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Real estate recovery as a regional development strategy

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ABSTRACT:
This study aims to explore the following questions: how military operations affect the level of damage to real estate and how to solve problems associated with the restoration of territories in the post-war period. The purpose of the study is to conduct an analysis, which primarily includes an overview of the current state of real estate in the country. Practical approaches to solving the above problems are considered and justified. A formula has been proposed to calculate the actual cost of housing that considers the risk factor and the risk zones of the territories. Additionally, financing proposals have been presented for restoring various real estate groups. A model for the restoration of real estate in the Sumy region has also been developed, with the focus on new construction. The presented recommendations and proposals correspond to and expand the content of the Program for the Development of Territorial Communities and Country Reproduction Projects until 2027 and the Regional Development Strategy of the Sumy region and its administrative and territorial units. A structural and logical algorithm of the mechanism for the development of real estate transactions in Ukraine has been done, which is used to model strategic planning of regional development, in particular, of Sumy region.

KEYWORDS:
real estate; country restoration; martial law; development strategy

1. Introduction

The conditions of the war pose large-scale challenges for Ukraine. These are not only limited to environment, but also relate to the restoration of territorial communities. This study aims to examine how the development of the economy and the realities of war can affect solutions to the destruction, the problems of managing available resources and the reconstruction of real estate after the war. It is necessary to conduct an analysis into the potential of the economy and develop practices in order to solve the identified problems.

It is clear that the war will end soon with victory, and it will be necessary to restore everything that was destroyed during the conflict. In Ukraine, every day of intense warfare results in significant losses, both in material and human cost. In March 2023, the World Bank revised its estimate of the scope of recovery and reconstruction in Ukraine, raising it to $411 billion [1]. In particular, many businesses have been destroyed or suspended as a result of the hostilities. In the affected regions, roads, bridges, railways, housing and other infrastructure have been severely damaged or completely destroyed. Work has already begun to develop an effective program to restore these areas.

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Overcoming these challenges requires a comprehensive approach that combines environmental solutions, political measures, social responsibility and economic support.

The Regional Recovery and Development Plan, which is approved by the Cabinet of Ministers of Ukraine, includes the following elements: recovery and development goals and measures; estimated funding requirements and possible sources of funding; indicators of the achievement of recovery and development goals and measures, as well as their projected values, etc.

Also, the RebuildUA Project [2] aims to analyze and visualize the destroyed infrastructure of Ukraine, to disseminate this information, to transfer the results to communities, state authorities and specialized funds for the reconstruction of the country, as well as to collect evidence of the crimes of the aggressor countries. In addition, a report from the Kyiv School of Economics [3] presents the results of the assessment of the damage to the economy of Ukraine, suffered as a result of Russia's military aggression. The report covers the period from February 2022 to January 2024. The Recovery Plan of Ukraine [4], created by the working group, contains an "Audit of Damages Suffered as a Result of the War" and is a platform for the revival of the country.

The essence of the problem lies in the need to create and apply economic development strategies and innovative practices aimed at ensuring the stability and sustainability of the restored settlements of Ukraine in the post-war period.

Based on an analysis of information sources and previous studies, the following assumptions were formulated:

1. The restoration of real estate in the territories of Ukraine that were destroyed during the hostilities will provide an opportunity to reduce environmental damage and improve the efficient use of available resources with the active support of communities and the state.
2. The revival of Ukrainian territories in the post-war period will contribute to the development of the regions.

2. Study methodology

The research is based on the analysis of scientific sources and the study of previous developments. The paper uses methods of logical analysis (in determining the state of Ukrainian construction products during the period of hostilities and in forecasting for the post-war period); observation and generalisation (in researching and identifying the environmental and economic prerequisites for the restoration of real estate); systematic approach (in defining the essence of the concept of a development strategy); analysis and synthesis (in identifying the levels of risk of the destruction of territories); forecasting (in determining the likely problems in the future in the construction and restoration of real estate).

