Urban and Regional Planning
2023; 8(1): 11-17
http://www.sciencepublishinggroup.com/j/urp
doi: 10.11648/j.urp.20230801.12
ISSN: 2575-1689 (Print); ISSN: 2575-1697 (Online)

Review Article

Cluster Organization of Open Public Spaces of the Post-Socialist City

Vadimov Vadim, Vasyliev Pavlo*

Department of Town Planning and Architecture, Educational and Research Institute of Architecture, Civil Engineering and Land Management, National University «Yuri Kondratyuk Poltava Polytechnic», Poltava, Ukraine

Email address:

vmvadimov@ukr.net (Vadimov Vadim), sich1985kozak@gmail.com (Vasyliev Pavlo)

*Corresponding author

To cite this article:

Vadimov Vadim, Vasyliev Pavlo. Cluster Organization of Open Public Spaces of the Post-Socialist City. *Urban and Regional Planning*. Vol. 8, No. 1, 2023, pp. 11-17. doi: 10.11648/j.urp.20230801.12

Received: December 22, 2022; **Accepted**: February 13, 2023; **Published**: February 24, 2023

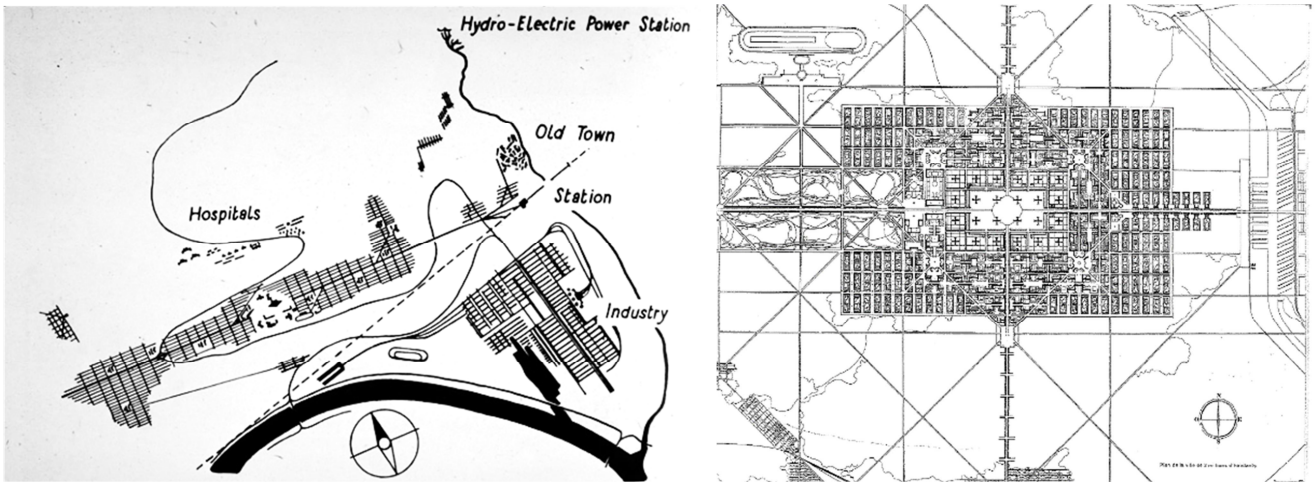
Abstract: The spatial organization of post-socialist cities in Ukraine requires the creation of an adequate, comfortable urban environment in the conditions of crisis phenomena caused by problems of an economic, ecological, social and military nature. The problem of reforming cities requires a review of the "functionalism" paradigm and a new systemic consideration at three interconnected territorial levels: macro, meso, micro. The article describes the change in the paradigm of functionalism of spatial planning in post-Soviet countries, considers new methodologies of urban development of cities, proposes a new approach to the study of open public spaces, namely, as an element of the system of the urban planning environment. This approach reflects the important role of public spaces in shaping the urban fabric. Particular attention is paid to the integration processes of sustainable development of cities, which reveal a new meaning of human coexistence in the surrounding environment. In the context of a new look at open public space, the text describes the assumption "space creates the environment", which allows us to consider urban planning in a completely new dimension. The latest developments in scientific research on the typology of public spaces are separately considered. The article singles out physically accessible and physically inaccessible categories of public spaces. The article assumes that the city, as a cluster structure, is the sum of independent environments (elementary systems), which consist of public spaces united by certain characteristics. The issue of the micro-territorial level is considered, where the priority is the spatial organization of the city's public spaces on the basis of an urban cluster. An important feature is the pedestrian accessibility to various service functions of the urban environment. Based on the assumption, new approaches to the study of open public spaces at different urban planning levels are proposed, taking into account the human-oriented principles of the formation of a sustainable urban environment.

