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NEW APPROACHES IN PERCEPTION OF HOUSING SPACE

PROCESS OF GLOBALIZATION AND INTEGRATION OF SPACE UNDER THE INFLUENCE OF DIGITAL MEDIA

Abstract | Due to the development of digital media, the production of space have become different and more complex than it was recognized in the past, at all spatial levels. The actuality of this topic in our region has been confirmed by the General Urban Plan of Belgrade for 2021, which emphasizes positioning of Belgrade within the network of European space. The process of globalization and development of information technology has become an important factor in understanding the localities, cities and regions, affecting the concept of contemporary housing. This paper starts from the premise that the significant part of these changes can be recognized through the research of the new approaches in perception of housing space. The area of the house, once viewed as a relation between the metric and anthropological dimensions, has now been identified in the sociological, psychological and sensory dimensions. This paper researches redefining of the perception of the living space under the influence of the development of new technologies from two aspects: the relation of the house and its urban environment as well as the relation of the house and its user. The aim of this paper is to present the complex forms of realization of contemporary housing within the system of new media technologies and their impact on the perception of housing architecture.

Key words | contemporary housing, digital media, networking, perception, interaction

НОВИ ПРИСТУПИ У ПЕРЦИПИРАЊУ ПРОСТОРА СТАНОВАЊА

ПРОЦЕС ГЛОБАЛИЗАЦИЈЕ И ИНТЕГРАЦИЈЕ ПРОСТОРА ПОД УТИЦАЈЕМ ДИГИТАЛНИХ МЕДИЈА

Апстракт | Услед развоја дигиталних медија, производња простора је другачија и комплекснија од начина на који је она била препозната у прошлости, што се може сагледати на свим просторним нивоима. Актуелност теме на нашим просторима потврђује се Генералним урбанистичким планом Београда за 2021, који као главно полазиште има позиционирање Београда у мрежи европског простора. Процес глобализације и развој информационих технологија постаје битан фактор у разумевању локалитета, градова и региона што се рефлексивно одражава и на појам савременог становања. Рад полази од става да кроз истраживање промена перцепије становања можемо да сагледамо значајан део тих промена. Простор становања, некад посматран као релација између метричких и антрополошких димензија, постаје идентификован у социолошким, психолошким и сензорним димензијама. У раду се истражује редефинисање перцепције простора становања под утицајем развоја нових технологија са два аспекта, односа куће и њеног урбаног окружења, као и односа куће и корисника. Циљ овог рада је да представи комплексне видове трансформације архитектуре становања у оквиру система нових медијских технологија, као и њихове последице на перципирање стамбене архитектуре.

Кључне речи | савремено становање, дигитални медији, умрежавање, перцепција, интерактивност

1. INTRODUCTION

The concept of technology in architecture does not any longer include instruments and methods of construction, but represent complex ways of realizing and representing architecture within the systems of digital technologies, and, as such, requires new ways of perceiving architecture. Architecture has, under the influence of new technologies and media, opened up to new programs and systems which are capable of achieving a dynamic relationship with the environment, accepting information and reacting accordingly. This paper is premised on the idea that digital technologies have brought immeasurable changes to architecture on all spatial levels and that, by exploring the changes in the perception of dwelling, we could see a significant part of those changes. This paper researches redefining of the perception of the living space under the influence of the development of new technologies from two aspects: the relation of the house and its urban environment as well as the relation of the house and its user. The main goal of this paper is to research the phenomenon and the role of cyberspace within the contemporary dwelling and to show the changes which virtual space introduces to the former perception of the house space with regard to its environment as well as its user.

The actuality of the globalization and space integration question is one of the main starting points of The General Urban Plan of Belgrade for 2021, which has as its goal the positioning of Belgrade in the network of European space. The transition of society, new social framework, the market and democratic relations all underline the necessity of having new approaches in architecture and urbanism: flexibility instead of rigidity, dynamism instead of static and a plan which supports the process instead of a plan which supports “the image”|1|.Therefore, the process of globalization and the development of information technology have become an important factor in understanding locality, cities and regions which reflects on the idea of contemporary living.

