Geometric singularity of spatial shape of urbanized territories

E V Khokhrin and S A Smolkov

1 Irkutsk National Research Technical University, Institute of Architecture, Construction and Design, 83 Lermontov Str., Irkutsk, 664074, Russian Federation

E-mail: hohrin@gmail.com

Abstract. The article considers the theoretical foundations of the emergence of geometric singularity of the spatial form of urbanized territories in the context of translating the specific vocabulary of formation and the norms of cultural tradition. A comprehensive consideration of the problems of preserving and developing the historical appearance of the city, as well as the issues of solving the problems of forming a modern urban environment, forms the basis of the meaning and content of the article. The methodology for studying the phenomenon of geometric singularity of the spatial form of urbanized territories in the context of the historical environment of the center of the Siberian city is the basis of analysis and criticism as specific forms of activity and functioning of the urban community. The study is based on various types of ideas about the organization of the structure of external relations, understanding and designing the mechanisms for developing their own types of activities and urban environment, which ensures the normal development and regeneration of the architectural form. The main stages of the formation of urbanized territories are outlined. The problem of formation of the concept of singularity considering preservation and development of urban identity, as well as formation of modern urbanized environment is considered. The methodology for studying the mechanisms for forming unique units of the original image of the cultural and historical environment is based on the study of the geometric identity of spatial forms of co-organization of urban communities. The methods of geometric singularity of spatial form of urbanized territories considered by us in the context of translation of specific vocabulary of formation and norms of cultural traditions of historical environment of cultural and social center of the city allow carrying out described operations on various types of initial and operational data from deployment of whole spectrum of parameters to their comparative assessment and obtaining indicators of compliance of studied structure of composition with given standard. The results confirmed the existing theoretical provisions, thereby showing the effectiveness of the study.

1. Introduction

Preservation and development, as well as changing the role of cities with significant historical and cultural potential, makes it necessary to understand the phenomenon of urban identity of city residents and is the goal and meaning of conducting research and design in the field of architecture and design, [3] updating and developing the architectural, spatial and artistic qualities of the historical environment and integrating the preserved heritage into the modern life of the city [1].

In the present time, the environment of the historical city, as a rule, does not meet the modern requirements of the optimal level of comfort and therefore urgently need to protect and preserve its unique properties, characteristics and qualities. In the process of intensive involvement of urban territories in the process provoking various types of competition, the socio-cultural space is constantly transformed, inter-urban migrations spontaneously arise and, as a result, a conflict is formed between the mass of
historically developed buildings and uniquely innovative architectural objects. These problems of harmonization and conformity of the quality of the historically established urban environment with the requirements of modern times underlie all the design problems of modern city management and providing comfort within the boundaries of historical settlements.

One of the effective ways to solve the problems of interaction between a historically established image and a "novelty" - wide use of tools and methods for the regeneration of the architectural image of the urban environment, as a way of preserving and reviving the original environment of the historical city, provoking the formation of new trends in the organization of the lifestyle of citizens, contributing to the expansion of the value picture of the world, as well as providing support and deepening of the traditions of the life of the city dweller, which will give his life steadily developing meanings and make it more dynamic.

In order to improve the objectivity of the assessment, the Government has developed criteria for the quality of the urbanized environment and a mechanism for the formation of the territorial identity of the Siberian city, as set out in the "Methodology for assessing the quality of the urban environment" [11]. The concept of "urban environment quality index" was introduced there, according to which the rating of urban settlement among cities of Russia is established.

In recent years, the Russian research space has included the topic of urban research, which has long been theoretically and methodologically justified and empirically tested in European countries. First, it is necessary to determine concepts, study the essence of the phenomenon of urban identity, as well as the factors of its design and design. Having analyzed materials on the theory of identity and the approaches available in the literature to the definition of the concept of "urban identity" [6], it is necessary to consider the following points:

- the geometric singularity of urban spatial form is the product of collective activity, is associated with inclusion in long-term stable social processes and determines the emotional filling of the individual's self-determination in relation to such a group as a whole, to the group name, to "their" and "strangers," as well as group values, social norms, stereotypes, behavioral patterns, etc.

