

# Cluster Dimensions of the Space of a New Residential District of Ukrainian 'Post-Socialist' City

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The article presents research material devoted to new dimensions of the spatial organization of residential areas of Ukrainian "post-socialist" city. He is currently faced with the challenges of military actions aimed at destroying the urban environment of Ukrainian cities. Residential areas of the micro-district type of the "post-socialist" city are mostly built on the basis of the postulates of functionalism. In the theory and practice of urban planning, they did not foresee the vulnerability of objects of necessary and social infrastructure. The criteria of centrality, as focus of concentration of functions of the spatial organization of the city, are currently being transformed into criteria of dispersion. Functional zoning acquires the multiplicative nature of multidimensional functional zoning. Fractal urbanism methodology assumes local freedom and global cohesion of individual urban planning elements. New exponential organizational structures with innovative digital technologies create "breakthrough" models of development. One of which is the urban planning cluster. The new residential area "Levada-2" in the city of Poltava (Ukraine) is presented, which demonstrates the latest approaches in the cluster organization of living space.

**Keywords:** 'post-socialist' cities; fractal urbanism; urban planning clusters; adaptation; adjacent house territories.

The spatial development of Ukrainian cities has certain methodological peculiarities that have developed over historical time. One of these peculiarities is that cities are considered in the system of spatial planning at the local level as elements of settlement systems of different territorial levels. The systematic approach in the theory and practice of urban planning in Ukraine has been implemented over the past 50 years at three interconnected territorial levels: national, regional, local (local). Cities, as objects of spatial planning at the local level, had a purely prescriptive nature of development management. Postulates of functionalism were predominant in the spatial organization of Ukrainian "post-socialist" cities. This led to directive fixed functional zoning with the priority of the production function, the "city-forming" factor. Residential areas in the planning structure of "post-socialist" cities were considered in most cases as a spatial addition to production.

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## Abstract

## Introduction



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Qualitative changes were necessary. Modern scientific and philosophical currents became the basis for them. Since the mid-60s of the 20th century, the prospects for the development of modern civilization and the prospects for urbanization processes have been actively discussed by the world scientific community. The formation of prospects for the development of the socio-economic state of modern society was theoretically substantiated in the form of “post-industrial society”, “post-capitalist society”, “third wave society”, “information-computer society” using data from literature (accordingly Galbraith, 1985; Dahrendorf, 1959; Toffler, 1989; Masuda, 1981), and others.

In view of the expected prospective changes and in connection with the process of globalization, the formation of a new information society was predicted by the acceleration of changes in social relations between certain social groups and at the level of interpersonal relations. Currently, in the conditions of the information society, the phenomenon of the “global city” has arisen, or rather “the global village” using data from literature (McLuhan, 1962). He caused the appearance of the implosion effect – an explosive wave, the compression of space and time, the transfer of part of the city’s functions to the information space, social networks.

Understanding the significant changes in the construction of the social component of a modern, informational globalized society also calls for the need for an adequate formation of an urbanized environment, a separate city. There is an assumption that more than one social institution will not play a central role in the information society. Society will be reorganized in the form of a network, not hierarchical institutions using data from literature (Toffler, 1989). In the new society, the nature of power will change, and it will have higher quality and maximum efficiency.

In an agrarian society, the source of power was coercion. In an industrial society, power is based on wealth. And in the information society, the determining factor in the exercise of power is not property, but knowledge. Access to information stratifies the information society, so that education, professionalism and qualification become the main factor of status differentiation. Ownership is dispersed and transformed into a joint-stock form, which provides a potential opportunity for inclusion in the management of virtually everyone. Power passes from the owner class to the educated ruling elite. In the new situation, the main social conflict is not the contradiction between labour and capital, but the clash of knowledge and incompetence. Knowledge and control over information means having power and the ability to influence. In the economic sphere, the localization of power is shifting from the sphere of production to the sphere of distribution; lack of information deprives the possibility of participation in decision-making and organization. New forms of conflicts are emerging – information wars using data from literature (Toffler, 1989). Social interaction takes a special form. The specific limits of the information society have become destandardization and demassification of all aspects of social life, as well as a high level of innovation and accelerated pace of social change. This means, on the one hand, the intensification and instability of social relations, with the predominance of “modular” relations in the sphere of interpersonal communication (the connection is not established by a complete person, but only with a certain function of it) and the growth of social tensions. And on the other hand, it means high mobility. Regarding the use of products, a new attitude is being formed – the culture of “one-time use items”. Social and individual value systems are also prone to rapid transformation and are temporary in nature. In turn, this causes the need to take into account such changes to the formation of the sphere of life of modern society, that is, the urban environment. Cities, which at the basis of their development had rigidly fixed functional hypertrophied industrial zones, faced the fact of spatial transformation.

Therefore, predictive design of “future cities” should be considered an important stage in the field of modern urbanism from the middle of the 20th century (authors P. Cook, P. Maymon, K. Tange, P. Soleri, J. Friedman, etc.). It was they who created a precedent for “breaking” spatial stereotypes in

the existing theory and practice of urban planning. Among such concepts, the perception of urban development as a global dynamic phenomenon is important. Such is K. Doxiadis's "theory of ekistics" using data from literature (Doxiadis, 1962). Its result was a proposal for the emergence of an "ecumenopolis" – a global polis on different continents. The dynamic development of urbanized territories predicted spatial development not only in the territories, but also in the air, as, for example, in the forecasts of the development of Paris (Y. Friedman). The spatial development of urban areas on the scale of entire states is demonstrated by the project of linear and nodal development of Poland (V. Malysh).

The post-socialist cities of Eastern Europe, including Ukrainian cities, have a special situation. Scientific and practical researches in Ukraine, scientific works of scientists-urban planners have created the foundations for the introduction of modern methodological approaches into the practice of urban planning. These are the works of scientists Y. Bilokon (Bilokon, 2001); M. Dyomin (Dyomin, 1991); T. Panchenko (Panchenko, 2021); H. Zablotsky (Zablotsky, 1976); E. Klyushnichenko (Klyushnichenko, 1999); M. Kushnarenko (Kushnarenko 1996); V. Nudelman (Nudelman, 1980); A. Osytnyanko (Osytnyanko, 2001); Y. Palekha (Palekha, 2017); A. Pleshkanovska (Pleshkanovska, 2005); H. Filvarov (Filvarov, 1989); I. Fomin (Fomin, 1997), and others. The gradual transition from a centric settlement system to the construction of a stable network system with the use of GIS technologies began to spread at the end of the 20th century and the beginning of the 21st century.