2. THE RELATIONSHIP BETWEEN A HOUSE AND THE URBAN ENVIRONMENT WITHIN THE CONTEXT OF GLOBALIZATION AND INTEGRATION OF SPACE UNDER THE INFUENCE OF NEW DIGITAL TECHOLOGY

The development of information technology as well as the process of globalization affected establishing of the new spatial organizations, during which, the physical structure and workings within the urban space were actively redefined. Reorganization of space comprises of different levels starting with the change of spatial visualization due to the increase of social and economic activities and reconfiguration of the urban geography which consequently created different transnational networks in cities. We can see the effects of this in the change of perception of the urban environment and also in the change of the relation between the house space and the urban environment. We can understand the contemporary space complexities which came into being under the influence of digital technology’s development and especially with the emergence of cyberspace.

Cyberspace is an electronic space of computer networks where online communication happens. As Novak said “enabling full copresence and interaction of multiple users, allowing input and output from and to the full human sensorium, permitting simulations of real and virtual realities, remote data collection and control through telepresence, and total integration and intercommunication with a full range of intelligent products and environments in real space”|2|happen due to cyberspace. That means that cyberspace, first of all, incorporates a

network of all communication channels and digital data which connect people and machines and is not a medium of passive information but a medium in which the user can integrate and direct virtual and real world. It is important to point out that communication in cyberspace implies a transformation of all activities and user interactions as well as the users and the environment into digital code. The user and his environment, whether virtual or real, become a part of a unique system of communication which occurs in cyberspace. They are networked in the process of a constant mutual interaction and affecting and adjusting in which all actors, in fact, become information.

2.1. Digital networking of space – redefining of urban borders and city centers

Currently, when the transfer of information does not have barriers in geographical locating, questions arise about new territorial organizing and identities which change the former definition of an urban place. As Sassen points out, because of this process, the division of center-periphery does not apply but new forms of centrality in the cities are formed. He states that today center's spatial correlation implies several geographical routes from the downtown business areas to the metropolitan regions and to transterritorial centers. He also points out that contemporary centrality is also based on electronically generated space, cyberspace, which includes all electronically networked spaces|3|. Soya points out that the modern metropolises lost their old borders which made new ways of looking at the city space possible|4|. He quotes Chambers who says that it is more difficult than ever before to portray a city as an isolated geographical, economic, political and social unit. The borders between cities became more porous, confusing our ability to draw a precise dividing line separating what was within from what was outside the city, or separating the city from its environment, suburbs and everything which is not a city, or between two metropolitan city-regions or between the natural and the artificial|4|.

Due to the emergence of new centrality forms, new forms of urbanity and the question of urban within the global came about. It is no longer necessary to have a high concentration of content and events within the center of the city for urban environment and, in contemporary cities, periphery in the centre and peripheral centers represent possible states. Soya explains that in that system this process does not revolve around one big metropolis, but that the core is now more in the network of urban nodes networked into a regionally defined system comprising cities, suburbs, towns, villages, open space, wilderness areas, and other urbanized landscapes|4|. New types of communication and globalization resulted in various centralities and types of isolation of the former pattern, center-periphery, dichotomy. Obliteration of the idea of a city leads to the fact that an urban place can be anywhere on this planet and its computer networking with the rest of the world is only important. Urban borders encourage the consideration of the relationship of the center and the periphery as well as the existing living conditions through various urban scenarios.

2.2. Contemporary house as a networked terminal – the relationship of the house and urban environment

The consequence of the new telecommunication and electronic technologies affect the social, cultural and the economic geography of the city. According to Grem and Marvin, in contemporary city, the individual living occurs as „the last reserved space“|5|. But the opinion that it is isolated from the social environment has quickly started to change. Many individual dwellings have become connected with their environment due to the increase in accessibility of telecommunication networks on a global level, which changed the significance of having a border between the private and the public. According to Grem and Marvin, Putnam was the first to define a house as a terminal: “The modern home is inconceivable except as a terminal, according the benefits of, but also providing legitimate support to a vast infrastructure facilitating flows of energy, goods, people and messages“|5|. Its most obvious aspect is a qualitative transformation of a house as a technical specification and its redefining as a terminal in a network.

