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Detection of Reflexive Signs in Town Planning Systems of Ukraine and Republic of Belarus

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Abstract. As a city is a complex system, it complies with the principles pertaining to organization and management of systems. System analysis makes it possible to figure out the difference between managing systems (subject) from systems that are managed (object). There is a link between these system formations which unites them in a common system. Such relationship is a source of information for development of management action. Impact on the system is achieved through availability of influential means and data. Urban planning science represents a city as a complex of socio-economic, territorial-productive and demographic-ecological systems of the following type: "population" – "environment" – "activity". "Environment" is thought of as a technical system with such synonyme notions as "urban planning system", "anthropogenic environment", "settlement system". "Environment" has two components – territory and buildings. Ukrainian legislation determines that management of urban planning activities is carried out through developing urban planning documentation and carrying out urban planning monitoring. Results of the urban planning monitoring are taken into account while preparing urban planning documentation (introduction of amendments to it) and programs of socio-economic development. Thus, urban planning monitoring represents a management system of urban planning activity in the Ukraine. Legislation of the Republic of Belarus contains some provisions which regulate urban planning activity through urban development planning and zoning of territories; creation and maintenance of urban planning cadastre; control over development and implementation of urban planning, architectural and construction projects; implementation of state construction supervision. Data of the urban planning cadastre are taken into account in urban planning documentation. In comparison with the Ukraine management of the urban planning system in the Republic of Belarus is attached to the urban planning cadastre. The urban planning systems of the Ukraine and the Republic of Belarus are self-managed reflexive systems that organize their behavior with due account of not only the past experience but also due to possible impact of other system which is in interaction with it.

Keywords: city, system, monitoring, cadastre, urban planning documentation, environment, population, impact, structure, sign, essence

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Выявление рефлексивных признаков градостроительных систем Украины и Республики Беларусь

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Реферат. Поскольку город является сложной системой, он подчиняется принципам организации и управления системами. Системный анализ отличает управляющие системы (субъект) от систем, которые управляются (объект). Между этими системными образованиями существует связь, объединяющая их в общую систему. Такая связь является источником информации для выработки управляющего воздействия. Влияние на систему достигается благодаря нали-

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чию средств воздействия и имеющейся информации. Градостроительная наука представляет город в виде совокупности социально-экономической, территориально-производственной и демографо-экологической систем вида население – среда – деятельность. Среда понимается как техническая система с синонимичными понятиями: «градостроительная система», «антропогенная среда», «система расселения». Среда имеет две составляющие – территорию и дома. Законодательством Украины определено, что управление градостроительной деятельностью осуществляется путем разработки градостроительной документации и проведения градостроительного мониторинга. Результаты градостроительного мониторинга учитываются при разработке градостроительной документации (внесении изменений в нее) и программ социально-экономического развития. Таким образом, градостроительный мониторинг представляет собой систему управления градостроительной деятельностью Украины. Законодательство Республики Беларусь включает положения о регулировании градостроительной деятельности путем: градостроительного планирования и зонирования территорий; создания и ведения градостроительного кадастра; контроля над разработкой и реализацией градостроительных, архитектурных и строительных проектов; осуществления государственного строительного надзора. Сведения из градостроительного кадастра учитываются в градостроительной документации. В Республике Беларусь управление градостроительной системой возложено на градостроительный кадастр. Градостроительные системы Украины и Беларуси являются самоуправляемыми рефлексивными системами, организующими свое поведение с учетом не только прошлого опыта, но и возможного воздействия другой системы, с которой они взаимодействуют.

Ключевые слова: город, система, мониторинг, кадастр, градостроительная документация, среда, население, воздействие, структура, признак, сущность

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Introduction

The specifics of urban planning development of Ukraine and the Republic of Belarus is the fact that the formation of a network of settlements, that took place during the thousand-year history is almost completed. The main task of town planning is organizing the urban environment [1]. Efficient management of urban development process requires permanent control and making reasonable decisions aimed at sustainable development of the territory [2]. The city is a complex system with an extensive network of different functional processes governing bodies [3]. Town Planning activity is characterized by a specific management organization of urban areas and it requires constant improvement of self-management functionality. It is necessary to explore the city in terms of system analysis [4]. Information research support of urban development activities are found in the works of M. M. Habrel [5], N. M. Demin [4, 6], G. I. Lavrik [7], A. A. Lyashchenko [8], A. P. Ositnyanko [9], Y. N. Palekh [10], A. I. Syngaevskaya [1, 6, 11], Y. N. Trukhachov [12], V. D. Shipulin [13], Z. N. Yargina [14] and others. The issue of supervision in town planning and architectural activety was studied by scientists O. M. Gorban [15], E. Y. Hnatchenko [16], M. V. Gubina [17, 18], L. P. Panova [19, 20], S. A. Shubovych [20], K. A. Soroka [21].

Theory of systems

The city as a complex system, is subject to the principles of system organization and management.