Keywords: Post-Socialist City, Fractal Urbanism, Urban Space, Urban Planning Cluster

1. Introduction

At the beginning of the 20th century, the phenomenon of the "socialist city" emerged in the theory and practice of urban planning. It became the most common on the territories of Eastern Europe. This is not accidental, because the political doctrines of the Soviet government (USSR) dictated the need to build urban space on the priority of the industrial component, where all other public, residential, recreational functional components were perceived as additional. The theory of the "socialist city" is based on the theory of the "industrial city" (T. Garnier) and the postulates of the Athens Charter, one of whose authors was Le Corbusier (Figure 1). The pioneers of this movement, like their predecessors, proposed new principles of city organization that, in their opinion, would create ideal societies [16]. This is how the prevailing paradigm of "functionalism" arose in the theory and design practice of the mid-20th century. New cities: Chandigarh (1950s), Brazilia (1960s), Milton Keynes (1970s) are vivid examples of the introduction of functionalism theory

into planning practice.



a b

Figure 1. *Spatial foundations of forming a "Socialist city" (beginning of the 20th century). Theoretical preconditions, models. a – "Une Cite Industrielle" by T. Garnier (1904), b – "Contemporary City" by Le Corbusier (1922).*

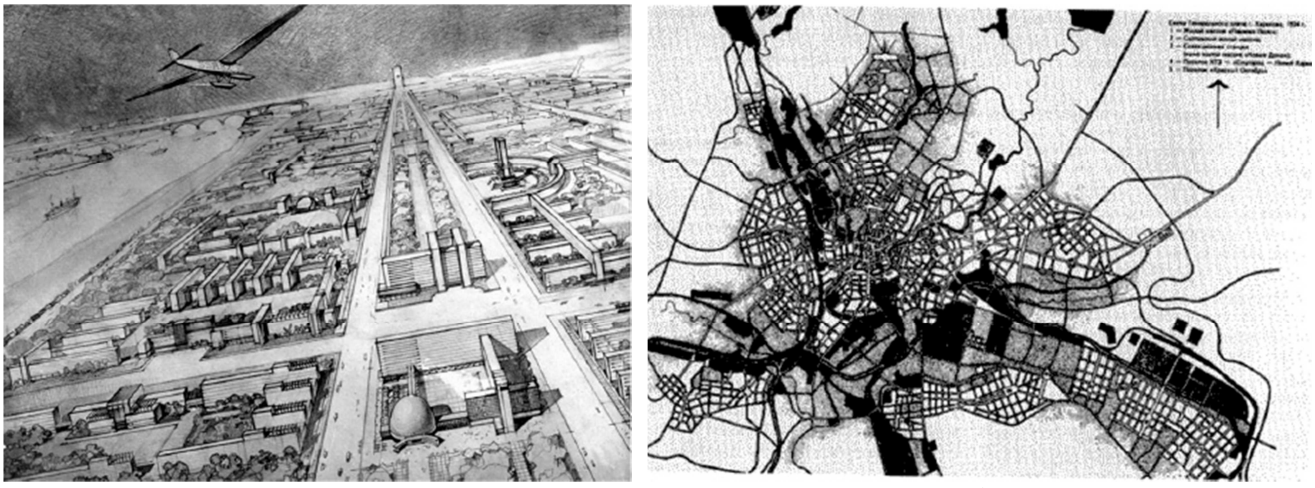


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Figure 2. *Spatial foundations of forming a "Socialist city" (beginning of the 20th century). Urban planning. a - Dniprovska HPP, settlement No. 6 "Socialist city" V. Vesenin (1929-1930), b - master plan of Kharkiv, O. Eingorn (1933-1934).*