3. Results analysis

The state has information on the extent of destruction and indirect damage in various areas and regions. It also has determined what financial resources are needed to restore damaged or destroyed assets in order to ensure effective planning for future actions. The main methodological principle for determining damages is the use of internationally recognized standards.

In almost all regions of the country there is and continues to be damage and destruction of infrastructure at various levels of severity. These damages must be documented and assessed in order to obtain specific funding and begin the recovery process. During the 792 days of the war, 40,000 objects were damaged, most of them civilian (Table 1). The settlements of the Sumy region, which experienced the horrors of war, are no exception (Table 2).

The most significant part of the total direct damage falls on residential buildings at 37.5 % or $58.9 billion, and on infrastructure at 23.4 % or $36.8 billion. The aim of this study is to determine the factors influencing the valuation of residential real estate in particular. Interest in buying apartments in Ukraine has now reaches 70 % - 80 % of the pre-war level. Since 2022, Kyiv

has lost 3 % of the value of one-room apartments. At the same time, the demand for buying apartments in Lviv increased by 12 %, and in Ivano-Frankivsk, one-room apartments rose in price by as much as 18 %. All this is connected with the destruction of the housing stock in the eastern regions and partly in the central and southern parts of the country. There is a process of internal displacement of the population in Ukraine due to the destruction of the housing stock.

Table 1
General assessment of direct damage to infrastructure as of the beginning of 2024

Property type	Estimate of direct costs, billion dollars	Share [%]
Residential buildings	58.9	37,5
Infrastructure	36.8	23,4
Enterprise and industry assets	13.1	8,3
Agro-industrial complex and land resources	10.3	6,6
Energy	9.0	5,7
Education	6.8	4,3
Forest fund	4.5	2,9
Housing and communal services	4.5	2,9
Vehicles	3.1	2,0
Healthcare	3.1	2,0
Culture, tourism, sports	3.1	2,0
Trade	2.6	1.6
Administrative buildings	0.5	0.3
Digital infrastructure	0.5	0.3
Social sphere	0.2	0.1
Financial sector	0.2	0.1
Total	157.2	100.0

Source: Kyiv School of Economics [3]

The Authors believe that the current challenges in real estate restoration are as follows:
- ensuring effective and transparent restoration and development of Ukrainian settlements affected by Russia's armed aggression against Ukraine or which have become concentrations of socio-economic, infrastructural and environmental crises;
- creating a promising future in which the cities and towns of Ukraine affected by the war come to life and turn into centres of prosperity. Here, people live in comfortable conditions and have access to advanced technologies that contribute to sustainable development and the well-being of society.

We propose that the territory of Ukraine is roughly divided into three zones depending on the occurrence or likelihood of the destruction of real estate and active hostilities:
- the first zone (lowest risk): Transcarpathia, the Carpathians, Bukovyna, Volyn, Podillia, Galicia, Polissya, Bessarabia;
- the second zone: Dnipro and Zaporizhzhia, Poltava, Naddnipranshchyna, Kyiv;
- the third zone (highest risk): Slobozhanshchyna, Sivershchyna, Donetsk, Luhansk, Black Sea, Tavria.

This division is not static. The territories of these zones may change as hostilities progress, and regions may move from one zone to another.

Calculating the real cost of housing can be done using the formula:

$$V_h = V_i \cdot S \cdot \sum K_{ch} \cdot K_r \quad (1)$$

where:
V_h – real cost of housing;
V_i – the inventory value of 1 m² of a building, calculated by the regional design and inventory bureau;
S – total area of the building;
K_{ch} – total coefficient taking into account the consumer properties of housing;
K_r – cost risk coefficient taking into account the conduct of hostilities in the region.

