# ENVIRONMENTAL RECYCLING MANAGEMENT IN MUNICIPAL ECONOMIES

Dariusz SOBOŃ [1]

[1] PhD, WSB Merito University in Warsaw,
e-mail: dsobon@post.pl

**Abstract:** The article substantiates theoretical aspects of the formation of effective systems aimed at minimising harmful waste from public production on the basis of technological opportunities for the introduction of waste-free nature-like technologies; it reveals the features of the modern concept of environmental recycling management in the context of the specifics of its application in municipalities. Hierarchical peculiarities of directions and strategies of ecological recycling management application at the levels are proposed

**Keywords:** ecology, efficiency, production, recycling, management, municipal education

## 1. Introduction

At the stage of formation and development of the digital transformation era, the solution of the problem of formation and development of environmental recycling management, including in municipalities in the conditions of digital transformation as an effective tool for managing the sustainable environmental and economic development of the process "disposal - recycling of rubbish waste" is becoming increasingly important [1]. Currently, this direction is one of the key and decisive prerequisites for improving the environmental and economic efficiency and competitiveness of organizations in various industries and spheres of the economy. The most important tool for solving this problem, at present, should be the development of recommendations for the creation, promotion and mastering of a new environmental-economic policy in municipalities

## 2. Research Methods

The methodological basis of the study was the scientific works of scientists in the field of environmental-economic systems management and environmental recycling management, as well as scientific developments on the formation and implementation of management systems in the sphere of environmental-economic processes. Abstract-logical, monographic, graphic, cartographic, economic-statistical and other methods of socio-economic research were widely used in the preparation of the article.

## 3. Results

Environmental recycling management in its content is a system of scientifically based measures implemented to ensure an environmentally friendly and safe model of economic functioning.

The term "recycling" (recycling) means, first of all, the return of social production wastes back directly into the processes of technogenesis. (In the scientific environmental community, technogenesis is commonly understood as the processes of pollution of all components of the natural environment as a result of active anthropogenic processes). That is, we are talking about an activity consisting of many diverse processes related to different spheres, branches and types of human activity. In scientific treatises recycling is considered as one of the key elements of utilisation of production and other wastes, which is directly one of the stages of their processing in order to reduce the negative consequences of human economic activity on the natural environment. At the same time, recycling implies reuse of waste and its return into new production cycles.

The core process of recycling is the technology where different products are re-produced from the waste sent for recycling (e.g. waste paper - paper; scrap metal - metal products, etc.).

The category "ecological recycling-management" is one of the most complex systemic philosophical categories, which contain the installation and determine the general line of development of effective ecological-economic organisations in the conditions of information-digital technological mode of production and consumption.

Environmental recycling management in its content is a system of scientifically based measures implemented to ensure an environmentally friendly and safe model of its functioning.

The term "recycling" (recycling) means, first of all, the return of social production wastes back directly into the processes of technogenesis. (In the scientific environmental community, technogenesis is commonly understood as the processes of pollution of all components of the natural environment as a result of active anthropogenic processes). That is, we are talking about an activity consisting of many diverse processes related to different spheres, branches and types of human activity. In scientific treatises recycling is considered as one of the key elements of utilisation of industrial and other wastes, which is directly one of the stages of their processing. At the same time, recycling implies, first of all, the reuse of waste and its return into new production cycles.

The core process of recycling is the technology where different products are produced again from the waste sent for recycling (e.g. waste paper - paper; scrap metal - metal products, etc.).

Ecological recycling management of the organisation reflects the peculiarities of the general strategy of ecological and economic development, aimed at creating such an organisational and economic model and mechanism of functioning, as a result of the implementation of which it will be possible to ensure both environmentally safe production and economic activity in the process of performing its social functions, and the solution of the problem of preventing pollution of the natural environment and elimination of its consequences.

According to the concept, rubbish waste processing is a complex technological cycle: collection - sorting - treatment - recycling - reuse of raw materials - disposal, etc.

