MULTILAYER READING OF THE URBAN ENVIRONMENT AS A METHOD OF STUDYING SPACE TRANSFORMATION

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Abstract: The article discusses the transformations of the urban environment under the influence of various factors, as well as the methodological problems of forecasting these changes in the context of sustainable development. The questions urban science addresses, from which point of view and with what tools it examines the urban space, and which phenomena are ignored and/or incompletely studied in that process was studied. Based on the level of complexity of the constituent elements of the city system and the interrelationship of these elements, the non-comprehensive and fragmentary character of studies of modern urban science has formulated the need to "read" the city and form the "language" of the city through it, applying the concept of "textuality" as an interdisciplinary method of study of space, as well as the principles and methods of reading space.
Keywords: urban planning, urban environment, the transformation of space, textuality, the identity of space.

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Introduction

Studying the causes, forms and consequences of environmental transformations is one of the keys to spatial planning, which allows to form multi-layered foundations of the theory of sustainable development, while contributing to increasing its level of resilience. Referring to the historical experiments of urban environment research, it is worth noting that they led to mostly partial results, because in many cases complete chains of cause-and-effect connections were bypassed. Many comprehensive urban studies address various topics such as the history of the forms and functions of the city [1], the formation and decay of cities [2], the relationship between city and people [3], as well as some studies of specific cities, their landscape, architecture, image, identity and semiology [4,5]. Nevertheless, economic-technical research of urban structures prevails, and modern urban science is gradually directed toward the tools of mathematical modeling and data science.

Such a vector of development, in turn, leads to the neglect of key anthropological and cultural questions, pushing them out of the scope of research. Moreover, for architects and urban planners engaged in spatial planning, from the perspective of design methodology, it is important not only to know the legal acts related to the environment, technical norms, infrastructure placement, requirements related to the protection of the environment and cultural heritage, but also the ability to see through the eyes of residents - "users" of the city.

This article refers to previous research on spatial structures and their transformations, principles and methods of object observation, from mathematical modeling experiments to studies carried out in the contexts of sociology and philosophy.

Considering all the above, the interdisciplinary approach to the research of spatial structures has been emphasized, which implies researching the city in different spatiotemporal contexts as an anthropological, cultural, architectural, engineering, economic, political and civilizational text.

And textuality, as an effective method of research, implies reading the research object at different levels of subjectivity and through various reading tools.

Materials and Methods

Cities, as the largest anthropogenic structures, are constantly undergoing changes that are sometimes unpredictable and chaotic. The complex of interacting factors of the city-system is constantly growing.

Combinations and effects of factors are gradually increasing, and their management is becoming more complicated. Even the dominant role of social and technical factors does not make the development of the city completely manageable, and the study of the urban environment allows only to a certain extent to predict the consequences of anthropogenic impact on the environment [6].

A comprehensive study of socio-economic, ecological, political, and cultural realities is key in the urban planning process. Their integrity has become a prerequisite and context into which the city needs to be integrated in order to ensure its vitality [7]. The totality of these factors is also a set of problems and questions to which the city must respond. The urban landscape at all stages of its design and formation should be considered in dynamic development, which is the result of the interaction of the natural and man-made structures of the city [8].

Economic relations, social, political, ideological and ecological factors directly influence the urban environment, and the guarantee of sustainable development lies only in the range of predictability and controllability of these factors. Meanwhile, modern realities prove once again that this range is too small, because these structures can collapse due to epidemics, wars and other major upheavals.

Along with its social nature, the city also becomes the space where traces of various historical developments are fixed, it is simultaneously an arena of ideological disputes and a record of past "victories". These realities not only transform the spatial structure of the city, but also the daily life of the city, as a result of which the society and the city form an eternal cycle of interaction: the city becomes both the effect and the cause at the same time. Each layer of historical geography eliminates the physical existence of the previous one or exists by articulating it [9].

Apart from the primary, short-term impact, socio-economic, political and cultural realities also leave their secondary, long-term impact. The response of the urban organism to these breakthrough events forms new spaces, they gradually harden in the urban fabric and become a material record of historical realities. Historical layers become one of the most important factors of architectural creation [10]. Considering the tendency of people to perceive themselves as a social group based on some spatial category (neighborhood, city, etc.) [11], it follows that the new space forms and consolidates new social strata, reformulating and interfering with the processes of public life in the city [12].

The mentioned realities have allowed individual researchers to conclude that cities live with their own unique logic, which can equally be considered both in the framework of cognition and hypotheses. In that case, the objective history of cities is considered not as a living environment (Habitat), but as a result of the activities of those who realize it (Habitus) [13].