Given this division of Ukraine into risk zones, it is suggested to determine the real value of restored housing construction V_h, respectively, using the following corrective cost risk coefficients (K_r) (as of 01.01.24):
$K_{\text{cost risk zone 1}} = 0.8$
$K_{\text{cost risk zone 2}} = 1.0$
$K_{\text{cost risk zone 3}} = 1.2$

The risk factor reasonably corrects the market value of real estate in real estate transactions. In this case, the adjusted value of real estate in the regions that were safest during the period of Russian aggression against Ukraine (zone 3) will be higher than the value of properties in regions of risk zones 1-2.

However, even with the above division of the country's regions into risk zones, each zone can and does have its own micro-regions, which are at a higher risk compared to other areas of the region. For example, in the Sumy region, the districts most affected by Russian aggression are Trostianets, Okhtyrka and Sumy (the region itself must determine which districts are affected) (Table 2).

Table 2
Assessment of damage caused by destruction in settlements of the Sumy Region during the period of occupation

No.	Settlement in the Sumy region	Number of inhabitants before the war	Damaged buildings [pcs]	Destroyed buildings [pcs]	Estimated total losses [million dollars]
1.	Boromlya village, Okhtyrka district	4357	99	10	9.3
2.	Trostyanets	19900	829	134	104.2
3.	Okhtyrka	47603	648	60	43.8

Source: [3]

Therefore, the restoration of real estate and the development of war-affected areas should have their own programs for returning to peaceful life and reconstruction. We envisage the need to create a buffer zone along the border of the Sumy region with Russia (between Kharkiv and Chernihiv regions). In these areas, the destruction of settlements is critical, so the restoration of residential, industrial and infrastructure facilities is costly and the danger to the population is at a maximum.

The total direct damage in the Sumy region at the beginning of 2024 is estimated at $3,398 billion. The state must take care of the residents of the settlements near the buffer zone in the Sumy region by investing more money than in other regions in the construction and reconstruction of facilities, and motivating the population to stay in the restored areas for the further development of the industrial and agricultural sectors of the Ukrainian economy. Formal mortgage

lending (when the project documentation for the construction of a new facility is pledged as collateral) should be introduced and developed in such areas for new construction.

In the process of restoring the region's infrastructure, we propose to introduce the issue of regional securities – construction bonds. This will enable businesses to purchase bonds and act as direct investors in construction.

We believe it is advisable to use different sources of funding for the restoration of real estate, depending on the classification of said real estate. For example, in the areas most affected by the consequences of Russia's military aggression against our country, the restoration of the housing stock should be carried out in the following ratio: 50 % of the total cost of the facility is invested by the developer, 50 % is compensated by the state.

If a commercial property is being restored, there should be a common interest of the state and the business. After all, for every UAH 1 spent on new construction, there is a UAH 5 increase in the regional product in related industries. The state is interested in increasing business activity and creating new jobs in the vacated areas, which logically leads to regional development.

The restoration of social real estate is entirely the responsibility of the state (with partial participation of philanthropists). We foresee further significant participation of the state as an effective social partner in addressing social issues.

At the current stage of development of the national economy, it is important to study the peculiarities of social partnership formation. There is no single model of social partnership that would be suitable for all countries. In Ukraine, work is underway to prepare a draft law on social partnership.

To further improve the social partnership system, it is proposed to: engage social groups and strata that are not currently involved in this system in partnership; review legislative and regulatory acts on social partnership and labour relations to ensure compliance with international legal standards; take additional measures by the state to encourage employers to engage in social dialogue; take measures to raise public awareness of the state development strategy and other initiatives.

In the process of rebuilding the country (restoration of real estate), certain target audiences interact: communities and energy companies of Ukraine present the destruction and are the customers of the construction of facilities; donors, such as financial institutions and investors that provide financing for reconstruction programs and connect the construction and energy industry to the implementation of the programs – the general contractors of reconstruction.

Each region, in accordance with its inherent features of social and economic potential, has an objective internal criterion of optimality, the determination of which necessitates the identification of the specialisation of the regional economy. The main task of the state in formulating the national strategy of socio-economic development is to determine the economic components of the policy of sustainable regional development.