The change in the postulates of functionalism takes place in the dimension of the latest philosophical views, as a change in scientific paradigms. In social space, a paradigm is characterized by a specific scientific community that shares it. It determines its integrity and boundaries. According to R. Kurzweil, every time a technology approaches a certain barrier, a new technology will be invented. It will allow us to overcome this barrier using data from literature (Kurzweil, 2005). He cites numerous past examples of this to substantiate his assertion. He predicts that such paradigm changes have occurred and will become more and more common. This will lead to 'technological changes so rapid and profound that they represent a rupture in the fabric of human history' using data from literature (Kurzweil 2005). In order to adequately predict the development of urban space, it is necessary to apply the characteristics of the digital world. Among them are VUCA, which is volatility, uncertainty, complexity, ambiguity, and BANI, which is brittle, anxious, nonlinear, and intuitive. According to these characteristics of the current state of scientific research, the theory and practice of Ukrainian urban planning is being formed.

The process of changing the postulates of functionalism takes place in Ukraine in two directions:

- *The first* - by creating a comfortable living environment under the conditions of subsidiarity and decentralisation of the administrative and territorial system of Ukraine, taking into account the architectural and urban assets of "post-socialist" cities, historical and cultural heritage, changes in the city-forming factors of the post-industrial society, revitalisation of abandoned territories, etc;
- *The second*, extremely relevant – the development of new methodological approaches in the formation of a new dimension of the urban environment. Restoration of residential areas and cities of Ukraine as a whole, which were destroyed during the military invasion of the Russian Federation. The choice of urban planning approaches for "post-socialist" Ukrainian cities is on the list of the discussion: "restore as it was, or do better than it was?". The modern discussion about the spatial organization of the urban space also has a focus on the criterion of centrality. Focus of concentration of the functions of the spatial organisation of cities, as service centres (for example, a tiered service system), are currently being reshaped according to the criteria of dispersion.

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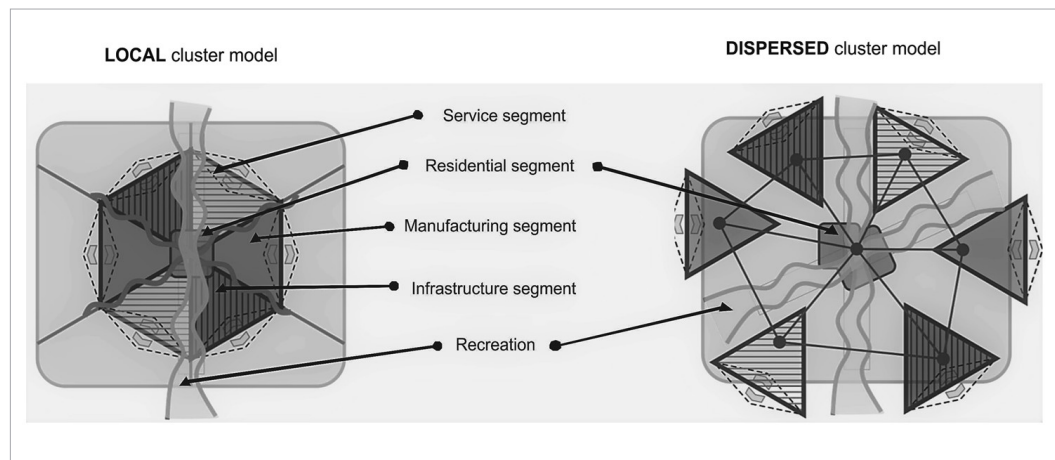
## Methodology

The Town sapiens methodology using data from literature (Vadimov, 1995) is one of the methodologies of the urban development of the “post-socialist city”. According to this methodology, the integrity of the system object (region-district-city) is provided by the maximum autonomy of individual elements. Such an urbanized system has macro, mezo and micro territorial levels. Spatial systems of this type belong to the class of complex (super-complex) systems. In them, priority is given to nonlinear differences. Local freedom and global cohesion are the main characteristics of such new urban systems - fractal urbanism. This approach should be applied to “post-socialist” cities using data from literature (Vadimov, 2020). Sustainable development of such urbanised systems (Town sapiens) is possible in other dimensions and categories. At the same time, a balanced ratio of natural and anthropogenic components that form the appropriate structural frames remains important. At the micro-territorial level (the city and individual urban planning elements), functional zoning gets multifunctional spatial characteristics.

For comprehensive consideration of multifunctional characteristics, exponential organizational structures should be used. Exponential organizational structures with innovative digital technologies create “breakthrough” models of industry and business development (finance, energy, transport, education, trade, etc.). They influence society and its spatial organization of urbanisation. The urban cluster is one such model. Local freedom and global cohesion – this fractal basis of the urban cluster gives it flexibility and advantages. Urban cluster is a morphologically unstable, multifunctional and self-sufficient formation. In it, the structural transformation of the city changes its urban fabric under the influence of post-industrial factors and innovative digital technologies. The urban cluster includes a different set of functional zones that do not necessarily have a single territorial connection. They can be concentrated both locally in one place, and they can be dispersed throughout the city (Fig. 1).

Fig. 1

Exponential forms of urban space organization based on a cluster (fractal urbanism – Town sapiens). Illustration: Vadim Vadimov, Dmytro Vadimov



Fractal division into clusters of self-sufficient parts of the city, based on exponential organization, allows the urbanized space to adapt to various challenges of the modern world, including war. The devastating consequences of military actions for Ukrainian cities made it necessary to take into account the vulnerability of centralized necessary infrastructure.

### The concept of integrated development of the city of Poltava (Ukraine)

In addition to the mentioned methodological approaches, project practice is important. In order to study the real situation at the city level (micro level or local level) in Ukraine, the GIZ (Germ. *Gesellschaft für Internationale Zusammenarbeit*) project “Integrated development of cities in

Ukraine” has been implemented since 2015. It includes the cities of Vinnytsia, Chernivtsi, Zhytomyr and Poltava (Ukraine). The customer of the project is the Federal Ministry for Economic Cooperation and Development of Germany (Germ. *BMZ*) and the State Secretariat for Economic Affairs of the Swiss Confederation (Swiss. *SECO*). In the framework of this project, it is important to carry out informal planning, which allows determining the main priorities of urban development with the participation of civil society. On the basis of research, the strengths and weaknesses of cities, their opportunities and threats are studied (USA *SWOT* analysis), development prospects are established with broad public involvement. In the future, they will be taken into account when developing urban planning documentation and, first of all, master plans. An important step on this way is the development of the Concept of Integrated Development of an Individual City.

