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RECONSTRUCTIVE TECHNOLOGIES OF SPATIAL ORGANIZATION OF ECONOMIC SYSTEMS AND ASSESSMENT OF THE QUALITY OF THEIR SPATIAL DEVELOPMENT

РЕКОНСТРУКТИВНІ ТЕХНОЛОГІЇ ПРОСТОРОВОЇ ОРГАНІЗАЦІЇ ГОСПОДАРСЬКИХ СИСТЕМ ТА ОЦІНЮВАННЯ ЯКОСТІ ЇХ ПРОСТОРОВОГО РОЗВИТКУ

The article defines and details fifteen quality factors of the spatial development of economic systems, which take into account the modern conditions of the functioning of the socio-economic system, challenges, risks, and threats associated with the state's ownership of natural resources, and efforts to develop the national natural resource asset. This became the basis for the development of a universal model for evaluating the quality of the spatial development of economic systems based on a generalized integral indicator as a single evaluation criterion. It is formalized according to: a) twelve integral indicators of the most important qualitative factors of spatial development (economic development; infrastructure; social development; innovativeness; environmental sustainability; tourism and cultural development; regional cooperation; digital technologies and innovations; inclusive development; water and land resources management; agrarian policy; energy security); b) taking into account the weighting coefficients for each potential factor determinant, which are defined and established by the method of logical design. Revealed and characterized: 1) the place and role of national natural resource assets in the formation of renewed economic relations in fourteen areas of sustainable management (economic, business internationalization, tax, trade, technological, infrastructural, energy, political, innovative, environmental, security, regulatory, social, geopolitical); 2) structured format, according to the importance for economic relations, the place and role of natural resource assets in the formation of renewed economic relations according to three priorities at the level of territorial formation (economic, technological, ecological) and the national level (economic, social, ecological); 3) the essence and content of reconstructive spatial technologies of the organization and development of economic systems, which made it possible to form two sets of reconstructive technologies recommended for use in Ukraine at the post-war stage of spatial organization and development of economic systems.

Keywords: *reconstructive spatial technologies of organization and development, economic systems, evaluation of the quality of spatial development, generalized integral indicator.*

У статті визначено та деталізовано п'ятнадцять факторів якості просторового розвитку господарських систем, які враховують сучасні умови функціонування соціально-економічної системи, виклики, ризики і загрози, що пов'язані з володінням державою природними ресурсами та намаганням розвинути національний природно-ресурсний актив. Зазначене стало основою для розробки універсальної моделі оцінювання якості просторового розвитку господарських систем на базі узагальненого інтегрального показника як єдиного критерію оцінки. Його формалізовано за: а) дванадцятьма інтегральними показниками найбільш вагомих якісних факторів просторового розвитку (економічного розвитку; інфраструктури; соціального розвитку; інноваційності; екологічної стійкості; туризму та культурного розвитку; регіональної співпраці; цифрових технологій та новацій; інклюзивного розвитку; управління водними і земельними ресурсами; аграрної політики; енергетичної безпеки); б) урахування вагових коефіцієнтів за кожною потенційно-факторною детермінантою, які визначено й встановлено методом логічного проєктування. Розкрито та

охарактеризовано: 1) місце і роль національних природно-ресурсних активів у формуванні оновлених господарських відносин за чотирнадцятьма просторами сталого господарювання (економічній, інтернаціоналізації бізнесу, податковій, торговельній, технологічній, інфраструктурній, енергетичній, політичній, інноваційній, екологічній, безпековій, регуляторній, соціальній, геополітичній); 2) структурований формат, за значенням для господарських відносин, місця і ролі природно-ресурсних активів у формуванні оновлених господарських відносин за трьома пріоритетами на рівні територіального утворення (економічний, технологічний, екологічний) та на національному (економічний, соціальний, екологічний); 3) сутність і зміст реконструктивних просторових технологій організації та розвитку господарських систем, що дозволило сформувати два комплекси реконструктивних технологій, рекомендованих до використання в Україні на повоєнному етапі просторової організації та розвитку господарських систем.