The main source of sustainable development is not only natural and material (physical) capital, but also financial and intellectual capital of the region. Accordingly, the economic basis for sustainable development is the growing capitalisation of the region's resources. At the higher stages of economic development, innovations, including clusters, play a significant role [5].

When the authors developed a model for a real estate restoration cluster in the Sumy region (Fig. 1), attention was paid to both the component of the new construction cluster in accordance with the sustainable development programs of not only the region, but also the country in general, and the cluster of reconstruction and operation of existing buildings and structures.

The costs associated with the construction, reconstruction, repair and maintenance of real estate are proposed to be covered by budgetary and other funds for the implementation of regional development programs in Ukraine to improve the social standard of living of the population, especially in rural areas, ensure road transportation of passengers and goods, and improve the environmental situation in the territories.

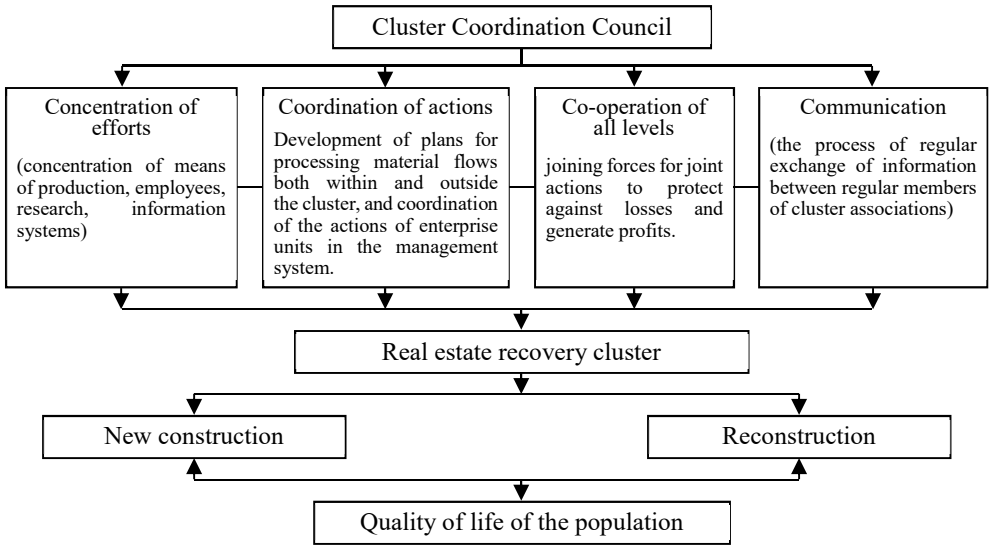

Fig. 1. Real estate recovery cluster
(developed by the authors)

A cluster is a territorial and sectoral voluntary association of business structures that work closely with research institutions and local authorities to improve the competitiveness of their products and economic growth in the region.

Cluster development is a team effort, not an individual one. We believe that the cluster form of production organisation helps to reduce the cost of construction products, increases labour productivity and allows for long-term innovation.

The authors are convinced that in the Sumy region, the formation of a sectoral construction cluster is the most appropriate for the restoration and development of real estate in an innovative direction.

A highly efficient cluster should cooperate with large enterprises producing construction machinery and equipment; construction materials industry enterprises; construction and maintenance organisations; educational institutions; design institutes, banks, insurance and leasing companies.