"Administration" in the wide sense of the word refers to "the element, the function of organized systems of different nature (biological, social, technological), which ensures maintenance of their certain structure, support of their activity mode, implementation of their programs and objectives" [22]. Based on this definition, in the organizations of various levels can be identified managing (the subject) and managed (object) part, as well as the links between them, which in general are often called the "management system". The management object is nothing but a system that performs the role function of the organization, whereas the subject of management supports the outputs of the system at a level that meets the specified criteria. Relationship in the management system is something, that unites management subject and object in a single unit. It should be seen as a source of information for the development of management effect. Through the channels of communication flows the information, including all subsystems of the organization and ensuring the achievement of its objectives [21].

The city has a hierarchical management structure: in addition to regional and city centre it includes district executive centers, interconnected.

According to behavior principle the systems are allocated to: material, homeostatic, deciding (not forecasting), predictive, reflexive [19, 21].

The material – a simple system whose behavior is caused only by the laws of physics, laws of conservation of energy, mass, continuity equation etc.

Homeostatic is called the behavior of dynamic systems, in which it remains constant composition and properties of the internal environment, the stability of the main system functions. In other words, the behavior is aimed at maintaining the stability of its composition and functional properties, the ability of the system to return to equilibrium. This principle of behavior is typical behavior of wildlife and most artificial systems that are in a state of dynamic equilibrium.

Crucial behavior of systems is not only limited to maintaining a balance in the system, but also the opportunity to choose one of several alternatives of their work or behavior. Those are the systems such as, for example, various automated devices or processes which take one of the possible states of operation or perform action of a certain set of options depending on conditions.

Predictive system is able to organize its behavior on the basis of past experience on the assumption, that future development does not significantly differ from the past. Such systems have sufficient memory and ability to predict the course of events for a certain period of time in the future based on interpolation and make decisions based on the results of the prediction.

Reflective system organizes its behavior based not only on past experience, but also the possible actions of other systems with which it interacts, that is behavior of systems endowed with intelligence, the ability to anticipate the actions of other systems.

According to the way of management the systems are divided into those managed externally, self-managed and the systems of combined management [19, 21]. At the second classification level the systems are divided depending on – how they are managed. For all systems – subclasses of the second level have certain common features.

The difficult according to the organization are systems with management by parameters – these are systems where the feedback is not only carried by the initial value, but also the change of the system parameters is possible. Examples of such systems are adaptive automated control systems, work of architects and designers on various function design objects.

The most difficult according to the management are systems, where management is implemented by changing the structure of the system. These systems work in extremely difficult conditions and changes in the structure of the system allows them to adapt to new conditions. Such systems include state and public administration in which organizational changes occur during development [23–26].

Certainly the city is a system of reflective principle, managed from the outside with the possibility of changing the structure of the system [27].

The city as a system

Let's look at the essence of the city. At the present stage of human civilization – the primary object of town planning development "is an artificial ecological system of the population – demographic ecological system and architectural theory and practice – are essential activities to create a harmonious (holistic) artificial environment for the processes of human activity" [3, 7, 12].

The basic structure of demographic ecological system is represented in the work of N. M. Demin, as a link between the ENVIRONMENT – POPULATION [4]. "Environment" as a natural formation in which the livelihoods of people, makes an an impact on "population" with their factors and thus there is a need for activities to create an artificial environment as a means to protect people from the adverse effects of the surrounding environment [3, 6]. Therefore N. M. Demin suggests to consider the city as a set of socio economic, territorial productive, demographic ecological system of POPULATION – ENVIRONMENT – ACTIVITIES [4].

In scientific studies of O. I. Syngaevskaya, ENVIRONMENT is understood as technical system with synonymous concepts of "town planning system", "anthropogenic environment", "settlement system". ENVIRONMENT as subsystem has two components "buildings and structures" and "territory" [1, 4, 6].

So, let's take town planning system as organized set of territories with houses and buildings.

The system of city management cannot and should not cover all city entities, such as socio economic, territorial productive, demographic ecological system, with parameters control of all subsystems of the city. In this case we would need to create a system several orders more complex than the city itself. By its characteristic the system of

city management is distributed and not concentrated in one place [1, 4, 12].

This study is limited by town planning activity management through town planning system.

Analysis of town planning legislation

Let's look at the legal principles of town planning management and organization systems in Ukraine and the Republic of Belarus.

According to article [7] of the Law of Ukraine "On regulation of urban development activities" management in urban planning activities and architectural – construction control is carried out by: territorial planning at national, regional and local levels; monitoring of the designing and implementation of urban planning at all levels; determining state interests, for their consideration during the development of town planning documentation. Article [25] of the mentioned Law stipulates that the results of urban monitoring are constantly included to the urban cadastre and are issued in the form of an analytical report, which is taken into account in the development of socio economic development programs and in making changes to town planning documentation.

According to article [15] of the Law of Ukraine "On the fundamentals of urban development" the core competencies of local administrations in the field of urban development also include decision making regarding: planning areas at the appropriate level; prepare proposals for socio-economic development of the territory; monitoring of construction and other use of areas.