Ключові слова: *реконструктивні просторові технології організації та розвитку, господарські системи, оцінювання якості просторового розвитку, узагальнений інтегральний показник.*

Problem statement. It is objective to recognize that when defining and substantiating the priorities and directions of the post-war recovery of Ukraine's economy, it is necessary to identify and detail a set of means and technologies that would ensure the achievement of results taking into account modern trends in the spatial organization of economic systems, using such a methodological approach that would allow to rationalize the development of national resources and reserves of different nature, as well as funds of international aid to Ukraine. At the same time, even if the scale of the destructive impact of military aggression is not fully established, it is currently necessary to form programs for exiting the economic and demographic crisis caused by the war, which will be based on the latest socio-political, moral, and ethical values of management and the principles of responsible consumption, minimizing the use of natural resource assets and other resources, the production of high-tech products, and the provision of services with a long life cycle. Therefore, it is extremely necessary to develop reconstructive technologies for the spatial organization of economic systems and methods for assessing the quality of their spatial development in the context of ensuring the quality of life of the population of territorial entities. In this regard, it should be taken into account that: a) reconstructive technologies must be unique and take into account the post-conflict economic condition of the affected territories and the level of destruction of both critical and civil infrastructure; b) reconstructive spatial development should be adapted to the socio-economic needs of the population's life, and the organization should be aimed at optimizing the use of life space.

Analysis of recent research and publications. It should be noted that the theoretical, methodological, and applied aspects of the reconstructive spatial development of economic systems (ES) and rationalization of the use of ecosystem assets of territorial formations are devoted to the work of domestic and foreign scientists, including I. K. Bystryakov, O. M. Borodina, O. O. Veklych, V. M. Geets, A. A. Hrytsenko, L. V. Deineko, D. V. Klynovy, V. V. Nebrat, O. I. Nikyforuk, M. A. Khvesyk, D. North, J. F. Moore [1–6] and others. Paying tribute to the theoretical and practical value of previous scientific achievements in the studied area, we consider it appropriate to recognize that in the context of the development and implementation of the recovery plan of Ukraine in the post-war period, there is a need to substantiate the complex of reconstructive technologies of the spatial organization of economic systems and to assess the quality of their spatial development, taking into account the existing natural resources and social assets.

Formulating the purposes of the article. The purpose of the article is to form a scientific basis for the development and justification of a methodical approach to assessing the quality of the spatial development of economic systems in Ukraine based on natural resource assets and a complex of technologies for managing their reconstructive spatial organization in the context of ensuring the quality of life of the population.

Presentation of the main research material. A recognized fact [1–4; 7–9] is the importance for the effectiveness of the reformatting of modern economic relations in the system of the space of sustainable management: increasing the scale of national natural resource assets and rationalizing their use, taking into account the challenges, risks, and threats that owning them brings to the economy of Ukraine. The authors support the reasoning of the representatives of the school of economic genetics, who studied economic evolution and the hereditary character of institutions and practices in the economy: 1) Douglas North (Douglas North) – known for his developments in the field of economic history and economic institutional theory [5; 10]; 2) Ronald Coase, who formulated the theory of corporate firms and the concept of "transaction costs," which affects the way economic activity is organized [11]; 3) Oliver Williamson, who detailed the internal structure of firms and market transactions [12]; 4) Peter Klein (Peter Klein), who studied the heredity of institutions and their influence on the management of firms [13] and others. These researchers and many other specialists actively worked on the study of economic genetics and its relationship with economic development, formulating concepts and approaches that are used in modern studies of economic evolution and institutional economics, in particular: a) heredity: the principle indicates that economic institutions, rules and practices are inherited from generation to generation; b) mutations: the principle indicates that institutions and economic systems can undergo changes and evolve over time, which can occur due to external influences, new technologies, socio-cultural changes and other factors; c) competition and selection: dominant indicates that economic systems are subject to competition, and those institutions that better meet the needs of individuals and society have more chances for survival and further development; d) community and cooperation: an important dominant is the interaction and cooperation between individuals and groups in economic systems, at the same time, the community can influence how economic institutions are formed and developed; e) innovations and changes: innovations and technological progress are dominant factors in economic genetics, as they create new opportunities and change the economic landscape; g) interaction with the environment: economic systems are exposed to the influence of the external environment, such as political regulations, tax policy, economic crises,

globalization, etc. These dominants help to understand and analyze economic processes and institutions from an evolutionary perspective, helping to develop and improve economic policy and practice.