- the geometric singularity of urban spatial form is a sociocultural construct, which is formed as a result of socialization and adaptation in a specific territorial settlement and is determined by assimilation and reproduction of cultural symbols, accepted norms, traditions, individual patterns and in general - the lifestyle of residents of this settlement.

- the geometric singularity of urban spatial form is the result of identification of a person with urban community as a large social group, which differs from several other categories of population allocated based on territorial affiliation.

The geometric singularity of the urban spatial form is a component of the social identification of the personality, a socio-cultural construct formed as a result of the self-identification of a person with a specific urban community and determined by the assimilation and reproduction of the symbolic wealth of the city, sociocultural norms and lifestyle that unite city residents.

Classification of factors that affect the process of urban identity formation:

1. symbolic factors - urban symbolism, political climate, cultural codes of behavior of residents, landmark events, iconic personalities, fashion for individual goods and services, the nature of communications within the community.

2. stable structural factors: location, climate, and history of the city.

3. quantitative and qualitative factors that are changing in the long term: the size of borders of city and population of the city, the appearance of the city, the well-being of residents, the cultural traditions of the local community. [7]

2. Materials and Methods

The general provisions of the organization of the process of forming the geometric singularity of urban spatial form set the scope of the concept of design logic and the mechanism for forming urban identity, which underlies the development of technology for creative search strategies. This is a complex procedure that not only precedes, but also accompanies the whole process, because the nature and sequence
of steps are largely predetermined by the relationship between the results already obtained in the course of work and new contradictions that will become the basis for future developments in the field of idealization and conceptualization of the image of the city and ways of translating it into everyday practice. Nevertheless, the main work on the reconstruction of the logic of urban identity formation needs to be done at the beginning of the process, based on the principles of modeling the ideal image and the existing ideas about research, design and design tools, the sequential passage of which will ensure the achievement of geometric singularity of urban spatial form. Shevelev I P described this as follows: "We are looking for a geometric structure that, with a limitless variety of probabilistic configurations, is composed of a set of original components selected by history of previous existence and creation. It is useful for an architect, artist, engineer to know the rules of the "correct" division of space. These rules are expressed in the orthogonal projection system, proportion, and metric "[1].

To ensure optimal work of the project mechanism, it is necessary to consider the design process as a phenomenon that implements itself simultaneously in two plans: organizing the logic of the forms and structures of the project activity and organizing the content of the subject and topics of the project activity. This is a very important remark that fundamentally affects the essence and internal organization of both the design work and the design object and, in fact, the final result, which manifests itself both in transforming and updating the forms of design thinking, and in relation to the subject of urban design, as will be mentioned below [3]. In addition, we highlight three stages of designing design logic: "staged," actually "design" and "implementation," which are described in the "Methodology for assessing the quality of urban living environment" [11], which allows you to determine the quality of life in urbanized territories. Next, consider the main provisions of the document.

In the process of formation of urban environment design, the system of normative limitations and requirements acts as a means of complex formation of architectural and spatial characteristics of historical city environment in the process of creation of elements of complex filling and re-arrangement of urban spaces on the basis of optimal architectural and urban planning solutions with inclusion of natural landscapes [2].

Restoration refers, as a rule, to the restoration of an ancient architectural monument building in its original form, taking into account all planning, structural and stylistic features, while reconstruction is the reconstruction of the whole based on preserved data (description, image, etc.) and its subsequent operation in modern conditions.

Renovation involves considering the available options for using the building (aesthetic, economic, functional), an architectural concept for renovation of the building is being developed. For each object, as a rule, an individual reconstruction concept and several interesting scenarios for using this territory are specially thought out. Renovation involves the complete modernization of buildings, as well as the surrounding area in full accordance with the current policy of the Capital, as well as the needs of business.

Resuscitation - the restoration of sharply disrupted or lost vital functions of the system, a set of measures to revive an organism in a state of "clinical death" - "the patient is alive rather than dead. If he is alive, he will remain alive or he will not remain alive. If he is dead, he can be revived or not revived."

Landscape recultivation - from lat. re - a prefix expressing the resumption, reverse action and cultivo - cultivation, processing - a set of works aimed at restoring the economic, medical, biological, and aesthetic value of disturbed and degraded landscapes.

