Formation of a Communicative Space as an Alternative to the Interaction of the Private and Public Spheres

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Abstract. The concept of the formation of a communicative space with certain practical methods of implementation in theoretical developments and practical proposals is considered. The main approach to the formation of this direction of research why is presented, associated with the expansion of the boundaries of the creation of architectural objects through the interaction between a person and a communicative space. Some manifestations of this trend is identified: integral space and information and communication environment, the concept of permeability and isolation in the context of open and closed communication space, integrated communication space for the formation of an architectural environment, as well as horizontal communications in the multifunctional aboveground space. The obtained materials of the article can be useful for the theory and practice of the formation of the habitat of the future, as it opens up completely new possibilities in architecture and construction.

1. Introduction
Research on the problems of architecture and urban planning, caused by the transformation of social relations, revealed the problem of the relationship between the categories of public and private and led to a rethinking of the very concept of "public sphere". This concept is use in the field of architectural theory, political geography, cultural policy, the theory of intercultural communication.

The problem of the relationship between a person and a communicative space in the context of its placement and interaction with the environment has recently been used and manifested in various fields of activity with certain practical methods of implementation. The term communicative in relation to space, which is use in theoretical works, takes into account the time factor, the dynamics of the structural model of its elements and functional connections between them. This is due to the creation of a harmonious anthropological architectural and spatial environment by turning architectural theories to methods that could help explain, streamline existing trends and serve as a basis for the development of their own methods.

2. Relevance of the issue
In theoretical research and practical development, the communicative space considered with the aim of creating an ecologically harmonious architectural and spatial environment. In this regard, the concepts
of the formation of the socio-cultural space of a modern city [1], adaptive space with feedback in the context of the cyclic paradigm [2], communicative space as a tool for cognition of modern architecture [3] and etc.

At the same time, the principles of shaping of architectural objects identified, recommendations developed for the implementation of these principles in practice, as well as the development of appropriate methods for organizing complex spaces. These practical techniques used to implement communication spaces with an obligatory set of interconnections.

This makes it possible to create spaces formed by internal and external forms that most fully reflect human needs in various aspects: material and objective processes, communication and hobbies, social, professional and industrial relations, the concept of a gap in modern architecture and so on [4]. Research results contribute to the creation of a harmonious architectural and spatial environment by turning architectural theories to methods that could help explain and streamline existing trends and serve as a basis for the development of their own methods.

3. Problem statement

Conducting a comprehensive study in order to identify new directions in the formation of the communicative space and methods for their implementation, using modern progressive technologies, predetermined the solution to the main task of the article. It consists in defining the concepts of the development of the communicative space in architecture in modern conditions as an integrated system, as well as in identifying innovative approaches to solving the problem under consideration in the future. This will require solving a number the task of research:

- Consideration environmental priorities for the formation of communicative space in architecture.
- Identification of current trends and prospects for the development of the communicative space as an integrated system.
- Disclosure of innovative approaches to the organization of the communicative spatial environment of the future.

This approach to research necessitates the identification of methods and techniques for the formation of a communicative space, which are practically not used in modern architecture and construction practice.

4. Theoretical part

The concept of the formation of a communicative space has embodied in the following areas of theoretical developments and design and experimental proposals discussed in this article.

4.1. Integral space and information-communication environment

The development of electronic communication and information systems can significantly reduce the relationship between the size of space and the performance of various functions of everyday life in it. This trend is associated with the currently actively developing ultra-high-speed and ultra-long-distance information communication means in the integral space. In this case, the formation of communication ties is of great importance’s, which at the present stage are the most important elements of the organization of public and private space of habitat. Information resource becomes a socially integrating factor [5].

Because the city as a communication system uses an increasing amount of information, its socio-cultural space is becoming mass media. There is a development of a qualitatively new type of communicative structures and processes, as well as a deep rethinking of the communicative nature of social reality [6]. On the other hand, the information environment turns out to be an intermediary between the inhabitant and the subject environment of the city, as well as virtual reality. In this case, there is a shift in emphasis and a modification of the phenomenon of architecture from its materialization to virtual reality. The information approach in architecture has manifested as the interconnection of two communicative spaces: architectural and information [6].
The emergence of an information communication environment affects the change in the conditions for cultural exchange and interpersonal communication in the city, and erases the barriers to this communication. The information space of the city, as a part of the socio-cultural space, according to researchers, provides new opportunities for personal development. The advancement of new requirements by the city to the individual consciousness and behavior of the inhabitant determines its "information activity" [7].