There are many technical and economic studies of urban space, which, based on data science and using mathematical modeling tools, address a number of issues, such as urban microclimates [14], the ratio of land use [15], the intensity of human and transport flows, and even the predominance of preferred routes for cyclists in urban space [16].

Of course, the ever-changing nature of the city-organism is the guarantee of its development and long-term stability, but it also raises problems of the formulation of the identity of the environment and its preservation. This cycle of interaction makes the city a mosaic of historical realities, the shades of which bear the imprint of the intensity of breakthroughs and changes. Sustainable urban development implies a smooth spatio-temporal transformation, where it is possible to see the sliding of the layers of space. Unfortunately, when the city faces sharp breaks, the sliding of the layers of space gradually turns into an unreadable noise (Fig. 1).
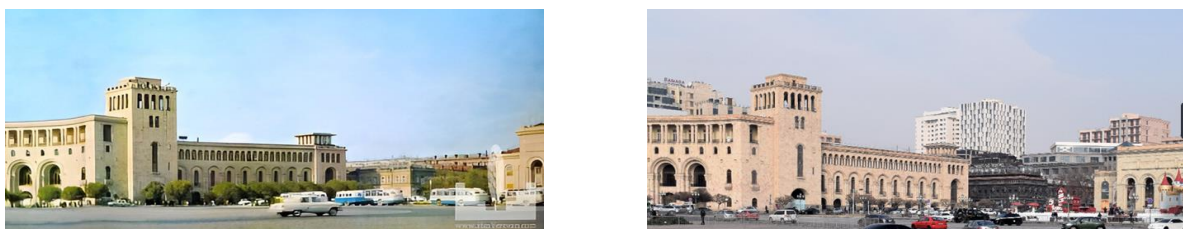
Fig. 1. *Republic square of Armenia at 1973 and 2022*

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In order to make the situation manageable, urban planning, as a theory, defines a certain design methodology, formulates a vision of the city's development, tries to predict the vector of further development, through design restrictions and legal regulations to ensure the stable and balanced development of the city, to make the city more resistant in crisis situations [17].

However, there are many cases where these levers do not work at breakthrough stages and the city faces dynamic changes. The multi-layered nature, structural complexity and variety of component factors of the concept of "city" make it almost impossible to define a universal formula for predicting city transformations in the theory of urban development, because to assess the state of the urban environment, it is important not so much to have an idea of the quantitative significance of a certain factor, but rather to have an idea of the environment under the influence of that factor, determining and evaluating the level of qualitative changes, taking into account its intensity. In this sense, it is first of all necessary to understand the constituent elements of the living environment and their relationships with the processes taking place in it, which can be done through a comprehensive analysis of the urban space, the task of which is to take into account the totality of factors, regardless of the prevalence of their characteristic features, a single methodological apparatus and a comprehensive assessment with the help of a standard.

Such studies of urban space are extremely important and informative in their nature. However, for comprehensive research, technical and economic analyzes are necessary, but not sufficient, because they are only one of the many perspectives of reading the space. Unfortunately, and perhaps still, this methodology cannot answer a number of anthropological and cultural questions related to space.

The complexity of modeling the state of the urban environment lies in the obvious structural heterogeneity of the characteristics of the studied object, which is caused not only by the qualitative differences of the generating features, but also by the difference in the degrees of complexity of the considered factors and components[1]. In the case of such differences in structural complexity, even in the case of mathematical modeling, any prediction of the development of urban space becomes impossible, and such a deterministic approach is nothing more than an attempt to create a Laplace monster ("Laplace's monster" is a mental experiment proposed by a French mathematician in 1814. Pierre-Simon Laplace. The protagonist of that experiment is a fictional, intelligent being who, knowing the position and speed of each element in the universe at every moment in time, is able to predict the universe's past and future).

In the indeterministic reality, we have to accept the impossibility of universal space research/planning tools and move to a specific research approach, a multiple and diverse *reading* of each city, through which it is only possible to form or perceive the language of space.

 "A city is a space of endless discovery and exploration, where at every moment there is more than the eye can see and more than the ear can hear, an environment or scene waiting to be discovered. Nothing lives by itself, but constantly relates to the environment, previous realities and the memory of past experience" [18]. It becomes necessary only to take the willingness to read the space and form the language of the city.

The primary function of environmental legibility and recognizability is to identify a place for a person, a way to orient oneself and not get lost. More profoundly, the landscape, spatial, climatic, cultural and ethnic characteristics of the city shape identity and image [19], and the reading of space is central to the formulation of the identity of the environment and subsequent interaction with it.