Urban planning of Ukrainian cities (Kharkiv, Zaporizhzhia, Kryvyi Rih, Dnipro, etc.) is an equally important example of large-scale implementation of a differentiated system of functional division of urban space into industrial, agricultural, public, and landscape-recreational spaces (Figure 2). This is how the dominant paradigm of "functionalism" emerged in the theory and project practice of Ukraine. The unconditional progressiveness of the clear functional zoning of the urban space at the beginning of the 20th century began to inhibit the processes of integrative development of the urban environment on democratic principles at the beginning of the 21st century, problems arose in industrial territories (industrial deserts), agricultural territories did not provide comfortable living conditions for residents, etc. Nowadays, there is a need to conduct both theoretical and practical research.

2. Changing the Urban Development Planning Paradigm

Since the beginning of the 90s of the 20th century, the processes of reforming Ukrainian cities in the post-Soviet space were accompanied by negative trends in almost all components of urban planning - demography, economy, social sphere, transport, ecology. Post-socialist cities found themselves, without planning and state support for development prospects, in a state of "chaotic dismantling", and in some cases outright destruction.

The process of changing the paradigm of "functionalism" takes place in two directions: the first one involves ways of creating a comfortable living environment in the conditions of architectural and urban planning assets of post-socialist cities, changes in city-forming factors, revitalization of abandoned

territories, improvement of the ecological situation against the background of climate changes, etc. The second one, which is extremely relevant, includes ways to restore agricultural 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 is under discussion: either to restore as it was, adhering to the outdated paradigm of "functionalism" or to do better than it was.

One of the methodologies of the urbanized development of the "post-socialist city" is the Town sapiens methodology (V. Vadimov, 1995) [20]. According to this methodology, the integrity of the system object (region - district - city) is ensured by the maximum autonomy of individual elements. Such an urbanized system has macro, meso and micro territorial levels. Spatial systems of this type belong to the class of complex (super-complex) systems, where nonlinear differences are a priority. Local freedom and global cohesion are the main characteristics of such new urbanized systems - fractal urbanism [22]. The sustainable development of such urbanized systems (Town sapiens) is possible in other dimensions and categories, while 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), the structural frames of public spaces acquire multifunctional spatial characteristics. In addition to the mentioned methodological approaches, project practice is important. Urban planning of urbanized territories, cities and individual urban planning elements of different hierarchical levels from national to local level requires the latest approaches. One of these approaches is a permanent design process based on GIS technologies, which involves constant monitoring of changes and crisis situations occurring in urbanized systems (challenges) and preparation of appropriate design solutions (answers) based on flexible urban planning programs [21].

The Sustainable Development Initiative (SCI) and the Leipzig Charter "European Cities on the Path to Sustainable Development" (2007) led to the adoption of the Concept of Sustainable Development of Ukrainian Settlements (1999), the Sustainable Development Strategy "Ukraine - 2020" (2015). These documents reveal a new meaning for the development of cities, which is the coexistence of Man in the surrounding environment. Integrated urban development (ISEK) creates such opportunities by combining the directions of informal design with the urban design process regulated by existing regulations and legislation.

An important step on this path is the development of the Concept of integrated development of a separate city (ISEK), which meets the requirements of the international practice of urban development planning. Such a project was implemented in Ukraine, within the framework of the program "Integrated development of cities in Ukraine", which is implemented by the German government company "Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH" [8]. The cities of Vinnytsia, Chernivtsi, Zhytomyr and Poltava are included in this project. The Concept of Integrated Development (ISEK), which was approved in 2018, was developed in Poltava for the first time among the cities of Ukraine. This became the basis of the new general plan, which was also implemented for the first time in Ukraine. The new master plan, which was approved in 2020, became the basis for innovative approaches in the spatial development of the city, in particular the methodology of fractal urbanism and the cluster organization of revitalized industrial areas, in the organization of public spaces.

3. Cluster Organization of Open Public Spaces

3.1. A New Perspective on Public Space

In this work, it is proposed to consider the urban planning environment at the micro-territorial level (individual city) through a system of public spaces that unite around themselves a set of functions capable of independent existence as elementary units of the city.