Residents have started, through networking within the electronic space, to reject their immediate social environment in the urban place. New types of communication and informational technologies are being introduced into the space of the house through complex and diverse processes of social constructions|6|. The space of the house became well-stocked with a self-sufficient world of pictures, sounds, news and information exchange. Castells points out that it could be possible for the houses to be completely separated from their neighborhoods and cities and yet not be lonely, isolated places, since they will be inhabited by voices, pictures, sounds, ideas, sexes, colours, news. He also warns of the dystopian, urban future were “secluded individualistic homes across an endless suburban sprawl turn inward to preserve their own logic and values, closing their doors to the immediate surrounding environment and opening their antennas to the sounds and images of the entire galaxy“|7|.

In the modern world there has been a change in the ratio of networking and the modern, urban house in now placed in the majority of territorial categories as a public node of information. According to Guallart, if the recent history is constructed on centralized energy, information or production systems, the future history will be based on the distribution of the decentralized system, according to the system of operational nodes (identification) – things, places, territories and people who are willingly cooperating in order to be more efficient. In the project “Hyperhabitat: Reprogramming the World”|8| he suggests redistribution of the structure, introducing the separation of information about every object through the digital nodes, network and environment. The project unites the development of digital technology and the multiscale habitat theory with the intention of introducing new patterns for generating objects and urban environment as well as restructuring functional connections between participants, objects and information which is made of both the temporal and the spatial. The world may be recognized as a structured place of interaction between the natural habitat, infrastructural networks and functional nodes which are connected according to the economic and cultural principals. As Guallart suggest, reprogramming of the world happens when each doer on the planet is assigned a digital identity which allows communication with other elements through decentralized relational protocols.

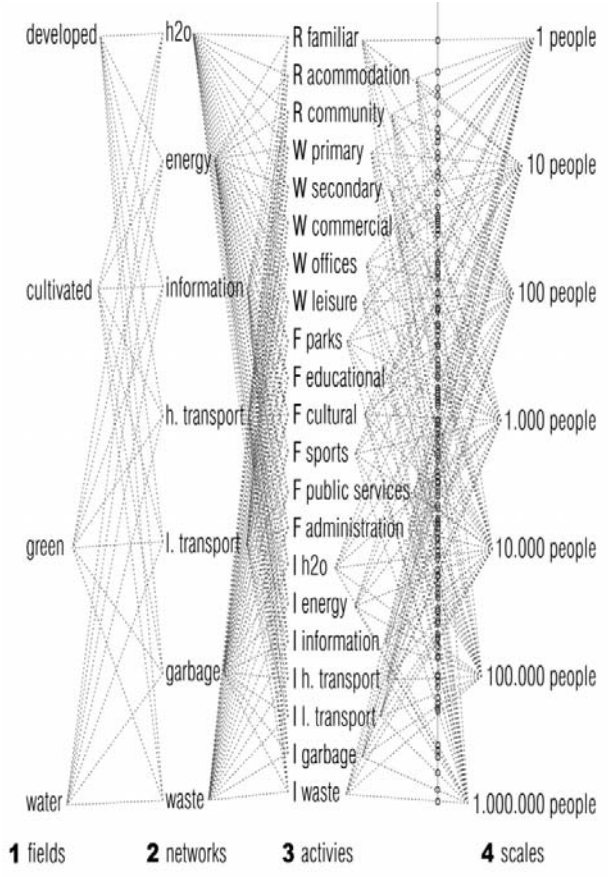

Image 1 | „Hyperhabitat: Reprogramming the world“, diagram, Guallart Architects|8|

Remapping of global space opens up questions about the new, spatial use, transformations and the new role of the urban space and center due to the formation of the new shapes and combination of social spatiality and territorial identities. These conditions reflect on the space of a house as well. A modern, urban house can be seen as a networked terminal in which the locality and the centrality are losing their role. A house is no longer dependant on its immediate, external environment and the outside information is being pulled into the private space by the electronic space. Therefore, a modern, urban house can be separated from the cities and neighborhoods and still represent a networked part of the global flow of information.