The Concept of Integrated City Development “Poltava 2030” (The concept 2022; Ukr. *Концепція інтегрованого розвитку міста «Полтава 2030»*) is an effective spatial planning tool. Urban geoinformation systems of city management are a new tool in the implementation of such a Concept. In the basis of geoinformation systems, cadastral information resources are combined – land and urban cadastres, register of addresses, register of objects of urban planning activity and others. They are the first step towards the formation of a “smart city”.

Spatial planning in information systems takes on the features of a permanent design process. The existing hierarchical system of urban planning is implemented at three interconnected territorial levels: national, regional and local. The essence of the permanent project process is that this existing hierarchical system of urban planning in information systems is transformed into a rotational system of development of urban planning documentation. At the same time, the subjects of the permanent project process, objects, processes and norms are determined (Fig. 2).

Urban planning programs of dynamic spatial objects become the basis of such a process. Urban planning programs are a new type of spatial documentation, which outlines the urban planning strategy and its constructive development. The urban development program is not a planning document rigidly fixed in its indicators. When the conditions change, the recommendations regarding possible implementation options will also change.

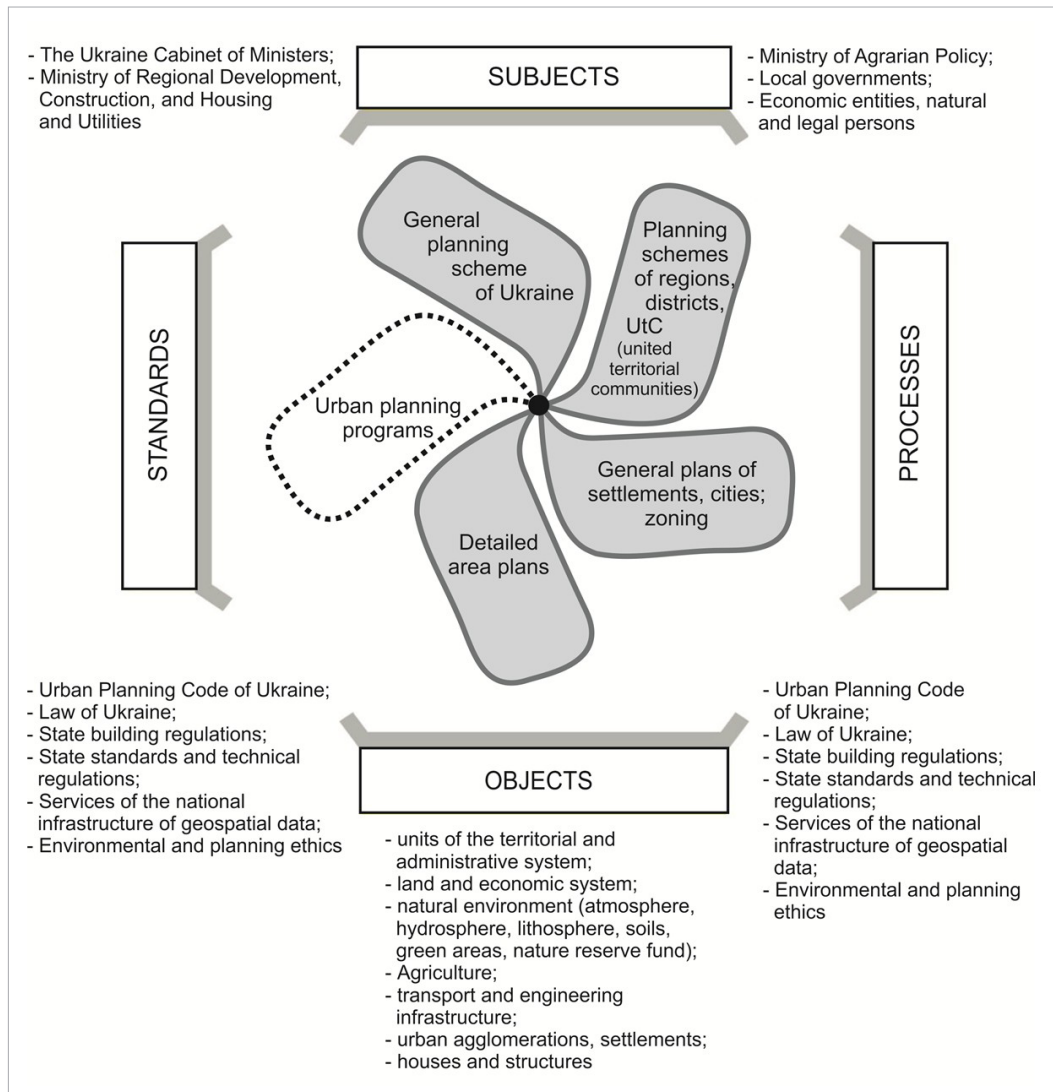
In Poltava, for the first time among the cities of Ukraine, the Concept of Integrated Development was developed, which was approved by the decision of the city council session in December 2018. The concept of integrated development of the city of Poltava has all the features of informal planning. On the basis of participative approaches, residents are involved in the formation of directions for urban development. This becomes the basis of an informal planning process. An important next step is the implementation of the defined priorities of the Concept through the implementation of projects within the framework of the already formal, regulatory and legal process. Spatial design of urban planning objects is of primary importance among them. But the existing legislative and regulatory framework for urban planning needs changes, taking into account the realities of the time.

The realities of the current state of war have shown the viability of the Concept of integrated development of an individual city. The Concept took into account the introduction of current project solutions that were not originally foreseen, for example, the new residential area of Levada-2 in the city of Poltava.

Based on the experience of the development process of the “Concept of Integrated City Development” in the city of Poltava, it should be stated that the appearance of such a strategic document is timely for the perspective of the city’s development. The development of the “Concept of Integrated Development of the City” provides opportunities to comprehensively take into account the features of the city, to create conditions for the realization of the existing potential. In the conditions of dynamic changes today, cities are faced with the need to simultaneously solve a number of problems: economic, ecological, demographic, social, and spatial according to the Concept (The con-

Fig. 2

Permanent project process in the conditions of information management systems of integrated area development. Illustration: Vadim Vadimov, Dmytro Vadimov



cept of Integrated City Development 2022). The success of its future development and prosperity depends on how adequately the city can respond to new challenges and plan long-term solutions that will ensure its sustainability. Therefore, cities need a comprehensive approach. It provides for the solution of new tasks and the most urgent problems, considers the needs and requirements of all sectors on the basis of equality. He involves deputies of all levels, businessmen, investors, civil society and residents in these processes. The Concept of Integrated City Development is just such a flexible tool that, if necessary, can be adapted to new situations. An integrated approach is used in the development of KIRM. That is, the relationship and interdependence between different spheres is considered according to the Concept (2023). At the same time, the spatial organization of the city of Poltava in the system of adjacent territories is defined (Fig. 3).