For the Sumy region, we propose the following participants to be included in the construction cluster:

1. Construction companies:
   - Notex
   - Sumbud
   - Topaz
   - Fedorchenko
2. Project companies:
   - Sumy Promproekt Ukraine
   - Sumbudproekt
   - Archbudproekt
   - Projectreconstruction
3. Universities – SNAU – training of builders; Sumy State University – training of ecologists
4. Research institutes and design institutes of construction profile (State Research Institute of Building Structures, Institute of Complex Transport Problems, Institute of Economics)
5. Companies supplying building materials:
   - "Stroymaterialy, the complete set centre" company (a wide range of materials for construction and repair)

- Road Construction (paving slabs, curb stones, non-metallic building materials, crushed stone, expanded clay, marble chips, rubble stone, construction of roads and streets, landscaping, arrangement of driveways, pedestrian walkways, playgrounds, parking lots, etc.)
- Construction industry (production of concrete and reinforced concrete products)
- Kerameya LLC (production of clinker facing bricks under TM `KlinKram)
- Polisan PE (production of paints and varnishes)
- Asphalt plant in Sumy
- Fedorchenko LLC (brick production)

6. Department of Ecology and Natural Resources Protection of Sumy
7. Local self-government bodies
8. Associations of territorial communities
9. Insurance company
10. Leasing company

Among potential participants in the restoration cluster of the Sumy region, it is necessary to conduct preliminary work on the relevance and feasibility of collective activities on the territory of the region to eliminate the consequences of Russian aggression. Cluster participants should make investments in specialized but related technologies, infrastructure, and human resources, which will contribute to the mass emergence of new firms. Thus, clusters are the cause of large capital investments, that is, they become something more than the simple sum of their individual parts. The organisational improvement of the construction industry should be carried out by creating a large construction cluster, which promotes the emergence of a synergistic effect of activities by accumulating financial, technical, production and human resources potential, and creating investment attractiveness of this sector of the region's economy.

The main principle of this agreement is partnership and mutual assistance. We propose to combine the efforts of the cluster members to support each other, help solve urgent issues and problems, and organise joint events to improve the environmental and economic safety of the construction industry.

The cluster's companies are located in the same region and make the most of its natural and human resources potential. As the cluster develops, economic resources begin to flow to it from isolated industries that cannot use them as productively on their own. Close cooperation between all participants in the production process, from suppliers of raw materials to consumers of the final product, ensures long-term planning of the cluster's operations, ensures constant utilisation, reduces the cost of products and services, and creates a single economic and informational space. New producers coming from other industries accelerate their development by stimulating research and development and providing the necessary means to implement new strategies.

The creation of a system of construction clusters has the potential to provide the following benefits:

- the elimination of fragmented impacts is made possible by the cluster system, which provides for systemic impacts and integrated involvement of constituent elements;
- strategic planning becomes available due to the possibility of generating predictive indicators with high accuracy through the use of clustering;
- the prospects for achieving a state of zero waste in construction activities are that the creation of a cluster system will allow full use or recycling of all waste arising in the production sector;
- the introduction of comprehensive remediation programs is made possible by the cluster system, which allows for the implementation of a comprehensive impact program that is not available for the usual segmental approach and spreads the impact simultaneously to all elements of the system;
- increasing the attractiveness of recovery for investment is reflected through the formation of a cluster system, which is the most appropriate model for specific processes. This allows for a clear display of the degree of risk mitigation and project implementation timeframes [6, 7].

According to the authors, the management entities in the construction cluster will be the state, the authorities of administrative-territorial units, territorial or industrial construction sectors, and managers of these entities. Each of these entities has its own mission and management tasks to successfully achieve its own strategic goals.

The priority link between science and industry should be the design of new construction projects and the restoration of existing real estate in compliance with regulatory requirements and taking into account foreign experience.