The use of the word "reading" implies the consideration of space as a text, in other words, the textualization of space, the consideration of space as a social, economic, cultural, political, and civilizational multi-layered text.

 This approach was first used by theorists and philosophers of the 20th century, who made textuality an interdisciplinary concept and applied it to various fields of science and culture, particularly urban studies. As

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[1] Preobrazovaniye sredy krupnykh gorodov. Research and Design Institute of Urban Planning, Kiyev, 1977 (in Russian).

noted by theorist and philosopher Roland Barthes: "Most of us will be required to try to decipher the city we are in, starting, if necessary, with a personal report. By collecting all the readings from different categories of decoders (as we have a full range of readers from local to foreign), we will be able to develop the language of the city. That is why I say that the most important thing is not so much to multiply the functional/technical studies of the city as to make readings of the city, of which, unfortunately, so far only writers have given us some examples" [20].

The multi-layered nature of the urban environment, which needs to be studied through reading, creates the very problem of the application of the method: legibility. Michel de Certeau defines the city as fragmentary and "paged" histories, hidden pasts, accumulated times that can be "opened", narratives that are kept in reserve and remain a mystery, and finally, symbols [21]. Due to this level of complexity, the city seems to avoid being read, therefore, this barrier can be overcome only in case of defining and formulating the fundamentals of multidimensional study of space.

Depending on the status and characteristics of the subject reading the space, the observation, study and relationship with the space are carried out in two main approaches (Fig. 2):

View from above, "view of power"
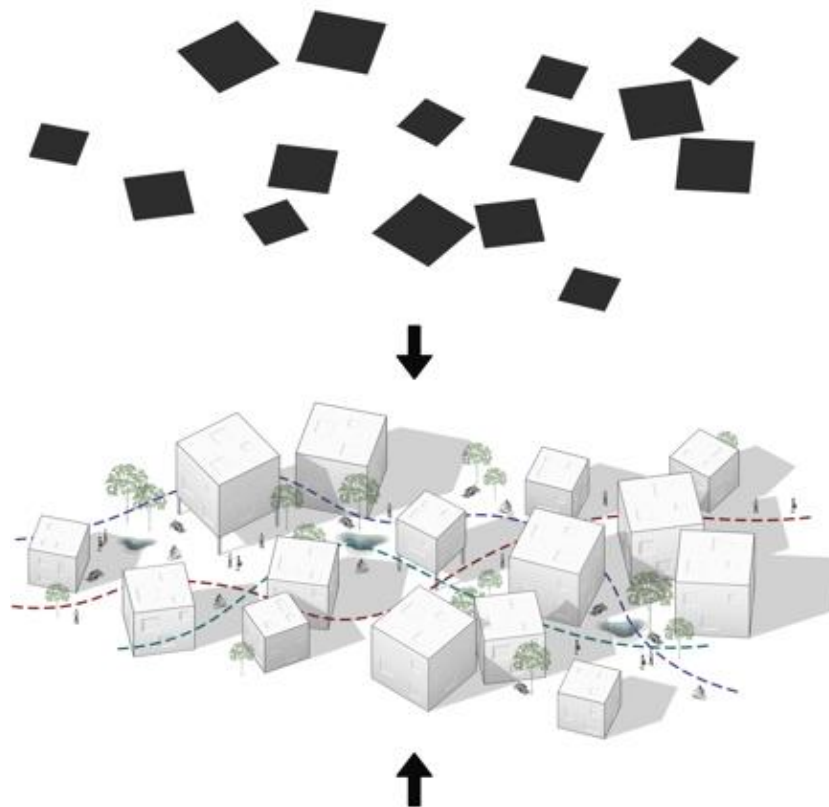
View from inside, subjective perception of the space

Fig. 2. *Basic approaches of space observation*

1. View from above: "all-seeing view of power" [22]. A perspective, a distanced view, characteristic of an architect, urban planner or cartographer, which lacks the sensuality that Roland Barthes considered necessary. A point of view that blocks and alienates the observer from the environment. Note that this approach dominates professional publications.

2. A view from below/inside, which is mainly possessed by the "ordinary" implementers of space, the ordinary "users" of the city, who live "below", where the object of observation as a whole is absent. They walk, which is the basic form of spatial experience, they are pedestrians (Wandersmänner) whose bodies are subject to all the inflections of the urban "text", they write without being able to read that script. They realize the areas that cannot be seen. In their knowledge of those territories, they are as blind as lovers in each other's arms. Paths that make up these textures, unrecognizable poetry where each body becomes a constituent element of multiple readings that avoid being read [21].