The Concept of Integrated City Development is the main element of providing the sustainability of urban development and an integral part of the daily work of local self-government. It is an effective tool of informal urban planning. It allows in a relatively short time to determine the main problems of the city and to find possible key solutions that have an impact on the economic and spatial development of certain quarters, districts and territories of the city. The speed of finding such solutions depends on the presence and availability of quality analytics, basic data and other relevant information. The an-

analytical stage is very important for determining the root causes of problems, which are usually multifaceted and require exactly integrated solutions. This approach makes it possible to optimally use the existing potential from the point of view of obtaining the maximum effect from the synergy of intersectional interaction.

In contrast to the rather static formal planning, informal planning not only saves time, but also has a strong dynamic effect for the city. The preparation of strategic concepts in informal planning takes place

on the basis of research and study of trends in the development of markets, economics, new technologies, sociology, scientific achievements, etc. This allows cities to respond to changes in the external environment, increase their competitiveness and achieve significant progress at the local, national and international levels.

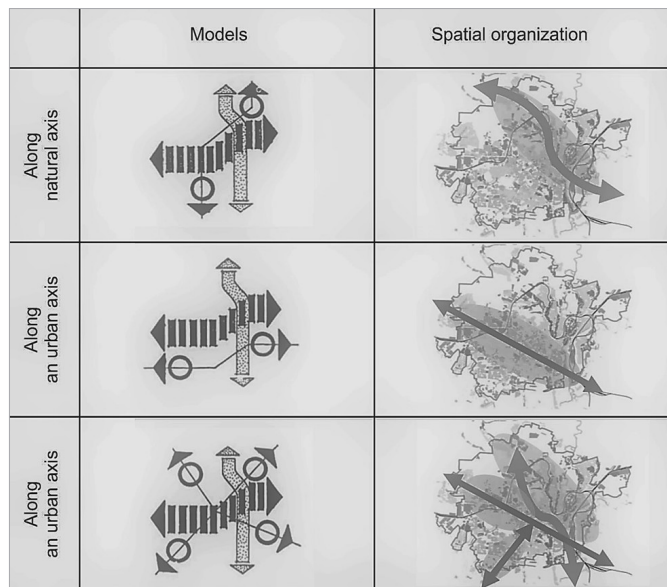
The Concept of integrated development is a modern flexible tool. Therefore, the main challenges facing the modern Ukrainian city can be solved among them:

- \_ Promote the transformation of the city, find a new way of development based on its peculiarities and principles of partnership;
- \_ Comprehensively cover the needs of the city;
- \_ Choose strategic courses of action in the conditions of a changing external environment and limited resources;
- \_ Focus on priority topics and areas that require urgent changes and development, harmonize development actions;
- \_ Coordinate the actions of various institutions, organizations, enterprises to achieve the general goals of the city's development;
- \_ make projects and planning processes understandable and transparent for residents;
- \_ To create an important base for attracting financing of national and international programs and assistance;
- \_ To create framework conditions that allows the city to become more attractive for life.

Conditional characteristics, which are determined on the basis of weaknesses and strengths of the SWOT analysis, provide an opportunity to formulate strategic goals. Strategic goals, in turn, provide an opportunity to determine operational goals and expected development for further work. Key areas of development are determined on the basis of the conducted research. The results of all previous stages make it possible to identify areas that need priority transformation on the way to prosperity and sustainable development of the city (Fig. 4, Fig. 5).

### The Approbation of Research

The city of Poltava with a population of 283,0 thousand people sheltered more than 65,0 283 thousand temporarily displaced people at the beginning of the war. There were problems of re-



**Fig. 3**

Spatial organization of the city of Poltava in the system of adjacent territories. Illustration: Vadim Vadimov, Dmytro Vadimov

Fig. 4

SWOT analysis Poltava spatial development. This is an economy section. Illustration: Vadim Vadimov, Dmytro Vadimov

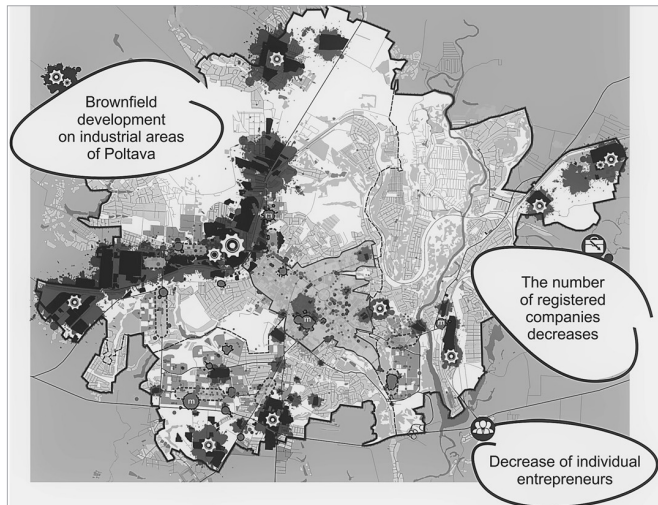
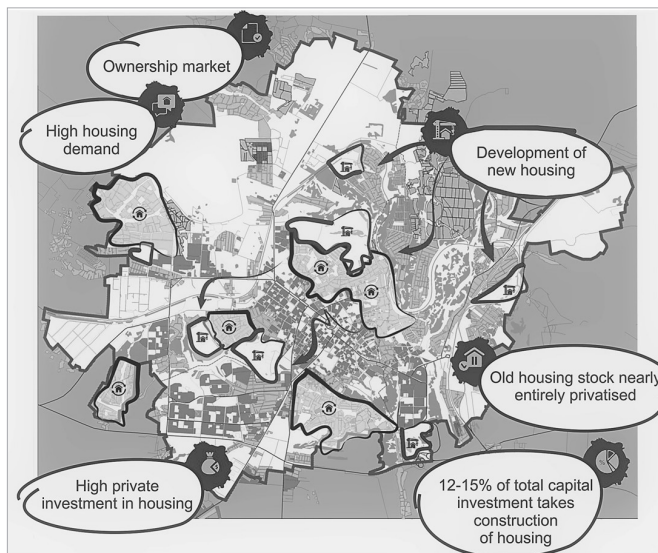


Fig. 5

SWOT analysis Poltava spatial development. This is a residential stock section. Illustration: Vadim Vadimov, Dmytro Vadimov



settlement of people. Already in March 2022 and June 2023, projects of cluster spatial organization (housing cluster) for temporarily displaced persons were developed by the National University "Poltava Polytechnic named after Yuri Kondratyuk". They were designed on the basis of model residential elements and capital multi-functional residential buildings (project design – Department of Urban Planning and Architecture, A. Konyuk).