The following stages of recultivation are distinguished: technospheric, biotechnological and sociocultural, the implementation of which assumes that the technical aspect of passing all the necessary procedures includes the planning, formation of slopes, removal, transportation and application of soils and fertile species, the construction of roads, hydraulic and other structures.

Another area that should be mentioned is the presence of undeveloped, unused, inefficient and abandoned urban areas - the regeneration of the urban environment, including its design, which can update the vital functions of the city and provide for various scenarios for future use.
The Quality Index is a tool that will help city administrators, research and project organizations identify key problems of the urban environment and begin work to eliminate them. This index was approved by order of the Ministry of Construction of Russia and was applied to all 1112 cities of Russia and consists of two blocks:

- The quality of the environment is assessed by 30 indicators, each of which is responsible for a certain of 6 types of urban space and displays the degree of quality of the environment according to one of 5 criteria.
- The effectiveness of using the subsidy allocated as part of the implementation of the priority project "Formation of the urban environment" according to 11 indicators is evaluated.

The main objectives established in the "Methodology for assessing the quality of urban living environment" [11]:

1. Creation of the Methodology based on the Rating to ensure an objective comprehensive assessment of municipalities according to criteria that determine the level of development of all spheres of life of the city.
2. Creating an Effective Application Tool:
   2.1 to identify negative and positive aspects in the development of municipalities.
   2.2. to make decisions to enhance competitive advantage and reduce negative factors in development.
   2.3. to eliminate imbalances in the territorial structure of municipalities for several socio-economic factors.
3. Determination of growth poles in the territory of the Russian Federation - in terms of conditions favorable for the life of the population, doing business, real estate investments, etc.
4. Description of the existing hierarchical structure of cities and their typologies.
5. Organization of an integrated system of analysis of socio-economic indicators of cities, which makes it possible to compare them, as well as conducting analytical studies to identify trends in socio-economic development.

Since the main goals are formulated in the theoretical and applied aspect, their development carried out a semantic and empirical interpretation of the original concepts in accordance with the identified scientific and practical problems, logical analysis of working hypotheses and the possibility of application. [9]

The main tasks established in the "Methodology for assessing the quality of urban living environment." [11]:

1. Analysis of existing domestic and foreign methods and practices of comparison of subjects of administrative-territorial division of macroregions and countries.
   1.1. Carrying out a comprehensive study and determining criteria and basic indicators of urban assessment by means of selected theoretical and methodological disciplines related to evaluation of qualitative and quantitative characteristics of the studied objects.
   1.2. Creating an identical methodological apparatus for compiling a rating, based on the best domestic and foreign practices, using its own developments.
   1.3. Development of a methodology for a comprehensive comparative rating of cities based on the application and calculation of a system of economic indicators.
2. Formatting a system of economic indicators that comprehensively characterize the functioning of cities.
3. Calculation of integral indicators, indices, and groups of indices in accordance with the developed methodological apparatus.
4. Distinguishing typical groups (typology) of objects by several characteristics, indicating general trends and differences in their development, highlighting characteristic individual differences, analyzing the results.
5. Mechanisms for monitoring the socio-economic situation of the objects under study are being created.
6. Create a demonstration analytical material based on the results of the work done.
7. Provide research materials to all stakeholders.
Evaluation criteria:

"Safety" is responsible both for determining the existing level of danger of certain spaces, and for assessing such environmental parameters that can potentially contribute to harm to human life and health.

"Comfort" helps to assess the convenience of the urban environment, as well as its visual, acoustic, and climatic characteristics.

"Environmental friendliness" determines to what extent the use of the city corresponds to the principle of preservation and improvement of the environment and assesses the state of certain elements of the urban environment.

"Identity and diversity" are responsible for assessing the identity and recognition of urban areas, as well as determining the variability of spatial solutions and the functional diversity of the urban environment.

"Modernity of the environment" measures the parameters that describe the city in terms of the opportunities that it provides to residents. Indicators help determine whether the city uses an outdated model of environmental production or a new model in which the environment is one of the basic values of city development.

"Environments":
- Accommodation and adjacent spaces.
- Residential buildings and house areas.
- Landscaped and water areas.