3. REDEFINING THE RELATIONSHIP BETWEEN A HOUSE AND ITS USERS INFLUENCED BY THE DEVELOPMENT OF THE NEW DIGITAL TECHOLOGIES

Application of technology, which is, according to McLuhan, the expansion of our senses and capacity|9|, causes changes within a house which represents a physical frame shaped according to our needs. For that reason, media technologies should be treated as unavoidable agents in articulating the living space that dictate the way and the intensity of its use. Cyberspace, as a form of new media technology, has a far-reaching impact on the perception of the environment and a tendency to significantly transform, in the future, both material and non-material aspects of what we traditionally refer to as house or home.

In architecture, cyberspace is realized as a network of information that folds a realistic, physical space and, by doing so, gives it a new dimension and forms a space of ‘expanded’ reality. If we accept cyberspace as a digital medium which implies participation through virtual

communication, it can be concluded that, on one hand, its implementation in the architectural space changes and intensifies the interaction between architecture and the user, and, on the other, intensifies the sphere of the virtual within the physical space changing the way the user understands architecture and the physical environment. Both of these aspects have pronounced manifestations in the living space where an intensive interaction between the user and architecture takes place.

3.1. Intensefying interaction in a relation between a house and a user

According to Jackiewicz, with the development of technology, the level of the participation of the user within the architectural space went through three transitional phases.|10| The first phase can be defined as a reaction of the user to the built space through the process of constant modification and transformation of the meaning and the function of the existing architectural spaces, their demolition and rebuilding dictated by the local, geographic and social conditions. The second level of participation is defined within the industrialized architecture as a slow process of limited participation of the user in the changes of technologically predefined architectural space|10|. That is the concept of architecture which aspires to achieve completely controlled conditions within the living space while not leaving the user many possibilities for intervention, accomplished by means of advanced technology. By introducing digital technology, we enter the third level of advanced participation which, according to Jackiewicz is: **"**continuously re-assigned, function and program can continuously change, energy and material circulation between architecture and its environment can be actively kept in balance, and one in which not only collective, but also individual agencies of humans can operate in a continuous, intense 'dialogue' with agencies of architecture"|10|.

It is evident that by involving digital technologies a new paradigm in architecture is developing which is, at the same time, a reflection of sociological changes caused by technology. Social trends of mobility and the new levels of communication demand that architecture develops different relations with the users, both individuals and groups. The digital age insists on a connection and understanding of an individual by the machine and on a constant reference of man to the machine. The logic behind this system is turning to the needs of an individual and a production based on an individual model instead of a group model which is characteristic for industrial production. Negroponte says that in postinformational age we often have a public comprised of only one man which results from the fact that everything is produced based on extremely personalized information |11|.

There are two possible ways of intensifying the interaction between man and his constructed environment. According to Jackiewicz, the first way implies creating conditions in which the users can directly and often change their environment and which he calls participatory architecture, while the second includes enabling of architecture to learn and independently adjust to changes in user's behavior and environment (autonomous architecture) |10|. The main condition for implementing these architectural concepts is the integration of digital communication and computer technologies within the architectural space. This new trend in architecture is developing as a part of the "ubiquitous computing" field which has a tendency to thoroughly integrate the processing of information into objects and activities of everyday life. In other words, it represents "a new metaphor in which computers are spread invisibly throughout the environment, embedded and hiding as it were, within the objects of our everyday life"|12| in order to establish the interaction between the user and the object. By means of these communication networks, the intelligent environments which have the ability

to recognize and understand ways of using the space as well as to transform that information into a reaction of spatial structures and objects within them are realized.

The interactivity and dynamism, as a result of computerization, are becoming the main characteristics of architecture as the intelligent environment. Interactivity is defined as the ability of architecture to accept and react to information. When we speak of interactivity in architecture, it is important to differentiate between reactivity and interactivity. In other words, we need to differentiate between closed systems which are characterized by limited rules of parameters and data input which cannot be expanded and in which the interaction of participants is actually the activity ruled by a predefined algorithm and the system which is capable of adjusting its behavior and in doing so establishes a relationship similar to human conversation|13|. The difference between reactivity and interactivity can be recognized as the foundation of "participatory" and "autonomous" architecture that Jackiewicz cites as the two ways of intensifying interactions between architecture and the user.