Therefore, relying on the results of research by scientists of the modern school of economic genetics [14; 15], we recognize that in the formation of genetically renewed economic relations in Ukraine, resource limitations, and the spatial reformatting of economic and ecosystems, the processes of extraction, development and use acquire an extremely important place and role natural resource assets (NRA). From this, we consider it expedient to represent their detailed characteristics according to the main fourteen areas of ensuring sustainable management at the current stage of functioning of the national socio-economic system (table 1), which is substantiated and characterized in [16].

Detailed in the Table 1, using the principles of economic genetics, the characteristics of probable spatial shifts reflect different (fourteen) planes and aspects of the place and role of the NRA in the process of renewal of economic relations in Ukraine. According to the author's belief [7; 8; 16] and taking into account the current conditions of operation of the ES, we offer the groupings given in the table. 1 planes that reproduce the place and role of territorial natural resource assets according to three priorities, recognizing the advantages in the sequence of implementation of measures and localization of efforts in the management system of the national NRA (Table 2).

By taking into account the identified priorities, management entities can develop an effective policy to ensure balanced and sustainable development of territorial entities, taking into account economic, social, ecological, technological, and geopolitical requirements and challenges to sustainable management. Based on this, we believe that the entities of the State Administration at the level of the territorial entity should be given priority in the following order:

I. Economic priority: the priority is the management of NRA with an orientation to ensure sustainable management and economic development, maximization of foreign currency income, promotion of the development of trade relations, creation of favorable tax conditions, and development of the economic potential of the State Government; etc.

II. Technological priority: the main thing is to focus and localize efforts on the use of modern technologies and innovations in the extraction, processing, and use of natural resources, as well as the development of "green"

Table 1

Characterization of the place and role of NRA in the formation of renewed economic relations in the main areas of sustainable management

Rating number	Base space	Characteristics of the place and role of the NRA
I.	Economic	A source of foreign exchange earnings through the export of resources. Stimulation of investments in resource-intensive industries. Domestic market for domestic enterprises. Impact on economic growth and GDP of the country
II.	Social	Providing jobs in the mining sector. Impact on employment and population welfare. Involvement of the local population in work in resource-intensive industries. Creation of conditions for sustainable management and development of regions where resources are extracted. Tensions in society due to income distribution
III.	Ecological	Preservation of biodiversity and ecosystems. Control over the impact of mining on the environment. Development of sustainable use of resources
IУ.	Geopolitical	Impact on the country's geopolitical situation. Geopolitical conflicts over resource control
У.	Innovative	Stimulating innovations in resource-intensive industries. Development of new technologies in mining and processing. Attracting investments in research and development
УІ.	Technological	The use of modern technologies in the extraction and processing of resources. Development of "green" technologies and environmentally friendly processes. Increasing the efficiency and economy of resource use
УІІ.	Infrastructural	Construction/modernization of infrastructure for transportation of resources. Provision of logistics networks for the supply and export of resources
УІІІ.	Energetic	Using NRA as an energy source. Ensuring energy security and independence of the country
ІХ.	Tax	Imposition of taxes and fees from extraction and export of resources. Provision of state revenues and financing of development
Х.	Trading	Support of foreign trade and balanced development of the external sector. Use of resources as a means of payment in international agreements. Development of new sales markets and expansion of export potential
ХІ.	Political	The influence of natural resources on the formation of political relations. Geopolitical importance of the country due to possession of valuable resources. Development of international partnership and cooperation in the resource sector
ХІІ.	Safe	Ensuring energy, food and raw material security of the country. Minimizing the risks of economic or environmental crises. Control over possible threats due to natural disasters
ХІІІ.	Internationalization of business	Attracting foreign investments in resource-intensive projects. Formation of international consortia for joint implementation of projects. Development of global supply chains and exchange of resources
ХІУ.	Regulatory	Implementation of regulatory control mechanisms for resource extraction. Formation of effective rules and norms regarding the use of resources. Protection of NRA from illegal exploitation