"Green zones" make up the territory of the city, including parks, gardens, squares, forests, as well as undeveloped territories adjacent to urban reservoirs.

"Street infrastructure" - city streets of various types, including territories from the facade to the facade of the building, except for the roadway. Street infrastructure is assessed separately and regardless of location in a particular space of the city.

"Social and leisure infrastructure and surrounding spaces"
- The territories adjacent to educational institutions (schools, universities, nurseries), medical and health facilities (hospitals, health camps, health centers), sports and recreation facilities (recreation centers, stadiums, sports grounds and complexes), cultural institutions (cinemas, museums, exhibition venues), as well as religious facilities.
- "Public and business infrastructure and adjacent spaces" Territories adjacent to administrative, business, commercial facilities, as well as catering, service, and service facilities.
- "Citywide space"
- The entire territory of the city within the administrative boundaries of the settlement. The introduction of this space is necessary to assess the citywide characteristics of the quality of the environment, which are not causally related to any of the types of spaces.

3. Results

The field and subject of design and study of the geometric singularity of urban spatial form are not identical to the concept of "objective reality" or the concept of "object design area." Communications, the relations, borders and a framework of consideration and property of a real object which are included in study process act as area of a research. The subject of design in this case is certain parties, the structure of properties, qualities, and relationships, which exists independently of the person who knows, but is reflected by it, serves as a specific field of project activity.

The object of designing an urban spatial form in the conditions of the historical environment of the city is a phenomenon, a certain phenomenon that exists independently of the subject of design and which is drawn to the attention of the designer. The concept of the subject of designing the geometry of urban spatial form is even more specific in its content: the object of study fixes that property or relation in the designed object, which in this case is subject to deep special study and research in order to identify
contradictions and problems that form it. In the same object various parties, aspects and subjects of design can be allocated.

The goals and objectives of forming the geometric singularity of urban space are a reasonable idea of the general final or intermediate results of pre-design studies within the framework of the design process. In our case - the justification and development of a methodological system for the formation of a comfortable urban environment that meets the requirements and needs of today. An important and necessary stage of design is the design and specification of a common goal in the system of design tasks. [1]

The project objective represents the stage of achievement of the objective. On the other hand, the objective is to transform a particular situation or, in other words, a multifactorial set of specific conditions that requires its transformation to achieve certain meanings. The task realized considering the current conditions synthesizes the substantial, motivational, and incentive and operational parties of design activity and is her peculiar "focus". Among the significant number of tasks to be addressed, it is especially important to highlight priorities. It is recommended that a total of 6 tasks be allocated to the three main groups:

- the first of the main group of tasks - historical and diagnostic - is related to the study of the history of the emergence and modern state of the problem, the definition or refinement of concepts, general scientific, professional and cultural-historical foundations of design;
- the second - theoretical-modeling - with the disclosure of the structure, essence of the studied object, the factors of its transformation, the form of the structure and functions of urban identity and the methods of its theoretical transformation and the construction of the development model;
- the third - practical-transformational - with the development and use of methods, techniques, means of rational organization of the research and design process, their intended transformations with the development of practical recommendations and theoretical generalizations. The rest, more private tasks, are most often attributed as sub-tasks to the main ones. [1]

The idea and hypothesis as a theoretical nucleus of the geometric singularity of urban spatial form. Setting the tasks and ways to solve them prepares the designer with a "breakthrough" in the field of the formation of urban identity, and all subsequent logical stages will represent the steps of the movement towards instrumental verification of truth and the implementation of this set of ideas. A form of such anticipation of the results of the mechanism for forming the design of urbanized territories is the design hypothesis. In the method of internal organization of the formulated design hypothesis, the real movement of the designer's thinking towards new, deeper generalizations based on prediction and creative foresight is manifested. To put forward a hypothesis, it is necessary not only to carefully study the state of the matter, professional competence, but also to carry out at least part of the pre-design study based on surveys, questionnaires, testing and other methods used in architecture and design.

Pre-design research and analysis - the study of the state and possibilities of development of the processes and phenomena under consideration precede the entire process of geometric singularity of the urban spatial form, accompanies it, but emphasizes the initial stage (at the beginning of the study) and the final analysis necessary to orient the search and determine its effectiveness. As a matter of fact, pre-design studies of the quantitative parameters of the studied objects are built according to the generally accepted method on the basis of previously developed criteria and indicators using known, including standardized methods, as well as new technologies obtained on the basis of design.

