



ЕКОНОМІКА ТА ІННОВАЦІЙНИЙ РОЗВИТОК НАЦІОНАЛЬНОГО ГОСПОДАРСТВА

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IMPLEMENTATION OF CIRCULAR ECONOMY APPROACHES IN THE TERRITORIAL COMMUNITIES OF THE REGION

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ВПРОВАДЖЕННЯ ПІДХОДІВ ЕКОНОМІКИ ЗАМКНУТОГО ЦИКЛУ В ТЕРИТОРІАЛЬНИХ ГРОМАДАХ РЕГІОНУ

Formulation of the problem. At the current rapid growth of world's consumption, it is obvious that the model of a linear economy with the creation of products, the use of these products, and then their disposal, without taking into account environmental, social, and economic consequences is a losing approach. The concept of households where nothing is lost, where waste becomes an asset and no value remains non-renewable, where all products are restored and reused after use and, finally, processed.

The European Commission has hopes for the introduction of a circular economy, where the value of products, materials, and resources is stored in the economy as long as possible, and the waste generation is minimized for a significant contribution to the EU effort to develop a constant, low-carbon, resource-efficient and competitive economy [1].

Implemented in the European Union, the concept of a closed cycle economy (or a zero-waste economy) determines that production and consumption systems need fundamental transformations in order to be sustainable and reach by 2050 the goals of life within the limits of the capabilities of our planet.

Analysis of recent research and publications. The concept of a closed cycle economy is based on the study of nonlinear systems, in particular living systems. The main consequence of the analysis of living systems is the concept of optimization of systems, not components, which can also be called "suitable design". It provides careful control of materials that in the circular economy are of two types, as described McDonough and Braungart: biological nutrients intended for safe return to the biosphere and the creation of natural capital, and technical nutrients that are designed to circulate with high quality in the biosphere [2].

The economy of a closed cycle is an industrial; relied on renewable energy sources; minimizes, monitors, and eliminates the use of toxic chemicals; and eliminates waste due to careful design. This term goes beyond the mechanism of production and consumption of goods and services in the areas that it seeks to override (examples include the restoration of capital, including social and natural, and the transition from the consumer to the user).

The introduction of a closed cycle economy is based on several basic concepts that can also be considered as tools to achieve its goals: eco-deity is a sphere in design and architecture that focuses on environmental protection throughout the product life cycle and harmonious existence in the environment.

The service economy is a part of the economy that is focused on the sale of a limited set of ownership of goods (such as rent) and the provision of services instead of the full transfer of ownership of material goods. This new economic concept is based on two basic principles: finding new ways of optimizing the resources used and selling services. In order to increase the wealth of society, it is not necessary to stimulate production growth. Optimization of long-term use of goods will maximize profit and reduce the dependence on increasing the production of new goods.

Approaches of the closed cycle economy make a clear difference between consumption and the use of materials. The need for a model of “functional services” is supported. Under this model manufacturers or retailers are increasingly retaining ownership of their products and acting as service providers, selling the use of products, and not their unilateral consumption. This change has direct consequences for the development of effective systems for returning and spreading practices of products and business models that create more durable products, facilitate disassembly and recovery, as well as the necessary changes.

Rural communities have significant problems in waste treatment, such as open landfills, open burning, river discharge, plastic pollution, etc., due to a lack of or poor access to official waste management systems. About 1.9 billion people do not have access to a regular waste collection system in rural communities [3]. There are significant rural–urban gaps in terms of accessibility to a network of basic utilities, which require rapid actions and multi-level cooperation. On the other hand, innovation could provide local solutions to transform unmanaged waste fractions into natural fertilizers, bioenergy, or secondary materials for other economic activities [4]. The linear economy prevails in most rural regions. According to the available information currently, only 7.2 % of the global economy is circular and every year the condition is deteriorating due to the growth of production and the use of raw materials. The first edition of this report in 2018 revealed, 9.1 %, further decreased to 8.6 % in 2020, and 7.2% in 2023 [5].

However, the concept of a closed cycle economy is gaining popularity among economists, politicians, and researchers through the potential to promote sustainable development [6; 7] through the introduction that is known as cyclical strategies. Researchers should find an opportunity that the CSR achievement on the agenda by 2030, which declares the UN [8] should be implemented in communities through approaches to a circular economy.

Setting objectives. The purpose of the research is to show the implementation of circular economy practices based on existing empirical studies. Communities of the Mykolaiv region selected for multiple benchmarking are Mykolaiv city, Voznesensk municipal territorial communities, Koblivska, Halytsynivska, Shevchenkivska settlement communities, and Domanivska, Berezanska village communities. All the data used in the study were obtained from the information and reference portal of the local self-government bodies [9–16]. The choice of communities fell on the sampled sample because they represent city, village, and settlement species and evenly geographically located territory of the Mykolaiv region.