The residential cluster of Levada-2 is located in the urban system of the existing transport and engineering infrastructure with corresponding duplicate elements of critical infrastructure within the cluster itself. This significantly increases its sustainability and safety conditions for its residents (Fig. 6). Residential elements and elements of the service infrastructure from modules create a comfortable environment similar to co-living. This corresponds to the cluster organization of the space on the one hand, and on

the other, it fully meets the needs of its residents: kindergartens, schools, places of employment, household services, etc. The surrounding environment of the residential cluster Levada-2 has a significant recreational potential of the riverside area (Fig. 7). The use of the characteristics of the natural environment, the design of the shoreline of the Vorskla River, the decoration of the coastal zone, the preservation of landscape areas will allow creating an interconnected composition of green spaces of the riverside area and a residential cluster. A pleasant microclimate with refreshing coolness, expressive aesthetic landscapes, and attractive water-landscape compositions will contribute to the high-quality physical recreation of residents of the residential cluster Levada-2 and the psychological and physical rehabilitation of temporarily displaced persons.

The basis of the spatial organization of the cluster is the creation of an individual outbuilding space of a block building with a comfortable living environment. The social infrastructure of the cluster includes commercial, industrial IT, educational and household facilities. An important compositional axis is a pedestrian boulevard that connects the residential cluster with the riverside area. In this way, socialization and reduction of psychological stress factors for temporarily displaced persons in the urban environment of Poltava takes place.



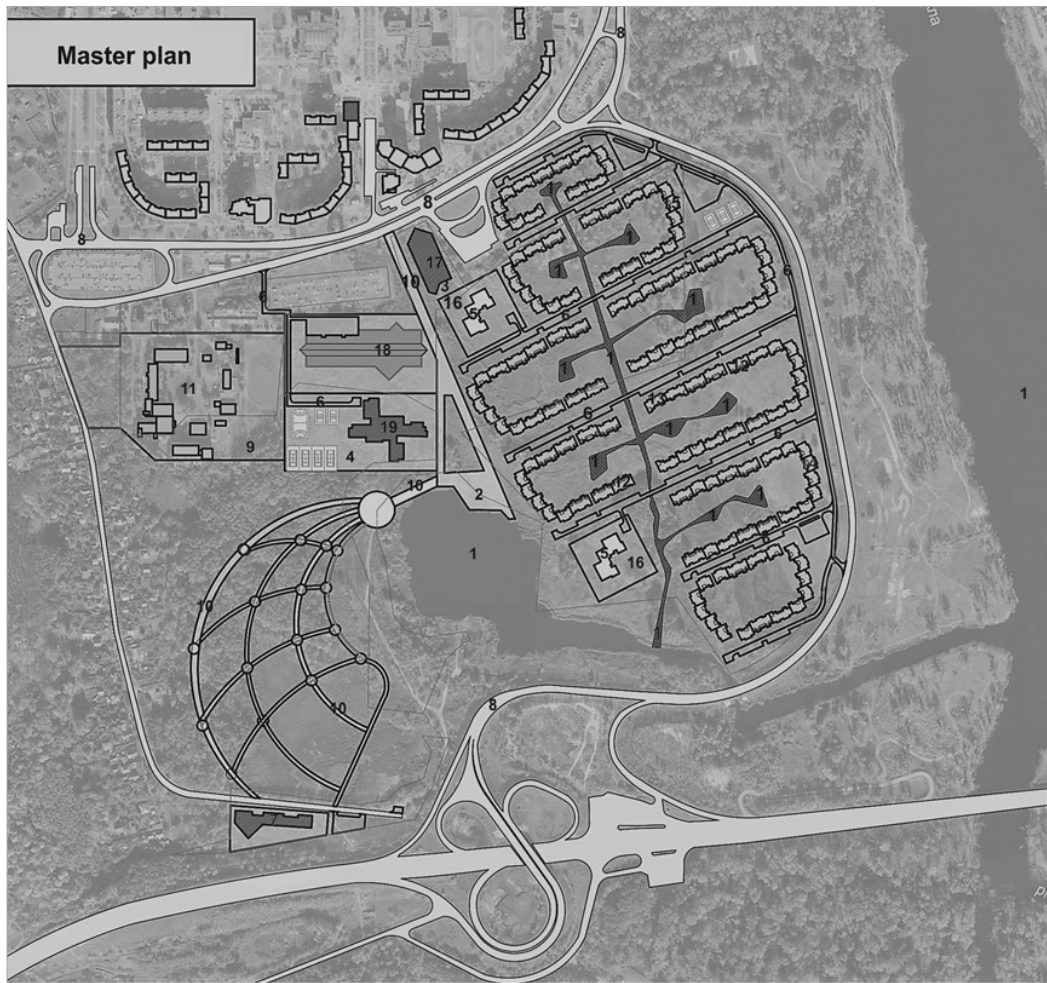


Fig. 6

Cluster dimension of the space of the new residential area "Levada-2" in Poltava. Illustration: Vadim Vadimov, Dmytro Vadimov.

Where: 1 - Water space, 2 - Area of mass events, 3 - Shopping area, 4 - Sports area, 5,16 - Kindergarten for 240 places, 6 - Residential street/parking lots, 7 - Camping-hotel for 50 places, 8 - Main street, 9 - Levada co-working centre, 10 - Pedestrian boulevard, 11 - Vocational and technical institution, 12, 13, 14, 15 - Residential sections, 17 - Shopping centre, 18 - Shopping and entertainment centre, 19 - School for 1200 students

The combination of capital residential buildings and modular residential elements in the project makes it flexible and effective in modern urban planning and life situations. Such a solution makes it possible to adapt it to today's challenges. In general, the urban environment over time, in conditions of constant mobility of various factors, needs to solve issues related to premature "mor-



Fig. 7

Visualization of the residential group of the Levada-2 residential district. Illustration: Liudmyla Shevchenko, Artem Shevchenko

al" aging of housing, the need for constant modernization, development, improvement, expansion and other dynamic modifications. This applies closely to the field of housing construction, the reconstruction of which is spend on about 20-25% of capital investments. Again, for our country, these issues became especially relevant at the end of the 20th and the beginning of the 21st century, when there was a need to modernize outdated residential buildings of the 50s and 80s of the 20th century and give them a new life on the way to humanizing the modern living environment. These questions were already raised by the authors in previous publications using the data obtained by L. Shevchenko (Shevchenko 2020, 2022, 2023). In this regard, the search for solutions to the problems of variability, mobility and adaptability of residential architecture comes to the fore.