In addition to the named "Town sapiens" methodology, the following scientific works became the scientific and methodological basis for the research: works focused on the formation of public spaces: K. Lynch, J. Gehl, J. Speck; studies of cluster theory in various fields of science: economics - Porter, Markusen, Martin and Sunley, Botham and Downes, Margaret Kohn, geography - Marshall, Jacobs, Perroux, Cumbers and MacKinnon, urban and regional planning - V. Vadimov, Yu. Kryvoruchko, A Panfilov, L. Krier.

Reviewing the history of architecture, the principle of life-space-building is followed at various stages of the development of settlements. Cities developed along trade routes, market squares, etc. Artisans, and later entrepreneurs, located their benches and houses, the streets developed, which prompted the situational transformation of cities. With the beginning of the modernism era, the idea of reverse urban planning gained popularity, in which buildings took on the main role of shaping the environment. The so-called "Brasilia" syndrome became dominant in the spatial organization of cities and this led to the loss of people-centeredness. A new round of the development of urban planning and a return to the human scale occurred at the end of the 70s of the 20th century; it was at this time that the movement of new urbanism appeared. It was during this period that the concept of "The City Within the City" was presented [11], which became the basis for research on urban planning clusters. According to the concept, the city should not be subject to fragmentation of functions, but on the contrary should form self-sufficient territories that will unite within its borders all the everyday functions of city life (housing, work, recreation). The main requirement for self-sufficient development of territories is taking into account pedestrian accessibility. Therefore, it is not by chance that among the urgent questions of the theory of urban planning of the 21st century there is the question of how in conditions of high concentration and density of urban agglomerations provide an opportunity to implement a variety of city services within walking distance. The works of Gandelsonas M., Glaeser E., Kostof S. are especially devoted to such questions [4, 6, 10].

According to the above, the essence of the new urbanism movement consists in the primary modeling of expectations and forecasting regarding the future human activity of the design territory. First of all, it is proposed to form the human dimension where a person spends the most time, namely open spaces [5]. Thus, as part of the Bo01 City of Tomorrow project, Malmö, Sweden, the primary organization of open spaces was envisaged, which, in turn, dictated the shapes and sizes of the plots for development. (Figure 3) And considering that the projects of individual buildings were developed by completely different architects, this did not affect the general perception of the environment, as it was formed by public spaces of a human scale. Therefore, the idea "spaces form the environment" is very interesting and ambitious.

Figure 3. *Project - Bo01 City of Tomorrow (1998-2001), Malmö, Sweden.*

3.2. Typological Characteristics of Public Spaces

An important element of any urban planning structure is its planning framework, but unlike the classical understanding that cities form buildings and their functional purpose, the following study proposes a new approach, which claims that cities form spaces and those spaces in their turn dictate the sustainability of the functional purpose of the environment. At the urban planning levels of the city, such formative objects are public spaces. Within the framework of the work, it was determined that the object of research is a limited segment - open public spaces.

According to the results of international and domestic practical studies of urban spaces [1, 7, 17], it is obvious that open public spaces have a significant impact on the quality of life of citizens. In addition, public spaces are an important communicative element of the urban environment, capable of improving its various functional and planning connections. However, when studying the quality of public spaces,

scientists and researchers identify a number of shortcomings that reduce their planning potential [9, 14], i.e. inconsistency of the design with the functional filling of the public space, lack of pedestrian connections, including transit, alienation of the territory, lack of communication with elements of sustainable urban mobility, ignoring social, economic and cultural features, etc.

For further research, it is worth deciding on the typology of public spaces. Since public spaces depend on different functional and planning content of the environment and general functions, such as social, cultural, economic - the main typological feature is the function and its stability. Typological features of the content and form of public spaces are not fixed, as they are able to transform with changes in the dynamics of society (Figure 4) [2]. These features are important in terms of sustainable urban development and are emphasized by the objectives of the new Leipzig Charter, 2020.