Source: formulated and systematized in tabular form by the authors of the study

Table 2

Structured description of the location and role of the NRA in the formation of renewed economic relations at the level of territorial formation according to spatial priorities

I. The priority is economic	II. The priority is technological	III. The priority is ecological
Economic plane	Technological plane	Ecological plane
Area of Internationalization of Business	Infrastructural plane	Security plane
Tax plane	Energy plane	Regulatory plane
Commercial area	Political plane	Social plane
-	Innovative plane	Geopolitical plane

Source: formulated and systematized in tabular form by the authors of the study

technologies and practices of sustainable use of resources in the context of building up a sufficient scale of NRA.

III. Ecological priority: it is envisaged to ensure ecological sustainability and preserve biodiversity in the territory in the process of extraction and use of natural resources, as well as the development of environmentally friendly practices and reducing the impact on the environment in the context of ensuring the quality of life of the population, strengthening regulatory interaction.

As for the tasks of public administration subjects, they are grouped in the space of sustainable management according to the priorities of "the place and role of NRA" (Table 3) in the formation of renewed economic relations defined by researchers [17], taking into account the triad of requirements and different conditions at the national level.

Structuring and distinguishing the main characteristics of the place and the role of national and local NRA in the formation of renewed economic relations (see Tables 2 and 3) at the national level and the level of territorial entities helps to understand their diversity, as well as the significance of key spatial aspects in the processes of reformatting the national economic system. At the same time, the authors present each priority represented by the corresponding planes, which will allow management subjects of different levels to focus on more relevant aspects of sustainable management and the management of national natural resources. This allows us to single out and detail the main factors ensuring the quality of spatial genetic development, which anticipate and take into account modern trends and existing problems that the national socio-economic system currently faces (Table 4).

We emphasize that such factors as the quality of the spatial development of the ES as the development of digital technologies and innovations, inclusive development, land management, agrarian policy, and energy security are currently extremely important for stimulating the processes of eliminating threats and economic growth, ensuring sustainability and sustainability of the ES, implementation of modern reforms on reconstructive spatial organization. And, management subjects taking into account the given list of socio-ecological and genetic factors of sustainable management in their activities, generating a synergistic effect when they are mutually involved, will help improve the quality of spatial development and contribute to ensuring sustainable management, sustainable economic growth, social security, and environmental sustainability in Ukraine in general.

In the author's opinion, the very development, virtual adaptation, and implementation in practice, first of all, of reconstructive technologies of the spatial organization of the ES (methods and tools of reproduction, interpretation, and virtual algorithmic learning), acquire up-to-date importance in the conditions of resource limitations in the context of the development of a complex of programs for exiting the economic crises caused by war. However, it should be taken into account that the reconstructive spatial development of ES and their reconstructive spatial organization have different signs and characteristics in relation to the performance of tasks in accordance with priorities (Table 5), which will determine the composition of the appropriate type of technologies and the specificity of their use.

We assume that not only those given in table 6, but also other technologies can be used by management subjects for spatial optimization, reformatting, and structuring the space of territorial entities in the context of rationalizing their development of assets of different natures, even with limitations in financial, technical, and technological resources.

Thus, as defined by the authors in the Table 5, the reconstructive technology of the spatial development of economic systems and their reconstructive spatial organization are excellent because:

1) The reconstructive technology of spatial development involves the use of various methods and tools to improve or restructure the spatial structure of the state according to national priorities for more effective and sustainable development. These technologies include, in addition to those specific for ensuring sustainable management, also geospatial analysis, computer modeling, the use of GIS, and, accordingly, other tools for the analysis and planning of the development of territories and economic systems, taking into account the defined priorities for territorial formation;

Table 3

Structured description of the location and role of the NRA in the qualitative formation of renewed economic relations at the national level according to spatial priorities

Priority rating	Quality priority	Space of place and role of NRA
I	Economic priority	Economic. Trading. Tax. Internationalization of business. Technological
II	Social priority	Safe Social. Geopolitical
III	Ecological priority	Ecological. Regulatory. Innovative. Infrastructural. Energetic. Political