Architecture's interactive answer, created during information processing, is manifested on its physical structure through the kinetic movements of a different purpose and proportions. The concept of kinetic architecture implies "either transformable objects that dynamically occupy predefined physical space, or moving physical objects that can share a common physical space to create adaptable spatial configurations"|14|. Dynamic changes of architectural elements and spatial layers do not only imply the flexibility of physical space components but include the changes of the sensory, living space dimensions (thermal, visual and acoustic conditions) that define the total psychological and sociological experience of the space. In that sense, demands placed on interactive architecture, according to Fox and Kemp, ca be divided into four categories: spatial optimization, multifunction design, contextual adaptability and mobility.|14| These demands exceed the basic needs of the user, which include shelter, comfort, safety, economy, efficiency, and are most commonly implicated in the domain of internal space reconfiguration. They also include transformations at the level of a living space where layered sociological and psychological needs are realized.

Spatial optimization includes the development of the kinetic environment as "a system that has the ability to accommodate spatial adaptability"|14|. That includes a multipurpose reorganization of the interior as well as a total spatial transformability adapted to various demands of the program. Moreover, visual and acoustic control is an integral part of the spatial optimization with the aim of synchronizing various activities in the spatial frame and achieving both privacy and contact of the users. Hence, the living space does not necessarily have to be both physically and functionally separated into specific zones and rooms. One of the requirements of the realization of adaptable spaces is also the use of the systems designed on multifunctional design principles which implies multipurpose architectural elements made up of components which allow transformability. As a result, each piece of furniture as well as structural elements of the space (walls, floors, ceilings) can change their form and adapt it to various functions of the environment. Contextual adaptability and mobility are aspects of digital architecture which represent the interactive relationship of architecture and the environment, the natural and the artificial, and the ability of an architectural object to react, with the dynamics of its form, to climate conditions and changes within the urban context |14|.

As an example of digital architecture, which illustrates the interactive communication between the complex, transformable, spatial systems and the users, a design of the architect, Guallart, The Media House, can be used and which the author describes as the computer whose structure is the network|15|. The space of the house consists of systems of independent elements which are connected so that they can communicate using informational protocols,

much like the nerves in the human body, and which use the structure of the house as the physical frame for the flow of information. The main idea behind such projects is that "people, objects and spaces – will both generate and consume information, and ideally, transform it into knowledge"|15|. Knowledge, which is created as a product of the interactive communication between the aforementioned agents, can actually be defined as a new experience in the use of space.

By applying these concepts of the programmable architecture, the relationship of the space and the user changes in different directions. Firstly, thanks to the ability of the house to learn, based on the needs and behavioral patterns of the users, the users gain the possibility of controlling their environment more and adapting it to their needs. The degree of personification of a specific environment is thus improved. On the other hand, the manipulation of the space is not one-sided, and intelligent environments open up to their users new possibilities of using the space. As stated by Fox and Kemp, new spatial experiences are actually to be found "in understanding the potential of space, or parts that comprise it, over a certain amount of time"|14|. In that respect, knowledge and the rules about the functioning of a specific space are evolving and reciprocal. Also, the use of such complex spatial systems creates new forms of interactions between the users and allows recognition of individual's or group's needs thanks to the visible interfases of the architectural spaces. In the current projects of digital architecture, the interactive surfaces are most often the representatives of specific information about the space and its users, which can be show within that space as well as outside|14|.

It can be concluded that with the concept of computerized architecture, which is dynamic and interactive, a plan is formed about the space which is not passive and content-defined but changes with time and always develops into a new space where people become participants and not only users. In this respect, architectural structure, a house, can be seen as a system in motion and as a complex network whose elements are connected in the process of continuous communication and transformation of the environment.

3.2. The relationship between the virtual and physical space of the house

As it has already been stated, the integration of digital technologies and cyberspace in the environment intensifies the presence of the virtual within the physical space of architecture. According to Grosz, the essence of the virtual is always the same and its core is the idea of bodylessness, telepresence, the ability to be present in some other place without the actual presence|16|. According to Novak, the relationship between the real and the virtual space can be understood through the relationship of the body and mind|16|, and that arises form the fact that cyberspace is a place of overstepping and overcoming the limits of the body through mind. In view of the fact that through cyberspace the user can achieve the interaction and control over the real and the virtual space, the intensity of the suggestiveness of the cyberspace is very significant in the context of architecture, first of all, in the sense of the influence on the virtual experience affecting the way the material or the physical is experienced.