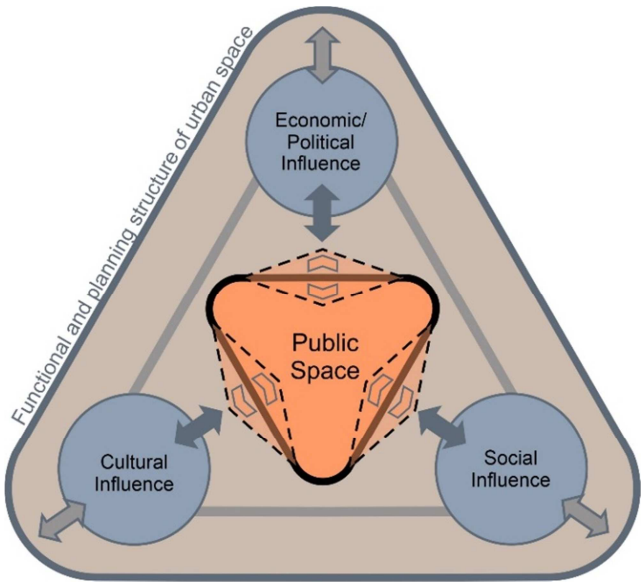

Figure 4. *The dependence of the shape and size of public spaces on external factors.*

According to the UN program on settlements, three groups of physical (visual) spaces are distinguished: public spaces, open public spaces, public urban infrastructure objects. This classification is not universally accepted and is open to careful study, because the attribution of public space may differ depending on the region and culture. Specialists of the UN-Habitat program propose to supplement the typology of spaces with three more non-physical categories of public space, namely general public space; the city as public space and cyberspace. In the context of the study, the category of the city as a public space is important, as it enables a holistic perception of a certain or the entire territory of a settlement [19].

3.3. Public Spaces Are the Basis of the Cluster Structure of the City

It can be assumed that the city, as a public space, is the sum of independent environments (elementary systems), consisting of spaces united by certain characteristics. An elementary system is able to maintain a specific relationship between its elements, as well as to change over time. The sum of such elementary environments (systems), in fact, forms the cluster structure of the city. The study of the components of the system at different urban planning levels will provide an opportunity to model and forecast the development of its parts. With a gradual transition to higher systems, it is possible to obtain clearer and more generalized indicators for working with the entire system and even combine them into larger supersystems [21].

Therefore, we can consider the urban environment as a fractal urban structure, the elements of which have the property of self-similarity and unique characteristics. Fractal division, in fact, is nothing more than a cluster organization of self-sufficient parts of the city that are able to adapt to various challenges of the modern world. Thus, the subject of this study is the prerequisites for the emergence, formation and transformation of open public spaces, in the conditions of the cluster organization of the urban environment.

In general, the cluster phenomenon is not new for spatial planning [3, 15, 18], but considering that the primary basis is the economic theory of clusters, which arose as an alternative to the "chaos" theory, it is worth noting that any cluster unit of space is able to respond to changes and transform freely. Considering the above, an elementary cluster is capable of two types of response to external changes: the ability to redistribute functions in the middle of the unit and deformation of the cluster due to the degradation or transformation of elements in the middle of both the unit and adjacent units. It is important to assume that the change of one element is a stimulus for another, the activity of one element stimulates the development of neighboring elements involved in it. Since the cluster is not a stable form, it is necessary to add elasticity to the term cluster [12]. (figure 5).

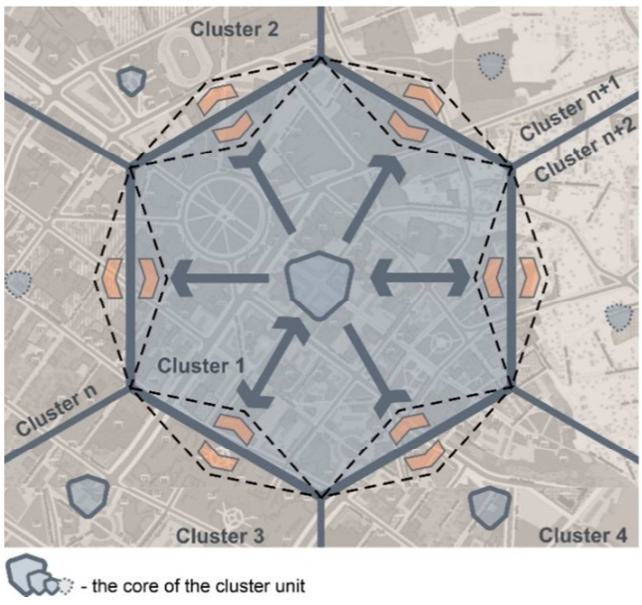

Figure 5. *The cluster transformation model in the context of the flexibility of public spaces.*