At this stage, the Levada-2 urban planning cluster is based on local freedom and flexibility. Therefore, it is advisable to include in its structure polyvalent and modular housing, housing with a flexible transformed layout and with a common multifunctional space. The proposed polyvalent housing has flexible functional zoning and allows the space to be interpreted depending on the needs of its inhabitants. Modular housing, in turn, is built from three-dimensional modules with built-in necessary equipment. The modules are collapsible. They can be transformed according to the needs of inhabitants within the same module. This allows each family to personalize their living space without additional conversion. Such adaptive housing models have the necessary set of characteristics. They make it possible to meet the modern needs of the population and to face such challenges of the time as:

- \_ Changes in the socio-demographic structure of an individual family and society as a whole;
- \_ Loss of housing as a result of military operations and natural disasters;
- \_ The desire to constantly improve one's housing, which often contradicts the current legislation (glazing balconies, changing the planning, arranging front gardens, various additional structures);
- \_ Saturation and complication of the functional program of housing (arrangement of a home cinema, production and individual educational zones for remote work and study at home, etc.), as a result - the appearance of offices in residential buildings, "loft apartments";
- \_ Climate changes, which give an impetus to design residential buildings, capable of preserving valuable resources – building materials, heat, electricity, etc.;
- \_ The development of technologies, which leads to the maximum operational autonomy of housing, ease of dismantling and replacement of the necessary systems for its life support.

Possible options for changes are already foreseen at the stage of creating a design solution for residential buildings due to modification transformations. They are implemented within the established program. It is on the Levada-2 site with its significant natural potential that there is an opportunity to create a residential environment capable of adapting to relevant changes. The predicted results of such an experiment will be:

- \_ Existing dynamic changes in the area development, the adaptation of buildings to the relevant conditions, in particular - marshy and sandy soils, forest areas and the bed of the Vorskla River;
- \_ A new modern solution for the development of free spaces and areas in the structure of the city;
- \_ Economical use of territorial and material resources, including reused ones (cycling of materials);
- \_ Significant saving of capital investments at the state and private level (openness to natural resources, use of solar and wind energy, local building materials, including recycled ones).

The proposed residential cluster demonstrates a new and relevant solution for both city residents and internally displaced persons. This is not just an area for living, but a society in which it is comfortable to live, work, study, meet your daily needs and have a quality rest.

## Formation of adjacent house territory of residential cluster Levada-2

In the city of Poltava, a comprehensive approach is used, when real estate objects are considered together with land plots and the conditions of their use. This creates additional improvements. But on this basis, conflicts often arise in the field of rational, legal and social land use when creating a comfortable environment. Sometimes they prevent the implementation of such a project plan. Interaction of project teams with final stakeholders is often limited only to phases of research at the initial stage and evaluation of the already obtained result. While the work between these phases' remains the prerogative of the project team. It involves the formation of ideas and methods of their implementation. In this case, we lose the opportunity to discover valuable, user-oriented solutions of the project product.

Beneficiaries are physical persons, social groups, service providers, partner organizations, state authorities, local self-government, mass media, etc. mostly act as stakeholders at the community level. Guided by their interests, they can influence the project activity by promoting or hindering it. Therefore, the establishment of dialogue and cooperation with interested parties, their involvement in the implementation of projects is an important factor in successful, effective and sustainable activities in the field of project implementation.

The pace of life of the urban population with a growing number of needs, an increase in the role of material well-being, and a decrease in the importance of social aspects of human life lead to various problems. They are associated with a lack of rest, communication, narrowing of social ties to the work team and family. The social needs of the population are realized in the spaces of the city with different functional purposes. But the most responsible area is the residential area. It is here that residential buildings and service infrastructure are located.

When implementing projects for the formation of a residential environment, contradictions are exacerbated when choosing options:

- \_ To follow traditions or to follow an innovative path;
- \_ To prefer local, national or global values;
- \_ To create, "open and friendly" environment or "safe and stable", and others.

Recently, in the public sector of the city of Poltava, the design thinking approach is becoming more and more common. Design thinking is a creative process to solve a problem of creation human-centred innovation. It is a process that helps develop projects, programs, services, policies, products, etc. Design can create an imbalance of influence. There is a dynamic of influence between the designer and the people for whom the product is being created. It predicts who is an expert and who is not, who is allowed to make important decisions and who is not. Sometimes this turns into design for design, instead of designing with product users, leaving them out of the decision-making process. This, in turn, later returns as obstacles to the implementation of quite good projects.

The self-sufficient unit of the city – the Levada-2 residential district is a complex socio-economic, spatial system in which various processes take place, primarily related to human livelihood. That is why the organization of land plots for general, common purpose, adjacent territories of residential and public buildings is an urgent architectural and planning task of this district. A large number of regulatory, legal, engineering and social features of the district create a number of challenges for investors, developers, owners and users. Among them is to arrange it properly, bring the project to full implementation, and create comfortable living conditions and an attractive living environment.

Participatory design was used in the development of Levada-2. This is an approach to design that involves target audiences (users of the expected product or result) in the main design processes. Participatory design is also known as "co-creation" or "co-design". It covers methods useful both

for the initial and for all subsequent stages of project implementation. With it, the end users of the product, service or methodology take an active part in the joint development of solutions for themselves. It is an approach to design that invites all stakeholders (consumers, employees, partners, residents) into the design process to better understand, satisfy and sometimes anticipate their needs. Participatory design is used in various fields and scales. Some consider this approach in a political dimension, to empower users and democratize. For others, it's a way to innovate and limit design influence. In the Scandinavian countries, during the 1960s and 1970s, participatory design was actively used in cooperation with trade unions.

In the Levada-2 micro district, together with land plots of general, common purpose, adjacent areas of residential and public buildings, the principle of good neighbourliness is proposed for use. The content of good neighbourliness is that the owners and land users of land plots choose such methods of their use according to their intended purpose, in which the least amount of inconvenience is caused to the owners, land users of neighbouring land plots: shadowing, smoke, unpleasant smells, noise pollution, etc. using data from literature (part one of Article 103 of The Land Code of Ukraine, 20214 Ukr. *Земельний Кодекс України*). The parties of neighbouring land plots are obliged not to create obstructions that could prevent the intended use of neighbouring land plots. Negative impact on the neighbouring land plot is unacceptable. A separate Chapter 17 "Good Neighbourhood" is provided for in the Land Code of Ukraine to regulate good neighbourly land relations.