In the process of economic activity, enterprises interact with the natural environment and significantly affect its degradation and pollution. Minimising such negative impacts requires the development of science-based measures for greening, reducing negative human impacts on the natural environment.

The greening of economic activities of enterprises should be understood as a system of measures that provide a noticeable reduction of technogenic impact of enterprises on the environment, including organisational and management measures. Environmental recycling management should play a significant role in solving this problem.

Nowadays, recycling and waste management is a vast network of different kinds of technological processes that support both basic production and the reuse of raw materials for the production of new types of products.

In modern science and practice, the role and importance of environmental management as a special management system for preserving the quality characteristics of the natural environment are immeasurably increasing. Environmental management systems represent an innovative approach to the development and implementation of modern management systems of organisations. One of its varieties, i.e. a specialised type of modern management of an organisation is environmental recycling management.

The need to form effective environmental recycling management systems is explained by the technological peculiarities of this process, when large-scale flows of rubbish waste, which take place in modern production, require deep consideration and differentiated approach in the choice of technologies for their collection, sorting, processing and disposal. First of all, these include wastes that are reusable (plastic, cardboard, wood, glass, metals, etc.).

The term "recycling" means a constantly repeating cycle of something. Thus, production and environmental recycling management means a constantly repeating cycle of management of environmentally safe processes of collection, recycling, utilisation of rubbish waste in order to produce new types of products from secondary resources. Application of the rubbish recycling model in the process of its application in practice requires the use of special technologies and special equipment [2].

Modern systems of ecological recycling management are complexes of interrelated and interacting measures in production-ecological territorial-technological chains of collection - sorting - processing - treatment - recycling - reuse of raw materials - utilisation, etc., developing in space according to certain regularities in order to solve the problem of preservation, minimisation of pollution and destruction, elimination of consequences and restoration of the natural environment on the basis of constant reproduction of natural resources.

Ecological recycling management studies objective regularities and principles of management in organizations of the processes of collection, storage, transportation, processing and disposal of technological production waste.

Environmental recycling management is a special subsystem in the organization's management system, the purpose of which is to preserve the quality characteristics of the natural environment in the process of operation of the production subsystem on the basis of application of special technologies that ensure prevention, minimisation or elimination of pollution consequences.

The subject of environmental recycling management is a system of socio-economic managerial relations in the process of providing key characteristics to improve the efficiency of greening the enterprise's activities in order to preserve and expanded reproduction of the natural environment.

The goal of environmental recycling management is to create organisational and economic systems of enterprises (measures) capable of ensuring minimisation and prevention of pollution and environmental destruction, as well as quick and effective elimination of their consequences.

Ecological recycling management is aimed at ensuring balanced dynamic, sustainable and efficient functioning of enterprises on the basis of justification of management decisions capable of ensuring ecological and economic efficiency in the process of prevention, minimisation of negative impacts of the consequences of social production on the natural environment, as well as the elimination of its consequences.

Environmental recycling management systems have their own specific hierarchy [3]:

a) recycling management at the state level;
b) recycling management at the level of industries and spheres of production;
c) recycling management at the level of regions and municipalities;
d) recycling management at the level of enterprises, companies, corporations;
e) recycling management at the level of on-farm elements of the organizational structure of enterprises.

Despite the commonality of the general goal and key objectives of environmental recycling management systems at different hierarchical levels and scales, the degree of generality of the models of their implementation, the goals, objectives and algorithms are embodied and detailed to a different degree differentiated on the basis of functional, technological, organisational, economic and managerial peculiarities. The closer the hierarchical level of the environmental recycling management system directly approaches the technological production processes of the enterprise.

Environmental recycling management systems are designed to provide management of the main elements of the organizational and management mechanism of its functioning and, above all, regulation [5]:

- organizational-economic and organizational-technological relations regarding supply, storage and maintenance of other processes of the chain of production - processing - utilization of rubbish waste on the basis of introduction of scientific and technical progress achievements in the technology of rubbish recycling, taking into account the

need to improve the processes of integration and cooperation between different enterprises;

- relations of interaction of all elements of the complex of reproduction processes on collection, sorting, storage, transport, processing and utilization of rubbish waste in production and technological issues;
- organizational and technological relations between enterprises producing rubbish waste and enterprises-consumers of rubbish waste engaged in its processing and disposal;
- socio-economic relations between the management of waste generating enterprises and the personnel employed at them, as well as the management of waste consuming enterprises in the context of maintaining the balance of economic interests in solving their tasks, etc.