Thus, in the case of considering the urban environment as an object of reading, it is necessary to examine the features of the perception of the environment at different levels of subjectivity, as well as the content layers of the environment as an object of reading.

Results and Discussion

Firstly, we should present the peculiarities of the perception of various objects built on textuality and the key difference between the reading of the environmental text and the perception of other texts (Fig. 3 a, b, c).

a. Ordinary printed, handwritten or audible text is read directly in its entirety (regardless of the nature of perception and degree of understanding).

b. The reading of a multi-layered text or palimpsest is possible only in the case of separation of different layers, that is, each layer as an object of perception can be accessed provided that it is observed separately from other layers, in other words, simultaneous reading of different layers of the palimpsest is impossible.

c. The reading of the urban environment has a completely different character, where different layers of the palimpsest are combined, however, unlike the usual textual palimpsest, in the environmental palimpsest all texts are directly and simultaneously visible and legible. Therefore, from the point of view of a purely scientific methodology, it is important to evaluate both the content components of the reading object, the urban environment, and the features of the perception of the environment by different groups of readers.
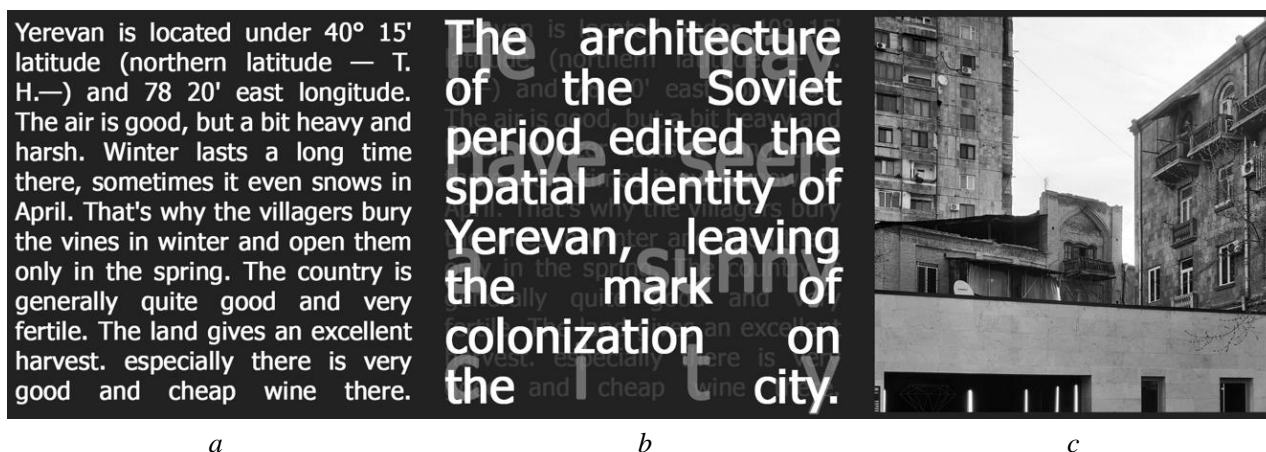

Fig. 3. *a. ordinary text, b. palimpsest, c. environmental text*

Object

Secondly, let's present what kind of layers of content the urban environment, as a historically formed material reality and as an object of perceptions, can offer to the readers.

We believe that identity, structure and functions should be considered key components of the urban environment (Fig. 4).

A. Identity: the character, image and semiotics of the environment, which a person perceives and directly relates to.
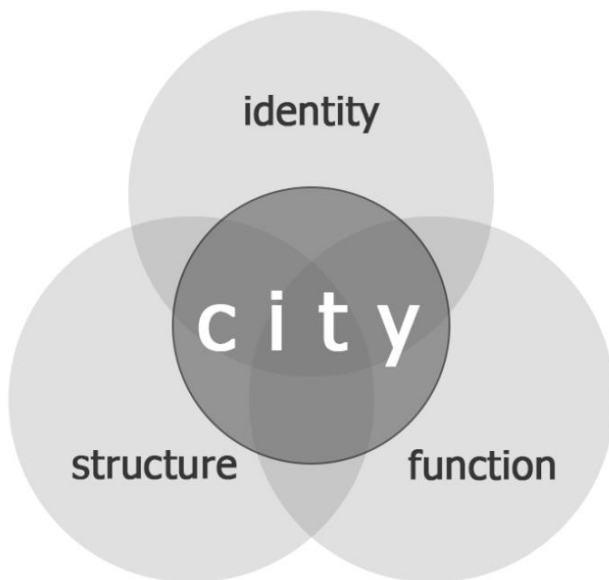
Fig. 4. *The content layers of the environment*

Man seeks to understand the identity of the space to which he belongs or which he realizes. Is the structure of the city, the symbolic objects that carry and define that identity (separate structure, street, district), the integrity of diverse identities perceptible, or does it not create any sense of identity at all? During a few minutes of walking, you can find yourself in different identity spaces, they combine, coincide, intersect, and in their absence, it is easy to get lost and lose the sense of place and belonging.