Information processing and data storage systems, in connection with the development of global telecommunication systems, are of particular importance when using the communication potential of the world information system. The project proposal "Sustainable Data Center in Iceland" (authors Mercury W., Merletty M.) 2016 (Italy) is an example of the implementation of this approach. The center is to use for host various servers of many companies for storing and processing information produced on a daily basis. The location of the facility in a cold climate allows you to avoid overheating of equipment, as well as to use environmentally friendly energy from renewable sources [8].

The information process in society includes not only the functions of creating and accumulating information, but also the function of transmitting it within a single system. At the present stage, the means of communication take on a new form at each successive stage of expansion and renewal of scientific, technical, economic and other information. In this sense, we can talk about progressive transformations in information and communication, as well as about a revolution in the use of communication tools associated with the intensification of communication. However, at present, the division of information activity into scientific and mass components remains, with a corresponding functional division of the means of communication [9].

The emergence of electronic infrastructures and the communication spaces created by them makes it possible to create a system for the rehabilitation of sensory information and emotions of the inhabitants. Modernization and globalization, in spite of all the comforts they bring, consume key components of life such as people's feelings, sensory information and emotions. The “Sensory Skyscraper” project (authors Alexandr Pinkov and Heng Chang) 2016 (Moldova and China) is a multifunctional laboratory for scientific research of human feelings. The object is a cube that consists of six pyramids, inside each of which, there are certain templates with functional sectors. Each sector represents an open space for different types of perceptions and feelings. Five magnetic pillars support cubes, visually floating in the air. The system of corridors inside the pyramid connects all its nodes vertically and horizontally. Thus, the project of a multifunctional cube can fully use autonomously [10].

4.2. The concept of openness and closeness of the communicative space
When forming a simultaneously open and closed, as well as an isolated and accessible territory in some developments, the design goal is to study the boundary values of the architectural space. This is due to the development of new models of "porosity" that determine radical environmental conditions, such as openness and closeness [11]. This concept manifests itself in two aspects: on the one hand, it raises the problem of the closeness of the social environment and its components, and on the other hand, it focuses on the potential of the architectural space, which corrects its physical instability [12].

An example is the proposal “New York Horizon” in Manhattan (USA) 2016 (authors Yitan Sun, Jianshi Wu) [13]. The project has conceived as a buried park in contrast to the densely constructed buildings and tall skyscrapers of the city. Moreover, as a means of providing city dwellers with a natural environment in which they can enjoy and use it as an exit from their busy city life. The goal of the concept is to restore the traditional relationship between landscape and architecture. Proposed creation an open natural landscape, which is the central element of the city, surrounded by a closed isolated architecture.

This trend can see in a historic city such as Paris, which can develop and increase its vertical density, emphasizing the existing historical context. According to the authors of the concept of the residential bridge "Living Bridge" (France), 2009 (architects Nicola and Adelaide Marchi), the
grandiose open spaces of Paris, and especially the Place de la Concorde, can be united by a new building-bridge 400 meters high. The building is integrated with the Seine River, becoming a new landmark and offering the historical center the development of a wide variety of program elements (including recreation, culture, living areas) [14].

4.3. The manifestation of isolation and permeability in the communication space
The space of a modern city has problem areas with conflict zones, characterized by the properties of isolation and permeability [15]. The problem associated with the solution of such conflicts in the design practice is represented by the proposals of mega-bridges. Korean architects (Kim Sehyeon, Lee Jung Boram, and Choung Yongsu) proposed the “Skyscraper-Bridge Unifies the Korean Peninsula” in 2010, which will link the two countries of the Korean Peninsula, contribute to the dialogue of reconciliation and preserve the existing environment. The bridge houses research laboratories, offices and conference rooms arranged on a structural, stationary grid. The design of the facility maximizes the possibility of consuming the sun and includes a series of agricultural terraces, meditation areas and recreation parks where citizens of both countries can meet [16].