From an urban planning point of view, a cluster can be considered as an elementary, self-sufficient unit of the environment, the process of communication in which occurs at the expense of public spaces (Figure 6). The size, relationship, hierarchy of public spaces depend on many factors that require additional research.

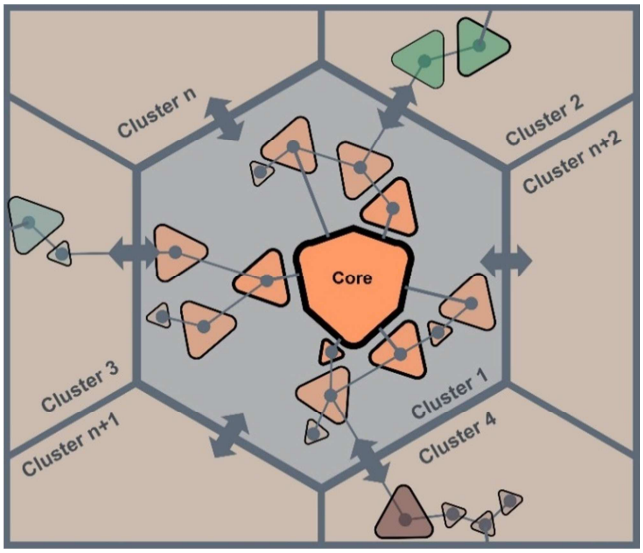

Figure 6. *A model of the formation of a cluster of public spaces.*

In terms of sustainable development of cities, it is worth understanding that the quality of public spaces directly depends on their environment and vice versa. It depends on a number of factors and can be unstable depending on the site, target group, time of day, season, etc. Thus, a scientific question arises to what extent these quality criteria of public space should be static and homogeneous, or on the contrary – dynamic, flexible and adaptive depending on the specific situation. What is the sphere of influence of a public space in view of the people-centric approach (walking accessibility, population density of the studied territory [13, 23, 24]?

4. Conclusion

In the context of implementing the principles of sustainable development of cities and the historical struggle for political independence of Ukraine, the field of urban planning needs new, bold approaches to the development and restoration of cities. Since the paradigm of functionalism no longer meets the requirements of today, there is a need to define a new urban planning approach that will allow to adapt to any challenges. Taking into account the already formed urban fabric, the relatively new methodology of Town sapiens, in the context of cluster theory, allows for a new systematization of territories or the whole urban environment as self-sufficient units that flexibly adapt to internal and external changes.

The assumption "space creates the environment" allows us to consider urban planning from a completely different angle, the angle of the human scale, which takes into account the specific features of a certain territory.

Public spaces play an important role and are an integral component of the urban fabric, particularly in cities with historic centres. Effective management of public space should be based on the results of quality assessments and should take into account the characteristics of external and internal factors of influence. It is necessary to move away from a dispersed assessment of public spaces and form a certain hierarchy of them. Due to the holistic understanding of the interrelationships of the urban space, the cluster approach can positively affect sustainable urban development.

The urban planning environment is considered as a cluster structure, the parts of which contain a unique set of circumstances that are capable of transformation due to changing spheres of influence on adjacent spaces. Each cluster unit of public space needs its own recipe, which will be based on the generalization of the results of the conducted research. Open public spaces are the planning framework of the cluster. The typology of these spaces needs further research, including the indicators of people-oriented solutions. The capacity of a specific space for planning and functional flexibility becomes decisive (functions can be episodic, change during the day, week or season).

Acknowledgements

Draught of the concept of integrated urban development Poltava 2030, German government company "Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH".

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