The general objective of the implementation of environmental recycling management of the organization is progressive changes directly related to the wide introduction and dissemination in practice of innovative technological innovations in the field of ensuring environmentally friendly and safe production.

The peculiarity of the main goal of environmental recycling management of the organization is to ensure that the activities of organizations, related to the introduction of innovative equipment and technologies and the necessary socially oriented organizational, economic and managerial innovations, meet the modern achievements of world science and technology. And the strategy of environmental recycling management is revealed as a system of various tools, measures, forms and methods of functioning of the organization aimed at ensuring the implementation of its policy.

## 4. Discussion

The generalization of literature and practical experience has shown that each technological method of production corresponds to specific models and organizational and economic mechanisms for solving the problem of environmental recycling management - management of the process of collection, storage, processing, sale and disposal of anthropological, technological and economic wastes.

Study of the features and principles of building models of environmental recycling management in accordance with the technological specifics of the way of human impact and interaction with the environment in order to meet the needs in the process of life, as well as trends and tendencies of transformation of forms and models of environmental recycling management as a consequence of the introduction of more highly effective forms and models of concentration and centralisation of management functions. The peculiarities of changing models of environmental recycling management in the process of transition from one technological mode of production to the next have been studied.

The study of literature and practical experience has shown that the increasing technogenic impact of public production on the environment at present creates objective prerequisites for a serious global environmental crisis. These processes put forward before the administrations of regions and municipalities the need to solve the problem of managing by-products and rubbish waste in the chain of their production, transport, processing, disposal. In order to improve environmental performance, it is necessary to form environmental recycling management systems as an effective tool for solving this problem.

The development and implementation of organisational and technological models of environmental recycling management can provide eco-efficient and low-cost technologies for recycling and disposal of rubbish waste, which requires the application of modern concepts based on the latest achievements of organisational and management science and practice.

The design and implementation of environmental recycling management should address a triple challenge at the same time [6]:

a) to ensure the market success of the socio-economic system of municipalities;
b) to ensure the construction and adaptive development of technological schemes of ecological recycling management in the mode of real-time changes in accordance with the latest achievements of technological progress, product, technical, technological innovative solutions;
c) to form and develop new progressive forms of environmental recycling management - organisation of the management process collection, storage, processing, sale and disposal of anthropological, technological and economic waste .

Models of environmental recycling management systems can be categorised as follows:

- innovative models (based on information and digital technological capabilities);
- modernisation models (based on a partially improved industrial technical and technological basis with the spread of elements of digitalisation of technological

processes of collection, storage, processing, sale and disposal of anthropological, technological and economic waste);

- partly archaic and partly modernisation models (based on previous technical and technological solutions).[7]

Increasing anthropogenic impacts of social production on the environment are currently creating objective prerequisites for a serious global environmental crisis. These processes put forward before the world community and companies the need to solve the problem of managing by-products and rubbish waste in the chain of their production, transportation, processing, and utilisation. In order to improve environmental performance, it is necessary to form environmental recycling management systems as an effective tool for solving this problem. At the same time, many issues of methodology and techniques for solving this problem have not found sufficiently deep discussion on the pages of scientific publications and in the practice of management in the chain of production - transportation - processing - utilisation of rubbish waste.

Development and implementation of organisational and technological models of ecological recycling management, capable of providing ecologically efficient and low-cost technologies of processing and disposal of rubbish waste, require improvement of methodological foundations, application of modern methodological concepts based on the latest achievements of organisational and management science and practice.