Discomfort and disharmony of the urban environment of historical settlements can be called indispensable attributes and obvious signs of destruction of mentality and spiritual life of modern society [5]. The study of the environmental qualities of the cultural and historical center of Irkutsk made it possible to formulate the main problems, some of which can be solved or leveled by design tools:

- loss of architectural and landscape qualities of viewpoints and panoramas.
- distortion of the scale of the new and established urban environment of the historical center, for example, the inclusion of non-aesthetic, in most cases typical buildings in the development of the center. [3]
• inconsistency of real sizes with visual parameters of functional use of city areas and streets - disproportionate to the surrounding buildings and empty areas with modern large administrative and public buildings.
• lack of landscaped streets - destroyed road and pavement, "blurred" boundaries of street profiles, unorganized landscaping.
• dilapidation and neglect of the physical condition of the facades of most buildings, an ill-conceived coloristic solution of both individual volumes and the street as a whole; use of unacceptable techniques and means of reconstruction and restoration of facades.
• oversaturation and weak structuring of information and advertising elements; unacceptable poor quality of advertising; imperfect and dissonant graphic design.
• lack of small architectural forms of street improvement, lack of symbols, signs, brand and iconic design.

The setting of problems in the complex solution of problems related to the formation and organization of the optimal functioning of the comfortable environment of the historical city is directly related to the methods of incorporating the form and content of its architectural, spatial and artistic characteristics into the basis of building the future image of the designed architectural complex. It should not be forgotten that each design phase includes two plans, two aspects: practical and research. At each stage, a practical (training, educating, consolidating) effect is important and at the same time approaching the clarification of design and research tasks, deepening into the subject of search and refinement of design and research and design methods. [4]

4. Discussion
The image of the city is only one of the translators of symbolic information about the city, which forms an urban identity. Other translators who participate in the process of urban identification: local myths and traditions, ritual traditions, components of the cultural landscape (monuments, etc.), holidays and festivals, city signs and symbols also contribute to the realization of themselves as a citizen and an understanding of the differences between their settlement and another. All serve to represent and maintain the geometric singularity of the spatial form of urbanized territories, which is the core of urban identity. [5]

Also, in our opinion, this includes various social and educational projects, cultural events, etc. This is due to the fact that the formation of the geometric singularity of urban identity provides for the search for the authenticity of the place, its uniqueness and unique identity, thanks to which a sense of ownership with the city, its communities and history arises. Thus, it is permissible to use the definition of the geometric singularity of urban identity as an instrument of the symbolic and semantic "construct" of the image of the city, which is determined by the perception of its inhabitants, as well as their style of behavior in relation to the urban environment.

Evaluation and interpretation of the results allow us to formulate preliminary theoretical and practical conclusions. The preliminary results of the studies carried out need to be understood in the general system of theoretical provisions and practical approaches, checked and clarified in the wider context of the interpretation of the experience gained - testing and visualization of projects, criticism and schematization of contradictions and problems of the starting situation, problematization and programming of project thinking procedures, its ontological analysis and subsequent rationalization of activities on the formation of urban identity.

The systematic approach to the formation of the geometric singularity of urban identity among the historical settlement has a significant impact on the perception of the artistic image of the modern city, its architectural and decorative design. The development of forms, means and techniques for the organization of urban identity design objects is of great importance for the formation of the socio-cultural and architectural and planning infrastructure of the city, the identification of its natural and spatial components and the preservation of historical and cultural heritage monuments. It is necessary to precisely and addressable build a system for the formation of the design of the geometric singularity of urban identity among the historical city and the structure of the existing urban development [8], in connection with
which the need for the development of a comprehensive architectural and artistic concept that will solve
the entire complex of problems of placing elements of innovative design in the historical part of the city
increases. Within the framework of this concept, a full-fledged architectural and artistic image of the
urban environment of the historical settlement should be formed; a mechanism has been developed to
build an artistic composition and style of urban equipment, harmoniously combined with the architect-
ural, artistic and coloristic features of urban buildings and structures; application of advanced technol-
gies and materials based on study of domestic and foreign experience and peculiarities of local artistic
national culture [9].