In another proposal, the symbolic structure "Bridge of Hope Skyscraper" is proposed to link the shores of the Dead Sea to help bring peace between Israel and Jordan. The skyscraper-bridge project was proposed by architects Mohammed Adib, Ivan Arellano, Jordi Cunill, Maria Teresa Farre, Christian Koester, Davide Roncato in 2012 (Spain). The construction of the bridge will begin on both sides of the sea and eventually the meeting will take place in the middle, where a settlement is create for Arab and Israeli inhabitants to live in harmony [17].

4.4. Integrated communication space for shaping the architectural environment
The combination of infrastructure and environment is effective enough to create a new way of organizing a high quality of life. Communicative spaces as a means of shaping the architectural environment are manifest in the conceptual proposals that have appeared recently. So, the project of the habitable bridge "Contemporary Habitable Bridge" (Italy) 2013 (architects Philippe Rizzotti, Vermet Tanguy, Manal Rachdi, Samuel Nageotte) is a communicative autonomous system. This is achieve with major energy resources through rainwater harvesting, landfill gas production and electricity using geothermal dry heated rock technology [18].

Another example is the 2010 “Habitable Media Bridge” in Seoul, Korea by Byung Ju Lee (“Planning Korea”) as a new concept using innovative technologies. The surface of the mega structure of the habitable bridge is cover with solar panels for energy. To create a healthy microclimate, vertical and horizontal gardens with green spaces, natural light and ventilation, using river and rainwater are organize on each floor of the facility [19]. Inhabitants can use the public museum, library and shopping mall equipped with advanced IT technologies. The bridge is design not only for cars, but also for cycling.

The skyscraper project "UP2U: Up to You Skyscraper" (architects Julie Defourneaux, Irène Galante, Jean Paillard, Laetitia Paneta, Guillaume Péle, Charles Murzeau) 2011 (France) is a city based on the natural principles of the existence of trees. This group of skyscrapers adapts to the climate and regulates its temperature. It stores water, collects wind and solar energy, providing a new set of service programs for the city. Each of the blocks includes functional programs such as research laboratories, energy facilities, offices and entertainment facilities [20].

4.5. Horizontal communications in a multifunctional space raised above the ground
The projects of "horizontal skyscrapers" can serve as precedents for this concept. The project “Flat Tower” (France), 2011 (designs Yoann Mescam, Paul-Eric Schirr-Bonnans, Xavier Schirr-Bonnans) is designed for the city of Rennes, France, in an old industrial area. This is a new typology of high-density architectural of objects, whose is different from the traditional skyscraper. The idea based on a dome structure that covers a large area while preserving its nature and basic function, ideal for
collecting solar energy and rainwater. Public recreational facilities are located at ground level, while residential and office space is at the upper levels [21].

The project proposal “Cloud City” in Bangkok, 2010 Thailand (architects Boonsern Premthada, Ittidej Lirapirom, and Natee Kungwannakornchai) is a structure that will supported by volumetric columns and a three-dimensional steel lattice. Cloud City divided into three main areas, with the upper section comprising an airport, a public park, and a solar power plant. The middle section reserved for retail, while the lower sections will be available for residential buildings and offices [22].

The concept of creating a new green layer of urban life for Tokyo was formed in the project "Sky-Terra" (USA), 2009 (design Joanna Borek-Clement) as a new level of squares for Tokyo. They rise 1,600 feet above the ground and form by the roofs of individual skyscrapers joined together. Each building is a module that can reconfigure into different spatial structures that can implemented in any metropolis around the world [23].

The main concept of the “Horizontal Skyscraper Above Existing City Block” (architects Rae Won Noh, In Ki Kim, Jeong Tae Kim, Hyo Bin Jung, Jang Ook Lee) 2010 (South Korea) is to build a new city-like structure over the existing’s facilities of the city. The main structural elements, also used for vertical circulation, are located in vacant lots at street level. The rest of the building is a fifteen-story strip that floats on top of existing buildings without blocking natural light. In addition to residential and office space, a new recreational space for the city is providing on the rooftop, where a green garden with sports facilities is located [24].