Thus, town planning monitoring system is a technical system of urban planning management system that has a set of tools to collect information about the controlled object and means of influencing its behavior, intended to ensure sustainable development of the territory [28–30]. The means of collecting information about the city is monitoring, verification, communication with town-planning cadastre. Means of influence on the behavior of urban planning systems are crucial for the area planning, since urban monitoring results are taken into account in town planning documentation development (making changes into it) and social economic development [10, 31].

In accordance with article [14] of the Law of the Republic of Belarus "On architectural, town-planning and building activities in the Republic of Belarus", the major areas of State regulation in the field of architecture, urban planning and construction activities, include: urban planning and zoning; creation and maintenance of urban cadastre; monitoring of the development and implementation of urban, architectural and construction projects; state construction supervision.

According to article [28] of the Law of the Republic of Belarus town planning cadastre performs registration function in relation to the town planning documentation of general and detailed planning, town planning development regulations and the use of the territories of other elements, that are not included in the other cadastral and registration state systems. The information contained in the urban planning cadaster is used to ensure: development and implementation of state policy in the field of architecture, urban planning and construction activities; reasoning and decision-making on sustainable modes of functional use of territories; development of urban planning documentation, documentation development; forecasts and programs for social economic development of the territory; another activity that requires accurate data about the territory.

Maintenance of urban monitoring in the Republic of Belarus is governed by article [31]. Urban monitoring – is a monitoring system of town planning objects and environment in order to control the use of town planning territories and forecasting results of urban development projects. Town planning monitoring database are urban cadaster, statistical information, reports, special studies. The results of town planning monitoring shall be listed in town planning cadastre.

As compared to Ukraine in the Republic of Belarus technical urban planning management system is town planning cadastre.

Town Planning system, as has been defined, is interacting with social economic, territorial productive, demographic ecological systems, so it adjusts its behavior considering the status of other systems. The necessity to correct the behavior of town planning system in Ukraine is signaled by – urban monitoring. And in the Republic of Belarus – it is town planning cadaster, through the relationship with the town planning monitoring – it monitors, analyzes the implementation of planning documentation, assessment and forecast of objects state and change [32, 33].

Decision making in the city is made based on legislation, economical, social, political and environmental factors [1, 6, 8, 12, 34]. Below is presented a simple control scheme of town planning system based on town planning monitoring (fig. 1).

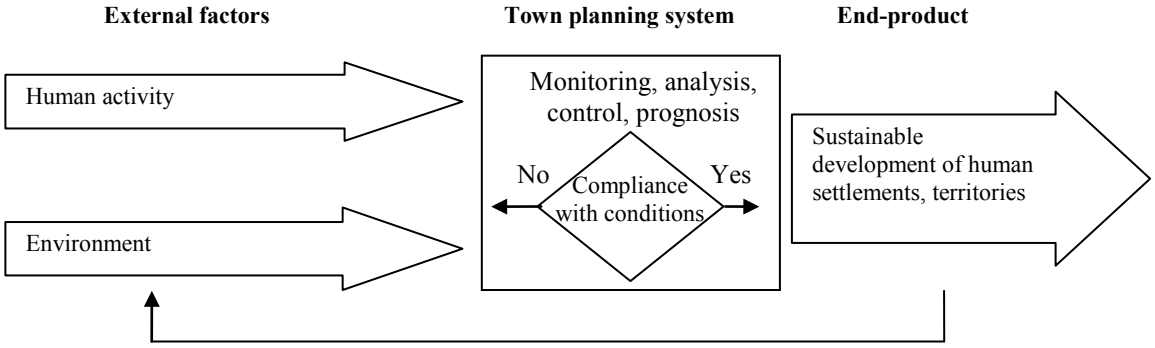

Fig. 1. Scheme of town planning management system

CONCLUSIONS

1. The decision making essences distinguished in town planning development are: managing system – local authorities, managed system – town planning system (a set of houses and buildings). Relations between the systems as a source of managing action is nothing more than a system of urban monitoring and cadastre.

2. In making urban planning decisions, such as approval of allocation/granting/sale of land for urban needs with a specific purpose; compliance of building intentions with the approved town planning documentation; the possibility of issuing initial data for the designing; the possibility of issuing building permits; approval of project documentation; the commissioning of the property; mailing address assignment to completed construction, etc. All the results of cases are submitted to the urban cadastre and are analyzed by monitoring system. The result of the monitoring analysis is information: about the critical deviation from the norm – town planning documentation, generalized and processed data of other urban systems, forecasts of further development of the territory based on mathematical models. Proposals and detected options of critical errors in the system may also be proceeded.

3. The decisions on urban system management are made based on the monitoring results, provided by the local administration [1, 12, 35]. For example, to urgently develop planning documentation, to build a new school to reconstruct the traffic intersection and etc. Thus appears system reflexive sign.

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