Summarizing the expectations from the implementation of actions to restore real estate in the post-war period, the following indicators and effects should be calculated:

1. Project cost:
   - Construction materials and works: calculation of the costs of necessary construction materials, services and works.
   - Design costs: inclusion of design and engineering costs.
2. Social benefits:
   - Social inclusion: assessment of the impact of the rehabilitation on the social development and life of the local community.
   - Job creation: consideration of the potential for new jobs to be created through the restoration project.
3. Economic indicators:
   - Expected returns: forecasting economic benefits in the form of new investments and profits from the recovery.
   - Cost of participation of private investors: consideration of the possibility of attracting private capital to cover costs.
4. Environmental aspects:
   - Environmental benefits and approaches: assessing and considering the environmental impact of the project and the potential for implementing green technologies.
5. Timing and risks:
   - Planning and scheduling: assessment of the duration and adherence to the schedule.
   - Risks and opportunities: analysis and elimination of possible risks and ways to manage them.
6. Assessment of innovations:
   - The use of modern technologies: taking into account the benefits of applying innovations in new construction and reconstruction.
7. Assessment of the restored value:
   - Estimation of the value of the restored object: analysis of the increase (decrease) in the value of real estate after the completion of works.
8. Monitoring and evaluation of the efficiency of construction production in the post-war period of history:
   - Monitoring systems: development of systems for tracking and evaluating results after the completion of real estate reconstruction works [2, 5].

Assessment of the effectiveness of the reconstruction process should include all of the above aspects, integrating them into a comprehensive analysis. It is important to take into account the needs of each local community in the regions, as well as engagement with various stakeholders to ensure broad support and success of property restoration projects. At present, in conditions of military confrontation, such work cannot be completed. But it requires efficiency and coherence of all branches of government in the post-war period.

In Figure 2 we proposed a comprehensive system for assessing the effectiveness of the country's real estate development recovery strategy, which includes five main stages: selection and evaluation of functioning construction entities; selection and evaluation of effective real estate restoration strategies in close relationship with the development of construction production; assessment of the effectiveness of the real estate recovery strategy as a whole and for each

participant in the process; monitoring of the implementation of the strategy of restoration and development of territories in the post-war period.