Source: formulated and systematized in tabular form by the authors of the study

Table 4

The main quality factors of the spatial development of the State of Ukraine

Rating number	Quality factors	Main indicators and indicators of quality factors of spatial development of ES
I.	Economical development	The level of economic growth, production, investment and employment in the region. Gross domestic product (GDP) and gross regional product (GRP), GDP / GRP per capita, investments in the real sector of the economy, export and import of goods and services
II.	Infrastructure	Development of transport links and transport network, communication and energy infrastructure, energy networks and other critical infrastructure, access to educational and medical facilities
III.	Social development	The standard of living of the population, access to education, health care and social services, the level of unemployment and poverty
IУ.	Innovativeness	The level of scientific and technical development, innovativeness of economic processes and technologies. Number of registered patents, volume of innovative activity, research and development of new technologies
У.	Entrepreneurship and business climate	Support for entrepreneurship, ease of opening and running a business, level of entrepreneurial activity. Number of registered enterprises, ease of doing business rating, level of corruption
УІ.	Security and stability	The level of security, stability and protection of property rights. The level of crime, the stability of the political and social situation, the protection of property rights
УІІ.	Environmental sustainability	A balanced approach to the use of natural resources and the environment, reducing emissions and pollution. The amount of greenhouse gas emissions, environmental pollution, the area of forests and green areas
УІІІ.	Tourism and cultural development	Development of the tourist industry, preservation and popularization of cultural heritage. Number of tourist facilities, cultural events and activities, profitability of the tourism industry
Х	Regional cooperation	Development of cooperation between different regions and communities to achieve common goals. The level of cooperation between regions and communities, exchange of experience, joint projects
Х.	Geopolitical significance	Geographical location and role of the region/territory in international geopolitical relations, geopolitical stability
ХІ.	Digital technologies and innovations	The level of implementation of digital technologies in various areas of the economy, the number of startups, the rating of innovativeness
ХІІ.	Inclusive development	The level of equality and equal access to opportunities, social integration of disadvantaged population groups.
ХІІІ.	Management of water and land resources	Rational use of water and land resources, state of water resources supply, soil quality
ХІУ	Agrarian policy	Stability and effectiveness of agrarian policy, development of agriculture, volumes of agricultural products
ХУ.	Energy security	Stability and reliability of energy systems, energy efficiency, minimization of the level of energy dependence

Source: formulated and systematized in tabular form by the authors of the study

2) reconstructive technology of spatial organization: involves the use of specific measures, algorithms, computer simulations, tools, and strategies that are aimed at restructuring the spatial organization of the ES, taking into account resource limitations and changes in the conditions of their operation. The technologies will include: a) reorganization of the location of ES and their industrial facilities; b) introduction of new technologies for optimization of transport routes and development of energy efficiency strategies of a certain ES to reduce energy consumption; c) procedures for recombination and revitalization for the restoration of infrastructure, the space of industrial or other types of territorial formation, industries, and productions at the intersectoral level.

Therefore, the reconstructive technology of the spatial development of the ES is a broader concept in essence and content, including a variety of methods and tools, while the reconstructive technology of the spatial organization of the ES refers to more specific measures and strategies aimed at improving the spatial organization of the functioning of the HS itself to increase efficiency and sustainability of economic activity in the specific conditions of functioning of the territorial entity.

In order to evaluate the effectiveness of the implementation of reconstructive technologies of the spatial development of the state, we offer a methodical approach based on the definition of the generalized integral indicator (GII) of the quality of spatial development – as a comprehensive indicator that should combine various aspects of the state's functioning. Taking into account such an indicator in the activities of management entities will help to avoid focusing only on certain aspects of development; instead, it will allow to provide a comprehensive vision of the situation and the dynamics of spatial development. At the same time, the GII of the quality of the spatial development of the ES is formed taking into account the weighting coefficients of the integral indicators, the values of which cover the values indicated by the authors in the table. 4 factors of the quality of economic activity, taking into account different levels of influence on the sustainable management of a territorial entity. The weighting coefficients of the latter were