B. Structure: what is the shape, scale and position of the elements forming the environment in space, proportions and both mutual and human relations, opening or closing perspectives, even the texture and color palette - in other words, the factors determining the level of comfort of the environment?

C. Function: what key goals are the environment and various functional objects or their combinations (housing, work, rest, movement, trade, culture, sports, etc.) designed to achieve, to what extent do they correspond to people's ideas, does the qualitative level of functions satisfy one or another circle of users (readers)?

Subject

The perception of the environment by different subjects may differ depending on the social role of the reader, features of psyche, memories related to the place, motivation to appear in the space and other factors.

From the point of view of subjectivity, the circle of "readers" of the environment can be divided into two main groups: **creators** of the environment and **users**.

Of course, the boundaries of this separation are very vague and inclusive, and each of the groups has its own actors. In particular, in the framework of environment creators should be included not only urban planners, architects, and other subjects participating in the design and construction processes, but also, as key actors, government bodies and clients. An equally important role here is played by maecenases, developers, investors and even vulnerable stratum of the population, carrying out spontaneous or voluntary construction.

Hence, even among the creators of the environment, the sameness of perceptions or reading is excluded due to the differences in the motivation of the readers, as well as the inevitable contradictions.

Even the motivation of the **government** can be radically different depending on the political system and the nature of the government. The monarch (pharaoh, emperor, king, etc.), as the orderer of the environment, reads it in a completely different field of perception than the city government elected by the population, although in both cases we are dealing with a "view from above".

In the case of those who create the space, deep reading is necessary if there is an ambition to intervene in spatial planning. The professional community and, in particular, the **planner** who is actively involved in urban development processes, must master the tools and methods of multidimensional reading of the space, be able to identify and formulate the identity of the space, realize the importance and necessity of preserving that identity in order to be able to carry out transitional interventions in the urban environment.

At the same time, if the view of the professionals directly involved in the design and construction processes can be described as "from above" or even "from the inside", then the **professional community** outside the processes is more characterized by a view from the "side" with the motives of the observer, critic or evaluator of the environment and its changes.

From the **inhabitant's** point of view, the holistic perception of the environment is a means of defining the collective identity of the place and its inhabitants, which is an integral part of the individual identity of the

person. Perceptions of this layer can be much more sensitive, conditioned by memories related to a particular object, street, neighborhood and even a city, to observe changes in the environment in the range of personal life experience, with a conscious or emotional approach.

The **temporary visitors** are a unique layer of urban environment readers, whose perceptions or reading characteristics may be determined by the purpose of the visit, motivation and timing, cultural experience, justification or non-justification of the expectations of the visit, etc.

Of course, a complete picture of the textual features of each individual urban environment, as well as the nature and components of the perception of different groups of readers, can be revealed by conducting surveys among these groups and summarizing the results of the survey.

Conclusion

Taking into account the heterogeneity of the constituent elements of the spatial structures of urban systems, the high level of complexity of their relationship and the impossibility of accurate predictions using accepted methods of environmental research, it can be argued that there is no single universal research formula and each study should be carried out based on the environment and influencing factors of economic, social and cultural originality.

In other words, the individual, multidimensional and comprehensive reading of space becomes the method of research, the totality of readings of urban space, which includes studies of semiotic, operational and volume-spatial formation of the environment, observations of the urban landscape.

Thus, referring to the previously carried out studies regarding the urban environment and its transformations, the principles and methods of observation of the object in them, the mutual effects of the environment and people, it is suggested to consider them as a special text when conducting research on spatial structures.

The following components of environment reading were the subject of research:

☐ urban environment as an object of perceptions and historically formed material reality and its content layers: identity, structure, and functions,

☐ features of perception of the environment by different entities: those who create the environment (authorities, clients, designers) and those who realize the environment (residents, temporary visitors, etc.).

The results of the research can be a methodological basis for studies aimed at evaluating individual environments, which must necessarily include social surveys in different circles of readers.

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