Presentation of the main research material. The problem of waste in Mykolaiv region is characterized by a particular scale and significance, both due to the dominance of resource-intensive multi-waste technologies in the national economy, and due to the lack of an adequate response to its challenges for a long time. The significant scale of resource use and the energy and raw material specialization of economy, together with the outdated technological base, determined and will continue to determine high rates of waste generation and accumulation. A detailed analysis of the materials provided by selected official websites found that in the existing strategic documents of the analysed communities solving the problem of waste management has been identified among the priority tasks (table 1).

Table 1

The results of the analysis of the introduction of closed-loop economy approaches in selected communities of the Mykolaiv region

| Name of the community | Strategic documents | Available practices | Involvement of community members |
|---|---|--|---|
| 1 | 2 | 3 | 4 |
| Mykolayivska, municipal territorial community | Mykolaiv Development Strategy 2016–2021 *The development process of the current strategy has not been completed due to the war in Ukraine. | Waste disposal technologies are outdated. Waste is taken outside the city to the landfill, the size of which is 379,000 m ² , and the reserves for expansion are limited. Most waste collection containers are not suitable for sorting waste by type, making the disposal process more difficult. Most of the containers do not have a lid and therefore cannot keep the garbage inside. | Public organisations and associations of citizens are active in Mykolaiv, including 1,355 public organisations registered by the Mykolaiv City Department of Justice. |

continuation of table 1

| 1 | 2 | 3 | 4 |
|--|---|--|---|
| Voznesensk municipal territorial community | Sustainable development strategy of the territorial community of the city of Voznesensk for 2019–2026 | There is a certified place for the removal of solid waste (garbage) on the territory of the community; it is 90% full and can be used for another 3-4 years, but there is a possibility of its expansion. Together with other self-governing bodies, the community has created a garbage cluster, whose task is to build a garbage sorting enterprise (within a radius of 40 km from the community). In 2019, the community intended to make a second attempt to introduce waste sorting; the system didn't work due to the unpreparedness of the residents, although environmental education is conducted in schools. It is worth noting that the city conducts energy audits on individual objects. | The activity of community residents is increasing. 52,9 % are interested in what is happening in the community. However, 45,9 % of residents answered that none of the family members usually take an active part in the life of the community, 26,3 % answered that a few family members usually take an active role in the life of the community, and only 4,8 % answered that they take an active part in the community's life, and 23 % could not answer this question at all. Only 5,1 % of respondents answered that members of their families participate in the activities of public organisations. |
| Domanivska village territorial community | Sustainable development strategy of Domanivska united territorial community, Mykolaiv region for 2018–2026 | Lack of infrastructure and waste collection system. There is no legal and ecologically safe landfill. | Residents are interested in community affairs (79 % of responses, including 51 % either very interested or active). However, only 10 % of households mentioned a person who participates in the activities of a public organisation. |
| Berezanska village territorial community | Development strategy of Berezanska united territorial community 2020–2024 | Low ecological awareness of the community residents, which leads to high littering of the community's territory due to unauthorized dumping of garbage. Low level of implementation of energy efficient measures. | Low public initiative and activity of community members. |
| Koblivska settlement territorial community | Development strategy of Koblivska united territorial community of Berezansky district of Mykolaiv region for the period 2021–2027 | There are containers and bins for solid waste collection in one settlement – Koblevo, incl. in the recreation area. However, their provision is only at the level of 30 %. Waste is transported from settlements by tractors to the general zonal landfill for solid household waste. The passport capacity of the landfill is 120,000 m ³ , the percentage of filling is 85 %, the estimated service life is 50 years, and the start of service was in 1975. The volume of accumulated waste at the landfill is 23,402 tons, the area is 4 hectares, storage type is surface and bulk. Waste from the activities of public catering institutions, maintenance, and repair of equipment, devices, and other products, municipal and similar non-specific industrial waste can be buried. Other villages of the community do not have sanctioned landfills. There are no specialized enterprises in the field of household waste management, which leads to a spontaneous accumulation of household waste in natural relief formations – beams and ravines on the community's territory. | Low public initiative and activity of community members. |

continuation of table 1

| 1 | 2 | 3 | 4 |
|---|--|--|--|
| Halytsynivska settlement territorial community | Development strategy of the Halytsynivska united territorial community for 2018–2026 | Outdated water supply and sewerage infrastructure, solid waste management system. | Community residents do not show an active position in solving current problems. The formation of proecological consciousness and behaviour of residents is needed. |
| Shevchenkivska settlement territorial community | Sustainable development strategy of Shevchenkivka united territorial community for 2019–2027 | There are natural (unauthorized) landfills in the community. All villages of the community are not provided with organized separate collection of solid household waste. | 41,3 % of households declare that no one participates in the community's life. The share of households in which someone belongs to a public organisation was only 4,6 %. |

Source: compiled by the author based on [9–16]

None of the analysed strategies specifies successful practices that implement the principles of a closed cycle economy. Two city communities have legal landfills for the accumulation of solid waste but do not use technologies of sorting, processing, and energy production, instead, there is a threat of exhaustion of the repository resource. Four rural communities only declared the need to allocate a specially equipped waste landfill for each settlement and began educational work among the citizens regarding the sorting of garbage, the danger of its burning, and awareness of its value as a resource for reuse or processing.