Table 5

Priorities and goals of reconstructive spatial development of economic systems and their spatial organization

Reconstructive spatial development		Reconstructive spatial organization	
Priority Content	**Priority Content**	**Priority Content**	**Priority Content**
Strategic planning	The process of strategic planning involves the development of strategies that take into account existing problems and opportunities to ensure the effective development of economic systems in territorial entities	Optimizing the use of space	Optimizing the use of space includes the rational placement of infrastructure and objects of economic activity, taking into account the increase in the efficiency of use and availability of space - activity
Infrastructural changes	Reconstructive development usually involves the modernization and expansion of infrastructure to support and ensure new economic needs and increase efficiency	Functional integration	Reconstructive spatial organization is aimed at creating integrated spatial systems that contribute to the convenience and efficiency of interaction between different functional zones
Socio-economic stability	The development of economic systems should contribute to balanced economic and social growth, ensuring stability and prosperity, quality of life of the local population	Stability and dynamism	The spatial organization must be flexible enough to adapt to changes in the needs and conditions of economic activity, but at the same time ensure the stability and reliability of the structure
Ecological urbanization	The reconstruction must take into account ecological aspects, ensuring the preservation of natural resources and reducing the negative impact on the environment	Effective use of resources	Resource efficiency involves the optimization of the use of energy, materials and other resources to ensure the efficient functioning of the HS
Public participation	Reconstruction must take into account the opinion and needs of local communities, ensuring their participation in the decision-making process and implementation of projects	Creation of comfortable and safe conditions for living and development	The organization should contribute to the creation of a comfortable and safe space for the population to live, work and rest

Source: formulated and systematized in tabular form by the authors of the study

established using the logical projection method (LMP) [22], depending on the importance of each spatial aspect for a specific HS, territorial entity, region, or country as a whole. As an example of the calculation of the GII, we offer for use the formula of the form (1) taking into account the 12 most important factors of the quality of the spatial development of the Kyiv region's public sector taking into account the importance of their influence on the space of operation and management.

$$Q_{ГС} = 0{,}20ED_{ГС} + \\ +0{,}15I_{ГС} + 0{,}10SD_{ГС} + 0.10In_{ГС} + 0.10EnS_{ГС} + \\ +0.05T\_CD_{ГС} + +0.05RCo_{ГС} + 0.05DT\_I_{ГС} + \\ +0.05IncD_{ГС} + 0.05M\_VrLr_{ГС} + 0.05P_{ГС} + 0.05ES_{ГС} \quad (1)$$

where, $Q_{ГС}$ – a generalized integral indicator of the quality of spatial development of a certain HS; integral indicators:1) $ED_{ГС}$ – economic development;2) $I_{ГС}$ – infrastructure; 3) $SD_{ГС}$ – social development; 4) $In_{ГС}$ – innovativeness; 5) $EnS_{ГС}$ – environmental sustainability; 6) $T\_CD_{ТУ}$ – tourism and cultural development; 7) $RCo_{ГС}$ – regional cooperation; 8) $DT\_I_{ГС}$ – digital technologies and innovations; 9) $IncD_{ГС}$ – inclusive development; 10) $M\_VrLr_{ГС}$ – management of water and land resources; 11) $AP_{ГС}$ – agrarian policy; 12) $ES_{ТУ}$ – energy security.

In this example (formula (1)), the weights of integral indicators are set arbitrarily and theoretically using the MLP and can be changed depending on the potential and priorities of a particular ES. The use of the UIP of the quality of spatial development in management activities will allow to reduce a large amount of information to an understandable and convenient format for analysis, simplify the decision-making process, and to direct a well-founded and formed by management subjects complex of organizational and economic measures in the direction of improving the quality of spatial development of the ES in the post-war period.