Under the conditions of information-digital mode of production and consumption, the development and implementation of environmental recycling management should solve simultaneously a threefold task [7]:

a) ensure the market success of the organization;
b) to ensure the construction and adaptive development of technological schemes of ecological recycling management in the mode of real-time changes in accordance with the latest achievements of technological progress, product, technical, technological innovative solutions;
c) to form and develop new progressive forms of ecological recycling management - organization of the management process of collection, storage, processing, sale and disposal of anthropological, technological and economic wastes. Improvement and implementation of such schemes should be carried out on the basis of mastering new concepts of organization of social production and improvement of social division of labour, including inter-farm, inter-branch, inter-regional, international; as well as

taking into account the latest trends of development and forms of social division of labour: specialization, concentration, cooperation, combination.

In the conditions of transition from the industrial mode of production and consumption to the information and digital mode, both technologies of the industrial era and the information and digital era can be used, taking into account the specifically developing circumstances. It is quite likely that mix-hybrid technologies of both one and the other era in combination can be used.

Thus different variants of environmental recycling management models are very likely, and in particular:

- innovative models (based on information and digital technological capabilities);
- modernisation models (based on a partially improved industrial technical and technological basis with the spread of elements of digitalisation of technological processes of collection, storage, processing, sale and disposal of anthropological, technological and economic waste);
- partly archaic and partly modernisation models (based on previous technical and technological solutions).

## 5. Conclusion

**Modern concepts, models and tools of** environmental recycling management of the organisation are largely predetermined by the peculiarities of the new stage of introduction of achievements of innovative techniques and technologies into social production - information-digital technological mode of production and consumption.

**Modern models and mechanisms of** ecological recycling management under the influence of revolutionary qualitative transformations of all elements, processes and subjects of ecological and economic activity of introduction of scientific and technological progress achievements into social production are fundamentally changed. This affects all elements of environmental recycling management of the organisation, starting with services and products, strategy development and ending with corporate culture and business processes.

Diversity and large-scale processes of using natural resources in economic activity in the context of preventing, minimising and eliminating the consequences of environmental pollution by rubbish waste predetermined the application of innovative methodological and

methodological approaches, concepts, doctrines of socio-economic research and, in particular, the development of methodology, techniques and methods of abstract-logical, system-creative and heuristic analysis. As well as the application of methodology of expert-project modelling of control systems of complex technological processes.

## 6. Bibliography


1. Agarkov S.A., Kuznetsova E.S., Gryaznova M.O. Innovation Management and State Innovation Policy. URL: https://studme.org/45024/investirovanie/organizatsiya_sistemy_upravleniya_innovatsionnoy_deyatelnostyu. [Date of circulation 20.12.2022]
2. Guliev I.A., Rybin M.V., Stepanov A.A. System of key performance indicators - a tool for managing the sustainability of innovation development in the companies of oil and gas complex // // Management of key performance indicators - a tool for managing the sustainability of innovation development in the companies of oil and gas complex. Management economic systems. ]20.06.2019]
3. Ibrayeva A.V., Stepanov A.A. Essence, regularities and principles of management of efficiency of socio-economic development of the region // Vestnik of Moscow City Pedagogical University. Series "Economics". №1(25), 2014 .- C. 66-72
4. Merzlikina G.S. Ecological and economic efficiency of industrial enterprise activity: assessment and management // Vestnik of ASTU. Series: Economics. 2019. №3. URL: https://cyberleninka.ru/article/n/ekologo-ekonomicheskaya-effektivnost-deyatelnosti-promyshlennogo-predpriyatiya-otsenka-i-upravlenie (date of reference: 15.10.2023).
5. Stepanov A.A. Socio-ecological problems and efficiency of motor transport development in the region// Applied Economic Research. Peer-reviewed international interuniversity scientific journal. No.1 (1) May 2014. ISSN: 2313-2086.- P. 50-59
6. Theory and practice of innovation activity efficiency management: a monograph / A.A. Stepanov, M.N. Dugin.- M.: RUSAINS, 2021.- P.89-95
7. CR-White-Paper_-Recycling-Management_-Outsource-or-In-House. [Date of circulation 02.06.2023].