Only one community informed its citizens about the energy audit of public premises, which confirms the low level of introduction of the economy of a closed cycle in the communities of the Mykolaiv region. Among the particularly alarming conditions, the low level of activity of community residents in solving existing problems is found, so the involvement of citizens is to be increased first of all.

Stakeholder engagement is assuming growing relevance as an approach supporting the success of circular business models. Developing a dialogue with key stakeholders is strategically relevant to achieve the objectives selected by a governance body. To ensure the effectiveness of a circular business model, a change in cultural values at the topmost level of the community is essential. These values should be aligned along the principles of responsible consumption, sustainable production and supply chains, and safeguarding ecosystems and health [17].

Circularity requires organizations to work along value chains from “cradle to cradle” and to recognize externalities and (potential) benefits for others [18].

The Ellen MacArthur Foundation [19] defines the following main areas of development: decrease of waste and pollution, the circulation of products and materials, and the revival of nature. The realisation of these goals will allow creating an economy that will be beneficial for people, businesses, and the natural world.

National strategy for waste management in Ukraine until 2030 [20] is aimed at implementing a waste management system on an innovative basis, which will ensure the consumption of natural resources (natural resources – useful products – waste – secondary resources – useful products – waste).

Studying the experience of cities that successfully implement the approaches of a closed-cycle economy has made it possible to recommend the use of the following tools for the evaluation of the desired changes by communities of the Mykolaiv region: city scanning and donut economy, and considering the communities based in the priorities of the ESG goals.

City scanning [21] includes the involvement of residents to the creation and development of new business models (circular design models, models of use and extension of life, value recovery model, circular support models), digital production, use of new tools, use devices for creating products and services, introducing a design principle for the future.

Basic circular scanning strategies consider the garbage as the main resource. Objectives of sustainable development are also related to the revitalization of the territories and the health of the community.

The Donut economy [22] provides the following main components of the circular city: creation and support of living conditions; population health; communications and communities inside the city; involvement and participation of citizens in the development of urban territories.

The first city in the world, which officially introduced the donut economy in early April 2020, was the capital of the Netherlands [23]. The Amsterdam city authorities then stated that they hope to get out of the current crises caused by the pandemic and avoid future crises by using this tool. The idea was supported by the city community. The city officials came together to design one of the city's most ambitious initiatives: Amsterdam's strategy to be 100% circular by 2050. Goals of the community of the city of Amsterdam are in table 2.

Table 2

Goals of the community of the city of Amsterdam in implementing new approaches

| Value chain | Assignment |
|--|---|
| Flows of food products and organic waste | <ul style="list-style-type: none"> – short food chains must provide a reliable, sustainable food system; – access to healthy and ecological food for city residents; – quality processing of organic waste flows |
| Consumer goods | <ul style="list-style-type: none"> – reduce consumption, showing a positive example for other cities; – thrifty use of resources |
| Infrastructure and urban environment | <ul style="list-style-type: none"> – the transition to circular development requires joint efforts; – formulation of new criteria that are included in the “circular economy” paradigm; – “circular” approach to the existing city |

Source: compiled by the author based on [23]

The city has set itself the goal of reducing food waste by 50 % by 2030 and has taken steps to make it easier for residents to consume less (by creating easily accessible and well-functioning thrift stores and repair services over the next three years).

Based on the described strategies, we assume that the questions highlighted in this study will be the beginning of further research. The identified regularities require the strengthening of empirical research through surveys and interviews, which will help to investigate the cause-and-effect relationships between socio-economic indicators of the community's development and the level of implementation of closed-loop economy strategies.

The spread of the circular economy at the regional and municipal levels in Ukraine needs systemic restructuring in the field of waste management, introduction of innovative technologies that will promote wider use circular products and distribution of circular consumption patterns. Consistent interaction and mutually beneficial cooperation between authorities and society within the framework of the implementation of the main tasks National waste management strategy [20] capable to create favourable conditions in the near future for the implementation of effective structural restructuring in the field of waste management, which will allow unlock the scaling process the spread of the circular economy in the studied region and to activate the purposeful movement to the fulfilment of the sustainable development goals.

Conclusions from the conducted research. This study focuses on the fact that the communities of the analysed region are aware of the problems caused by the accumulation of waste from production and household consumption. This fact is confirmed by the results of the analysis of the socio-economic development strategies of seven communities. These problems are typical for both urban and rural communities.

Additional research is needed to investigate that sustainable rural development could be achieved by the intersection of circular economy approaches with other sustainable economic alternatives, such as bioeconomy, blue economy, green economy, and digital economy. For better spatial planning, statistical data, law enforcement, and monitoring of pollution efforts with community participation are required in rural regions and identify the specifics of the introduction of a closed-loop economy in rural and urban communities in the context of the implementation of the 2030 Agenda for sustainable development goals.

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