The concept of creating horizontal communications in a multifunctional space raised above the ground is embodied in the project "Sky Table - Social Implant" (by Ayrat Khusnutdinov) 2010 (Russia). The Sky Table is a large horizontal structure set over six blocks of an abandoned historic city. Its main structure is a steel mesh that divides into four colossal columns that connect to street-level squares and parks [25]. Here, many green technologies integrated into the overall “implant” space, and the processing plant and gas tank are located underground under the main columns. Solar panels are located at roof level along with wind turbines, which also used under the steel mesh, where the building's aerodynamic shape will direct the fast air currents.

5. Practical the significance of the
A new architectural paradigm that meets the modern strategy of civilization not only for survival, but also for a decent quality of life for people predetermines the expediency of considering new approaches to solving the important problem of forming a communicative space. Modern architecture must function as a means of integrating with an innovative living environment based on scientific and technological advances. The use of new approaches to the design and construction of facilities and can be achieved through the use of the results of not only fundamental research in applied areas of architecture, but also technological innovations [26]. The concepts of the organization of communicative spaces identified in the article as an alternative to the interaction of the private and public spheres are associated with a new attitude towards the value of the environment, the preservation and conservation of resources, as well as the creation of the comfortable living environment.

6. Conclusion
Because of the study, innovative approaches to the formation of communicative spaces in architecture as an alternative to the interaction of the private and public spheres in this review were identified in the context of the following directions discussed in the article.

1. Integral space and information-communication environment. The city as a communication system uses an increasing amount of information and his socio-cultural space is becoming mass media. The information environment is an intermediary between the inhabitant and the subject environment of the city, providing new opportunities for the development of the personality and his "information activity". An informational approach appears in architecture as the interconnection of two communicative spaces: architectural and informational. With the emergence of electronic infrastructures and the communication spaces created by them, progressive transformations in
information and communication take place, as well as a revolution in the use of communication tools associated with the intensification of communication.

2. The concept of openness and closeness of the communicative space. When forming a simultaneously open and closed, as well as an isolated and accessible territory in some developments, the design goal is to study the boundary values of the architectural space. This concept manifests itself in two aspects: on the one hand, it raises the problem of the closeness of the social environment and its components, and on the other hand, it focuses on the potential of the architectural space, which corrects its physical instability.

3. The manifestation of isolation and permeability in the communication space. The space of a modern city has problem areas with conflict zones, characterized by the properties of isolation and permeability. The problem associated with the solution of such conflicts in the design practice represented by the proposals of mega-bridges. Architectural complexes are not only a habitable volume, but also an interactive, informational and multimedia substance, expressing their ideas through images and meanings. As a result, designers begin to pay more attention to the development of processes taking place in the object itself, and the object itself becomes only a shell for their internal filling.

4. Integrated communication space for shaping the architectural environment. The combination of infrastructure and environment is effective enough to create a new way of organizing a high quality of life. Communicative spaces as a means of forming habitable space have recently manifested in conceptual proposals of mega structures with an ecological focus. This group of objects is an autonomous system due to the use of the main types of renewable energy sources. They adapt to the climate and regulate its temperature, store water, collect wind and solar energy, providing an optimal set of service programs for the city.

5. Horizontal communications in a multifunctional space raised above the ground. The projects of "horizontal skyscrapers" can serve as precedents for this concept. This is a new typology of high-density architectural of objects, whose is different from the traditional skyscraper and is to create a new city-like structure over the existing city objects. The concept of creating horizontal communications in a multifunctional space, raised above the ground, embodied in various innovative proposals with an environmental and economic effect.

Research devoted to this issue mainly deals with geometric algorithms and process architecture methodology. The main issues in this area are the problem of creating an architectural object by analyzing the connections between a person and functional processes, which are structural models of communicative spaces. Of greatest interest is the interaction between human, communicative space and eco-sustainable processes of organizing the living space. With this approach, it is possible to apply a scenario for a specific object in such a way that it does not oppose the satisfaction of human needs.

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