Conclusions. Summarizing the results of scientific and applied development, we note that the authors identified factors for identifying the quality of spatial development of economic systems, which take into account the conditions of functioning of the socio-economic system, and characterized, taking into account the dominant economic genetics, the place and role of natural resource assets in the formation of updated economic relations according to the main fourteen areas of sustainable management (economic, business internationalization, tax, trade, technological, infrastructural, energy, political, innovative, ecological, security, regulatory, social, and geopolitical). At the same time, the characteristics of the location and role of natural resource assets in the formation of renewed economic relations are structured according to three priorities: a) at the level of territorial formation (economic, technological, and ecological); b) at the national level (economic, social, and environmental). Recognizing the importance and urgency of implementing reconstructive technologies for the spatial organization of economic systems, two complexes of reconstructive technologies for the spatial organization and development of economic systems

Table 6

Reconstructive technologies of spatial development and organization of economic systems

Reconstructive technologies of spatial development		Reconstructive technologies of spatial organization	
Technology	**Description of the technology**	**Technology**	**Description of the technology**
Adaptive land use	The use of technologies, means and methods that allow optimizing the scale and depth of the use of land resources in order to preserve environmental sustainability	Geographic Information System (GIS)	The use of geospatial data for the analysis and visualization of geographical aspects of territorial formations in the context of ensuring sustainable management of ES
Ensuring energy efficiency	Implementation of technologies and practices aimed at reducing the amount of energy consumption in ES and increasing their energy efficiency	Computer simulation	Creation of computer models for the simulation of various scenarios of spatial organization of ES in limited territories and under the condition of limited resources
Innovative approaches to the development of transport infrastructure	Development and modernization of transport infrastructure using innovative technologies to increase its efficiency and reduce the negative impact on the environment	Virtual reality	The use of virtual environments for visualization and interaction with potential organizational models of territorial entities, within which the reformatting and restructuring of the activities of the State Government is foreseen
Reconstruction of industrial zones	Repurposing and modernization of existing industrial zones in order to optimize the use of the territory and reduce the negative impact on the environment in the context of ensuring the quality of life	Analysis of the current state	Collection and analysis of data on certain signs of the functioning of territorial entities in order to identify problematic aspects or potential opportunities for activation and stimulation of the reconstruction of existing or newly created ES
Water resources management	Implementation of technologies and new methods to optimize the use and conservation of water resources, taking into account existing restrictions, while reducing the negative impact on the environment and ensuring sustainable management	Optimization methods	The use of mathematical methods to find optimal solutions for the allocation of resources and the development of a new format of spatial organization of economic activity within the boundaries of a territorial entity using strategic planning methods
Stimulation of sustainable tourism	Development and implementation of initiatives aimed at the development of tourism, taking into account the principles of sustainable development and management, which contribute to the preservation of natural and socio-cultural potential	Machine learning systems	The use of machine learning algorithms for the analysis of large-scale volumes of data and scenario forecasting of optimal strategies for resource use and development within certain territorial formations of NRA and social assets

Source: Defined, identified and systematized in tabular form by the authors taking into account developments and developments [18–21]

of territorial entities are proposed to the management subjects for use.

Based on the results of the research, as an example, a model for assessing the quality of spatial development of economic systems was developed based on the format of calculating a generalized integral indicator as a single evaluation criterion, formalized according to twelve integral indicators of the most important factors of spatial development (economic development; infrastructure; social development; innovativeness; environmental sustainability); tourism and cultural development; regional cooperation; digital technologies and innovations; inclusive development; water and land resources management; agrarian policy; energy security), determined taking into account the weighting coefficients for each potential factor determinant, which are established by the method of logical design. The formalization of the universal model solution is based on the initial indicators identified as decisive factors in the quality of the spatial development of economic systems in fourteen areas of sustainable management, the description of which is performed using dominant economic genetics to determine the place and value of natural resource assets in the formation of renewed economic relations.

Prospects for further research on solving the problem of developing principled approaches to the organization and reformatting of natural-economic relations in the reconstructive development of territorial formations are related to the substantiation of the concept of reconstructive spatial development of economic systems in the post-war period on the basis of natural-resource assets, and within its limits, with: a) determination of means of provision and formation of a scheme for the organization of spatial development of the economic system of Ukraine with the development of project models for the construction of competitive territorial formations as factors for ensuring the quality of life of the population; b) development of an algorithm of management actions for the reconstructive spatial organization of economic systems in the sequence of implementation of several stages to solve the problem of adapting European directions of spatial development to national economic conditions in resource limitations.

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