Thus, today in the city of Poltava, targeted tools of modern urban planning are actively used. Among them is a humane and ecological ideology with the use of technological and communicative innovations, new forms and methods of territorial and spatial organization of the urban environment. The design of the Levada-2 micro district is an example that demonstrates the city's need for high-quality urban development. Such a building is able to fit into the context of the human factor, that is, into the socio-psychological, visual, behavioural and social aspects of the perception of spatial objects of the new district of the city of Poltava.

Levada-2 is the territory in the south and eastern part of Poltava. It has a landscape structure, a neighborhood with a beautiful water body (the Vorskla River), a forest massif, and the already existing Levada micro district. Plans and prospects for the development of this territory have been relevant for about 15 years. During this period, the architectural community of Poltava and Ukraine took an active part in the creative urban planning process and expressed their professional visions. We will present the most interesting of them (Fig. 8):

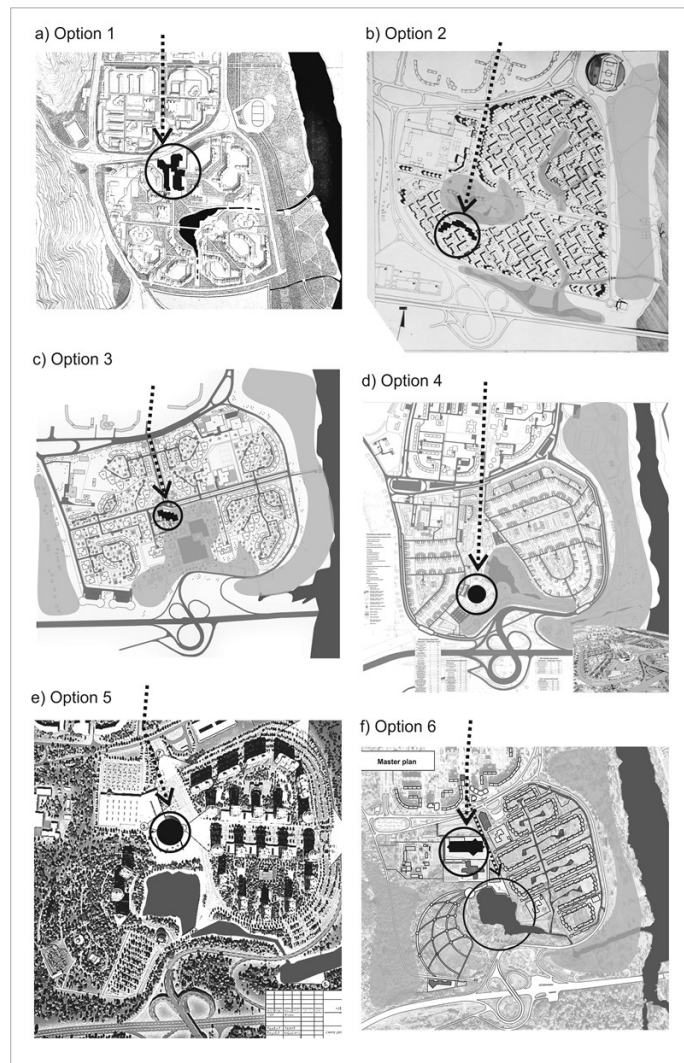
1. Project proposal of 1984 (author – F. Bogachenko, Fig. 8a, option 1). It is characterized by closing the perspective of Bohdan Khmelnytskyi Boulevard with a significant public object, the formation of residential groups from multi-storey buildings with kindergartens and a school, the dispersed location of landscaped recreational spaces within the neighborhood with a central water element, a service block;
2. Project proposal of 1995 (authors – V. Vadimov, O. Khliupin), Fig. 8b, option 2). It is characterized by a clear continuation of the perspective of Bohdan Khmelnytskyi Boulevard with a flanking multi-story building with service and closure by a multi-story sectional building with an expressive spatial and volumetric solution. The proposed increased density of development with mainly blocked residential buildings, the inclusion of additional linear water bodies in the recreational spaces of the residential environment, the active development of an axis perpendicular to the main one and leading to the Vorskla River;
3. Project proposal of 2009 (authors – V. Vadimov, M. Dron, Fig. 8c, option 3). It is characterized by the continuation of the perspective of Bohdan Khmelnytskyi Boulevard at an angle, closing it with a residential multi-storey building with service, access to a large recreational space with water elements, the formation of a picturesque composition of residential groups from sectional and point buildings, a network of kindergartens and a school, a service block, a direct connection in the form of a boulevard from the Vorskla river;

4. Project proposal of 2010 (authors – O. Skrypal, A. Konyuk, Fig. 8d, option 4). It is characterized by a clear continuation of the perspective of Bohdan Khmelnytskyi boulevard in the form of a boulevard, a flanking service block and a closing water park with a ski slope of city-wide significance, an energy-active residential development of a mixed type (sectional high-rise, block and individual residential buildings), an educational area with a school and kindergartens;

5. Project proposal of 2012 (author – Ukrainian trade guild and Golan Architects architectural bureau, Fig. 8e, option 5). It represents a new vision of the development of the territory, part of which is mainly residential with access to the recreation area along the bed of the Vorskla River. It is characterized by the continuation of the perspective of Bohdan Khmelnytskyi Boulevard, a 23-storey high-rise residential building, mostly single-section, a large shopping and entertainment complex, a futuristic park, an ice rink, a ski sports complex, an observation wheel, kindergartens and other infrastructure facilities. Due to the point buildings, it differs from the previous ones by increased greenery of various nature (squares, landscape areas, etc.);

6. Project proposal for 2022-2023 (author - A. Konyuk, Fig. 8f, option 6). It represents the cluster organization of space. It is characterized by the continuation of the perspective of Bohdan Khmelnytskyi Boulevard, a comfortable residential environment with block residential buildings, individual yard spaces and a common service block - kindergartens, schools, places of employment, everyday life, facilities of service and recreational infrastructure. The residential area is as close as possible to the recreational area along the Vorskla River.