Rebranding in the conditions of the formation of the geometric singularity of urban identity and the
reconstruction of the historical core is an important moment that must be considered when designing
the design of an architectural and spatial environment. Regardless of size, location and administrative
structure, the historical city urgently needs to understand its own uniqueness, understand the origins of
identity and the uniqueness of the image, sociocultural identification, and recognition of its iconic ele-
ments. And to form the required attitude towards the city, its positive image in the external and internal
consumer market, it is necessary to emphasize the historical, cultural, artistic, and economic attractive-
ness of the city. To this end, a set of measures is being formed and carried out to analyze, test, develop
and implement the key provisions of the "city brand," maintain its functioning and ensure the conditions
for successful development, in which the formation and development of a native architectural style and
the artistic image of the historical settlement come to the fore.

The brand of the city, in fact, is his name, a strange entity lying between the impression of the indig-
enous residents - residents and the view "from the side" of visitors - interventionists - an important
component of the urban identity of the image of the settlement. As a rule, it has a visual expression - a
sign, symbolism, motto, logo, corporate (corporate) block and style - but has global value primarily
when it is immanently associated with the city's development strategy, its image and semantic messages.
In fact, the brand promotion procedure is a kind of creation of a positive reputation, which entails an
increase in direct and indirect urban investments, as well as its subsequent economic development and
cultural prosperity [1].

5. Conclusion
Thus, it should be assumed that for the formation of urban identity in the context of the geometric sin-
gularity of the spatial form of the city, projects can be used aimed at identifying and understanding the
unique mechanisms for the formation of the design of urbanized territories, updating significant
"places of strength" and "collective" memory in the designed areas. Projects should also be attributed
to factors of active influence, since they can change the attitude towards the city, as well as symbolic
factors, since such projects will contribute to the establishment or strengthening of a symbolic connec-
tion between the city and the city. [1]

This approach involves the formation of a mechanism for regenerating the architectural style of the
urban environment not only according to the criteria of "benefit, strength and beauty," but also from
the point of view of its development prospects and functional-spatial flexibility of solutions in any
range of problems - from solving the problems of transport and architectural and landscape complexes
of the city to the design of the interior of urban spaces, color and light filling and the design of systems
of elements of urban furniture and equipment. [9]

Consequently, projects to create the geometric singularity of urban spaces, in addition to achieving
their own goals, can fulfill indirect goals, i.e., have a more or less strong influence on identification
processes. The object of the design and formation of urban identity is a complex education, containing
interlinked subsystems: society, culture, and the urban environment. And in this case, the project of
building the mechanism of urban identity acts as a way to preserve or recreate social phenomena and
cultural phenomena that correspond (both quantitatively and qualitatively, meaningfully) to estab-
lished cultural norms [2]. The design of the urban environment is very multifaceted, but the goal of
the urban identity project will still be to increase the level and expand the comfort zone for the individual,
which can directly affect the urban identity. A person should be pleased with his habitat so that there is
no uncertainty in life sense, so that the place of life is associated with the smallest number of negative experiences, so that the environment contributes to the realization of personal resources. [3].

Methods and techniques of transformation of the urban environment are based on modern engineering technologies and social requirements, in the interaction of which contradictions arise between the requirements of preservation of historical environmental values and the need to fill with new environmental qualities that correspond to the modern understanding of the comfort of the urban environment. [8] Thus, the creation of a mechanism for constantly improving the comfort of the living environment in the city, increasing its maximum safety level and ensuring the "atmosphere" of friendly activity of all elements of the life support system and is one of the important criteria for assessing the quality of design in conditions of regeneration of the architectural style from the point of view of the tasks of modern urban design.

It should be noted that of particular importance for the formation of urban identity will be those projects for the formation of the geometric singularity of urban identity and the reconstruction of the historical core of settlements, which are aimed at updating and maintaining the meanings of urban cultural and historical heritage, since in this context the identification mechanism will work as an instrument for the formation of geometric singularity, the maintenance of cultural identity and the development of collective heritage.

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