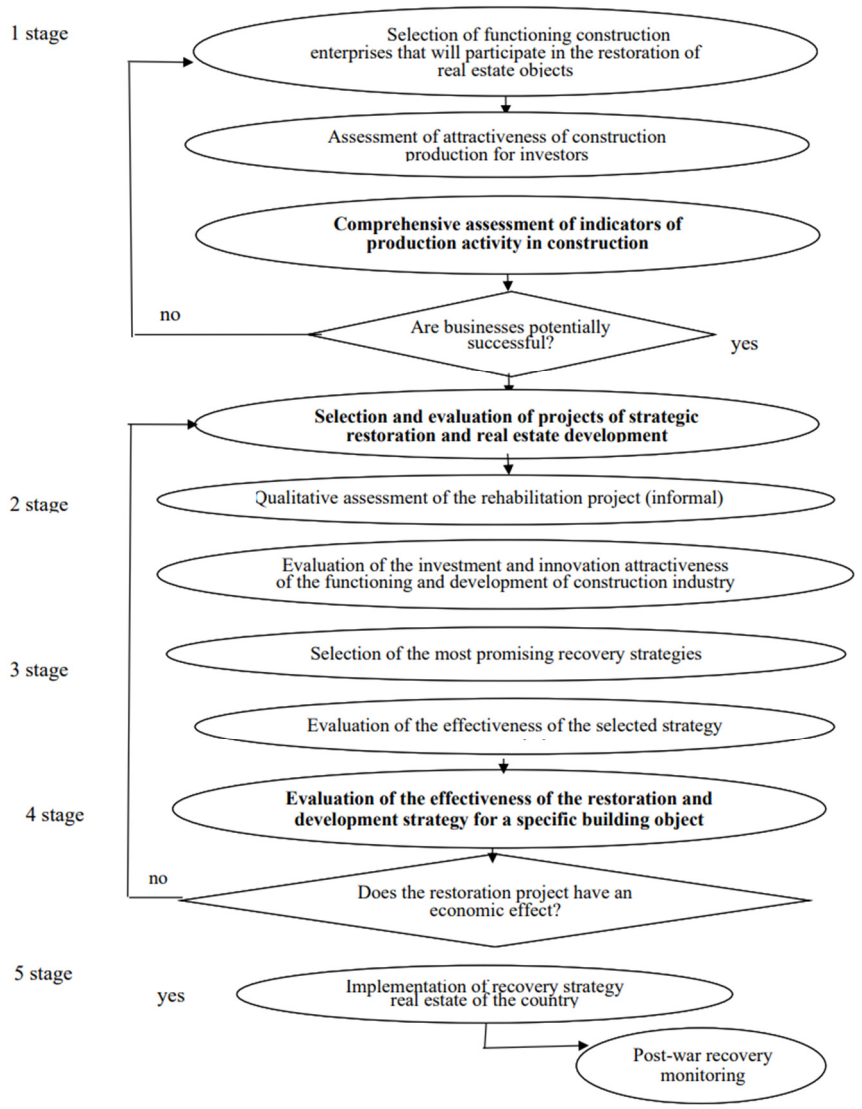

Fig. 2. A comprehensive system for evaluating the effectiveness of the real estate recovery strategy (developed by the authors)

Monitoring the implementation of the real estate recovery strategy provides information that helps to make effective decisions to prevent risks.

The described approach, although it does not replace the need to carry out a detailed economic analysis of the results of the construction industry's real estate restoration activities using known methods, at the same time is an effective way of express research of its production and economic condition.

4. Conclusions

It has been noted, the need to create and implement a unified conceptual approach and action plan for state bodies and local self-government bodies in determining the damage caused as a result of the war. Government subsidies, international grants and business investments – all these sources jointly contribute to the recovery of the country. It is important to continue to work to attract funding and ensure that funds are used as effectively as possible for the recovery and future development of Ukraine and its communities.

It has been proven that one of the key perspectives is the partnership between the public and private sectors. Government budgets and subsidies play an important role in financing recovery, but it is equally important to attract investments and resources from private companies. This collaboration can lead to efficient use of resources and speed up the recovery process.

It has been confirmed that the recovery process not only helps restore the affected regions, but also contributes to the creation of new jobs, the development of entrepreneurship and the improvement of the quality of life of the population. This is an investment in the future of Ukraine.

With regard to conducting further research and forming proposals, we consider the development of a system of economic indicators of the effectiveness of radical transformations of renewable processes in relation to real estate to be a promising direction.

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Odzyskiwanie nieruchomości jako strategia rozwoju regionalnego

STRESZCZENIE:

Niniejsze opracowanie ma na celu zbadanie, w jaki sposób operacje wojskowe wpływają na poziom zniszczeń nieruchomości oraz jak rozwiązać problemy związane z odbudową w okresie powojennym. Celem badania była analiza, obejmująca przede wszystkim przegląd obecnego stanu nieruchomości w Ukrainie. Rozważono i uzasadniono praktyczne podejścia do rozwiązania powyższych problemów. Zaproponowano formułę obliczania rzeczywistych kosztów mieszkaniowych, która uwzględnia czynnik ryzyka i strefy ryzyka różnych terytoriów. Ponadto przedstawiono propozycje finansowania odbudowy różnych grup nieruchomości. Opracowano również model odbudowy nieruchomości w regionie sumskim ze szczególnym uwzględnieniem nowego budownictwa. Przedstawione zalecenia i propozycje odpowiadają i rozszerzają treść „Programu rozwoju społeczności terytorialnych i projektów odnowy kraju do 2027 r." oraz „Strategii rozwoju regionalnego regionu sumskiego i jego jednostek administracyjnych i terytorialnych". Opracowano strukturalny i logiczny

algorytm mechanizmu rozwoju transakcji nieruchomości w Ukrainie, który służy do modelowania strategicznego planowania rozwoju regionalnego, w szczególności obwodu sumskiego.

SŁOWA KLUCZOWE:
nieruchomości; odbudowa Ukrainy; stan wojenny; strategia rozwoju