On one hand, experiences connected with the virtual space, which is consumed every day, are much stronger and more real than the presence in the space which is the place of living during the increased intensity of information and social communication which is achieved through digital media. In that context, Giddens, the English sociologist, maintains that contrary to the earlier period when the idea of "place" and "space" overlapped, in today's modern society, by

nurturing the relationship with that which is absent, space is separated from place and far from the direct interaction |17|.

On the other hand, the possibility of establishing active communication with a space which has a capacity to recognize the needs of the users through digital technologies, may create very pronounced feelings of attachment to that space|14|. Direct interaction, not only within the space but also with the space itself, intensifies the feeling of belonging to a specific physical environment. This attachment can develop as a result of spatial experience which, in the case of the interactive architecture, arises from the possibility of a real, physical space satisfying the virtual aspirations of the users.

Morse, when speaking of dwelling in spaces of mediatized, virtual reality, far from the place of direct experience but which are part of everyday life, quotes as examples of such places the television, shopping malls and highways. According to her, those are real places which exist in interstices defined by a specific state of the mind of the viewers, shoppers and travelers, and she defines them with a term “non-space”|17|. Those are the places of “shifted” reality in which dreams become a habit, a place of realization of mediatized aspirations of people. Auge defines the “non-place”, with respect to the idea of “place”, as the opposites|18|. If the living space of home is defined as “place”, a materialized idea of the identity and the relationship of a society, than “non-place” is the space which cannot be defined as historic, relational or as a carrier of identity. According to him, these spaces found their complete expression and domination in modern society, in what he calls supermodernity.

The question arises then if a digital, interactive house can be seen as an example of “non-place”. As networked terminal and “media center” of intensive flow of information, as well as a complex computerized system, the digital house can use its spatial elements as interfaces which represent interactions between the virtual and the real agents. If you imagine a house as a computer whose walls are made up of screens, it is clear that those “electronic windows” would look out on to anything. They can show anything, any space, any reality. That would fill the environment with scenes and narrations which are not connected to the existing environment, location. The possibilities for change would be countless and, therefore, the number of possible interiors man can identify with. The point of the interior of a house, a place which bears a personal stamp of people, would be completely lost. The reality would turn into countless possible virtual realities, and the identity of an individual would remain elusive.

In view of this digital environment’s dynamics of change, a house would no longer be a space which would be a carrier of memories, history and identity. A house could definitely become a “non-space” in the context of traditionally imposed values in which architectural space functions. However, modern technologies bring dynamic transformations which question the permanence of the material form and impose constant change in the environment, caused by continuous circulation of information, as reigning parameters of modern life. That is why the architectural space, including the living space, cannot be viewed only as a social and physical shelter but also as a place of intense, spatial experience.

4. CONCLUSION

Soja begins the book *Postmetropolis: Critical Studies of Cities and Regions* by citing Mumford: "*Postmetropolis* opens with a city that was symbolically a world – the very first such "city-world" in human history – and closes with a world that, in so many ways, has become very much like a city, where urban ways of life extend to every corner of the globe"|4|. Every individual, urban center, from the biggest to the smallest, contains an entire word within it, and forms incredible "culturally heterogeneous city spaces"|4|. And, thus, every place on the planet becomes a part of the global network. On another level, through the space of the house, Guallart in The Media House project points out that the house, due to the development of new digital media, became a microcity. It became bigger than a city, outgrowing all spatial frames but not with its physical component of space but with its integrated digital space.

We can conclude that the development of the informational technology, as well as the process of globalization, became an important factor in understanding the localities, cities, regions and countries, due to which the perceiving of new spatial grouping, integration and the production of space is different and more complex than it was recognized in the past. The space of house is redefining its relation with the outside environment and is no longer dependent on it, but through cyberspace of information is sneaking in from the outside environment into the space of the house turning it into "a media centre, a reality that will forever transform our understanding of both public and private"|19|. On the other hand, the relationship between architecture and its users shows us that the digital age insists on being connected and on understanding of an individual by the machines. Through dynamism and interactivity, the digital technology enabled the redefining of the house space according to an individual model, through understanding the needs of an individual user.

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