenko, K.O. (2018). Tools of environmental policy in solving the problems of rational use of land resources. *Problems and Prospects of Economics and Management*, 4, 7-15.
- Dhaske, G. (2021). The Emergence of Circular Economy in Integrated Agriculture-Livestock Livelihoods. *Emerging Economy Studies*, 7(1), 94-100.
- Dzwigol, H., Trushkina, N. and Kwilinski, A. (2021). The Organizational and Economic Mechanism of Implementing the Concept of Green Logistics. *Virtual Economics*, 4(2), 74-108.
- Getman, A.P. (2020). Human life and health as an object of environmental law in the globalised world. *Journal of the National Academy of Legal Sciences of Ukraine*, 27(1), 189-200.
- Getman, A.P., Getman, Y.A. and Lozo, V.I. (2019). Climate protection laws: European reality and Ukrainian prospects. *Environmental Policy and Law*, 49(2-3), 190-195.
- Henrysson, M. (2021). The Role of Institutions in Creating Circular Economy Pathways for Regional Development. *The Journal of Environment & Development*, 30(2), 149-171.
- Hill, M. (2020). *Understanding Environmental Pollution*. Cambridge: Cambridge University Press.
- Hopkinson, P. 2018. Managing a Complex Global Circular Economy Business Model: Opportunities and Challenges. *California Management Review*, 60(3), 71-94.
- Ibrayeva, A., Sannikov, D.V., Kadyrov, M.A., Zapevalov, V.N., Hasanov, E.L. and Zuev, V.N. (2018). Importance of the caspian countries for the European union energy security. *International Journal of Energy Economics and Policy*, 8(3), 150-159.
- Kalenska, S., Novytska, N., Stolyarchuk, T., Kalenskiy, V., Garbar, L., Sadko, M., Shutiy, O. and Sonko, R. (2021). Nanopreparations in technologies of plants growing. *Agronomy Research*, 19(Special Issue 1), 795-808.
- Kazak, R. (2017). Development of legal norms on biodiversity protection reflecting eu trends. *Environmental Policy and Law*, 47(3-4), 147-152.
- Kazak, R. (2018). Periodization of nature protection in Ukraine in the latter half of the 20th century: Legal aspect. *Espacios*, 39(19).
- Kazak, R. and Hotsuliak, S. (2020). Features of sanitary legislation in Ukraine in the mid-20th century: Historical overview. *European Journal of Sustainable Development*, 9(3), 257-266.
- Marjamaa, M. (2021). A Sustainable Circular Economy: Exploring Stakeholder Interests in Finland. *South Asian Journal of Business and Management Cases*, 10(1), 50-62.
- Meadows, D.H., Meadows, D.L., Randers, J. and Behrens, W.W. (1972). *Limits to growth: A report for the club of Rome's project on the predicament of mankind*. New York: Universe Books Publ.
- Morath, S. (2022). 10 – *The Circular Economy*. In: Our Plastic Problem and How to Solve It (pp. 187-200). North Carolina: Cambridge University Press.
- Novytska, N., Gadzovskiy, G., Mazurenko, B., Kalenska, S., Svistunova, I. and Martynov, O. (2020). Effect of seed inoculation and foliar fertilizing on structure of soybean yield and yield structure in western polissya of Ukraine. *Agronomy Research*, 18(4), 2512-2519.
- Pearce, D. and Turner, R. (1990). *Economics of natural resources and the environment*. Baltimore: Johns Hopkins University Press.
- Piila, N. (2022). Organizational Drivers and Challenges in Circular Economy Implementation: An Issue Life Cycle Approach. *Organization & Environment*, 2022, 1-28.
- Sandul, G.O., Sandul, O.G. and Bulgakov, A.O. (2018). On the nuclear decision-making theory. *Nuclear and Radiation Safety*, 4(80), 58-64.

- Sharma, R. (2020). Green Management and Circular Economy for Sustainable Development. Vision: *The Journal of Business Perspective*, 24(1), 7-8.
- Shkurenko, O. (2021). Integration of Sustainable Development and Business Development as a Dominant Basis of the Circular Economy Model: Theoretical Aspect. *The Journal of V.N. Karazin Kharkiv National University*, 13, 152-165.
- Stankevičius, A., Novikovas, A., Bakaveckas, A. and Petryshyn, O. (2020). Eu waste regulation in the context of the circular economy: Peculiarities of interaction. *Entrepreneurship and Sustainability Issues*, 8(2), 533-545.
- Statistical Collection "Income and expenditure of the population by regions of Ukraine". (2020). https://ukrstat.gov.ua/druk/publicat/kat_u/publ2_u.htm.
- Temirbekov, E.S., Jomartov, A.A., Zaurbekov, N.S. and Zaurbekova, G.N. (2016). The pneumatic delivery device weft laying on multi-colored looms STB. *Izvestiya Vysshikh Uchebnykh Zavedenii, Seriya Tekhnologiya Tekstil'noi Promyshlennosti*, 364 2016-January(4), 120-125.
- Tkachuk, V., Skrypyk, A., Baidala, V., Klymenko, N. and Namiashenko, Y. (2021). Optimization and diversification of natural gas supply in Ukraine. *E3S Web of Conferences*, 250, article number 02003.
- Tyliszczak, B. and Pielichowski, K. (2013). Novel hydrogels containing nanosilver for biomedical applications - Synthesis and characterization. *Journal of Polymer Research*, 20(7), article number 191.
- Unruh, G. (2018). Circular Economy, 3D Printing, and the Biosphere Rules. *California Management Review*, 60(3), 95-111.
- Vystavna, Y., Cherkashyna, M. and van der Valk, M.R. (2018). Water laws of Georgia, Moldova and Ukraine: current problems and integration with EU legislation. *Water International*, 43(3), 424-435.
- Yi, S. (2019). Evaluation and development of Korea's national plan for resource circulation towards a circular economy. *Energy & Environment*, 31(7), 1129-1146.
- Zhantasov, K., Ziyat, A., Sarypbekova, N., Kirgizbayeva, K., Iztleuov, G., Zhantasov, M., Sagitova, G. and Aryn, A. (2022). Ecologically Friendly, Slow-Release Granular Fertilizers with Phosphogypsum. *Polish Journal of Environmental Studies*, 31(3), 2935-2942.

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