All considered options are aimed at the formation of sustainable infrastructure for the development of the territory of Levada-2 with an area of 62 hectares in total. Therefore, from the point of view of practical implementation, option 5 is the most promising, which becomes the central focus of the entire Levada-2 micro district. Options 3, 4, 6 provide for the use of the existing transport and engineering infrastructure, but without taking into account the prospect of developing the entire territory. This is their drawback. Implementation of option 4 should be preceded by significant works to preserve the landscape dominant of the district - the pond. Option 3 is close



**Fig. 8**

Discussion questions regarding the choice of the most successful option for the development of the territory of the Levada-2 micro district. Illustration: Liudmyla Shevchenko, Artem Shevchenko

to the concept of implementation. But option 5 has the main difference from it - it is the creation of a sustainable living and comfortable environment without transit spaces, which are present in option 3. Therefore, from the point of view of developers, option 5 turned out to be more attractive.

## Conclusions

Following the latest theories of the development of urbanized systems (fractal urbanism) and imitating progressive philosophical views, it is proposed to change the approach to the spatial organization of residential areas of the Ukrainian "post-socialist" city. It is shown how modern innovative digital technologies and new exponential organizational structures create "breakthrough" development models.

Decisive attempts in this area were proposed in the city of Poltava (Ukraine), where proposals were made to create an urban residential cluster Levada-2. It has a flexible system and significant advantages, which are that:

- \_ An urban cluster is a morphologically unstable, multifunctional and self-sufficient formation;
- \_ It is possible to form functional zones of the cluster both locally and dispersedly;
- \_ An urban allows urbanized space to adapt to various challenges of the modern world, including during war, when centralised necessary infrastructure facilities are vulnerable.

Project proposals for the creation of a sustainable living and comfortable environment of Levada-2 demonstrate the active all-round search work of both scientists and practitioners. This work included an in-depth analysis of the existing topographical natural situation and, at the same time, projected development prospects of the territory. The cooperation of the architectural community with developers, residents of the city and the real economic background narrowed the options, focusing their attention on one of the most effective options - option 5.

Such experience of architects and urban planners of the city of Poltava is an effective example of finding new solutions, testing bold theoretical concepts. After all, this is a real answer to the modern threats and challenges faced by Ukrainian "post-socialist" cities.

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## References

- Bilokon, Y. (2001) Problems of urban development of territories: study guide. Kyiv, Ukrarchbudinform.
- Dahrendorf, R. (1959). Class and class conflicts in Industrial Society. Stanford, Stanford University PRESS.
- Doxiadis, K. (1962) The Town of Tema Ghana: Plans for two communities. *Ekistics*, 13(77), 159-171.
- Dyomin, M. (1991) Management of the development of urban planning systems in Kyiv. Kyiv, Budivelnik.
- Filvarov, H. (1989) Patterns of spatial organization of the city's social-production complex. Doctoral thesis in architecture. Moscow, Moscow architectural Institute.
- Fomin, I. (1997) Basics of urban planning theory: textbook. Kyiv, Naukova dumka.
- Galbraith, J. (1985) The New Industrial State. Princeton University Press.
- Klyushnichenko, E. (1999) Socio-economic foundations of city planning and development. Kyiv, Kyiv Ukraine Academy of Architecture.
- Kurzweil, R., (2005) The Singularity Is Near, USA, Viking.
- Kushnarenko, M. (1996) Methods of pre-project analysis in urban planning: Training manual. Kyiv, IZMN.
- Masuda, Y. (1981) The information Society as Post-Industrial Society. World Future Society. Washington. D.C., USA
- McLuhan, M. (1962) The Gutenberg Galaxy: The making of typographic man.. Toronto, University of Toronto Press.
- Nudelman, V. et al. (1980) Региональная схема расселения на территории. УССР [Regional resettlement scheme on the territory of the Ukrainian SSR]. *Строительство и архитектура*, No. 2. 8-10.
- Osytnyanko, A. (2001) City development planning: Monograph. Kyiv, Kyiv National University of Construction and Architecture.
- Palekha, Y. (2017) Географічні особливості планування та розвитку міста Київ на сучасному етапі [Geographical features of Kyiv city development planning at the

current stage]. Український географічний журнал, 39-48. <https://doi.org/10.15407/ugz2017.04.039>

Panchenko, T. et al. (2021) Transformation of Ukrainian cities in the post-Chernobyl and post-totalitarian "transition" period. Transfer of innovative technologies, No. 2, 3-16. <https://doi.org/10.32347/tit2021.42.0101>

Pleshkanovska, A. (2005) Functional and planning optimization of the use of city territories. Kyiv, Institute of Urbanism.

Shevchenko, L.S. (2020). Second life of the residential building area of the middle of the 50s-Early 80s of the twentieth century in Ukraine: Opportunities and perspectives. Lecture Notes in Civil Engineering, 73, 449-462. [https://doi.org/10.1007/978-3-030-42939-3\\_45](https://doi.org/10.1007/978-3-030-42939-3_45)

Shevchenko, L. (2022). Mass Housing in Ukraine in the Second Half of the 20th Century. Docomomo Journal, 67, 2022/2, 72-78. <https://doi.org/10.52200/docomomo.67.08>

Shevchenko, L. et al. (2023) Landscaping and Greening of the Residential Buildings Courtyards of the 50s-Early 80s of the XX Century in Ukraine: Current Situations and Renewal Perspectives. Lecture Notes in Civil Engineering, 299, 541-558. [https://doi.org/10.1007/978-3-031-17385-1\\_43](https://doi.org/10.1007/978-3-031-17385-1_43)

The concept of integrated development of the city of Poltava (2022). URL: <https://www.2030.poltava.ua/ua/kontseptsiya-intehrovanoho-rozvytku-mista-2030>.

The Land Code of Ukraine (2021). URL: <https://zakon.rada.gov.ua/laws/show/2768-14#Text>.

Toffler, A. (1989). The third wave. Michigan, Bantam Books.

Vadimov, V., & Vadimova A. (2020) Ukrainian Post-socialist Cities and Integrated Development. International Journal of Innovative Science, Engineering & Technology, Vol. 181 ,Issue 32022, 79-83.

Vadimov, V. (1995) Urban problems in the costal regions - from 'Ecopolise' to 'TOWN Sapiens' in Ukraine. ARCHITECTUS (8), International Journal of Theory, Design, and Practice in Architecture, 8, 59-63.

Vadimov, V. (2018) The latest methodological approaches in the spatial development of Ukrainian cities. Smart project, building and city, Cracow University of Technology, 156-160. <https://doi.org/10.4467/25438700SM.18.045.9210>

Zablotsky, H. (1976) Methodological recommendations for determining functional connections and territorial development of settlement systems. Kiev, Gosgrazhdanstroy.

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