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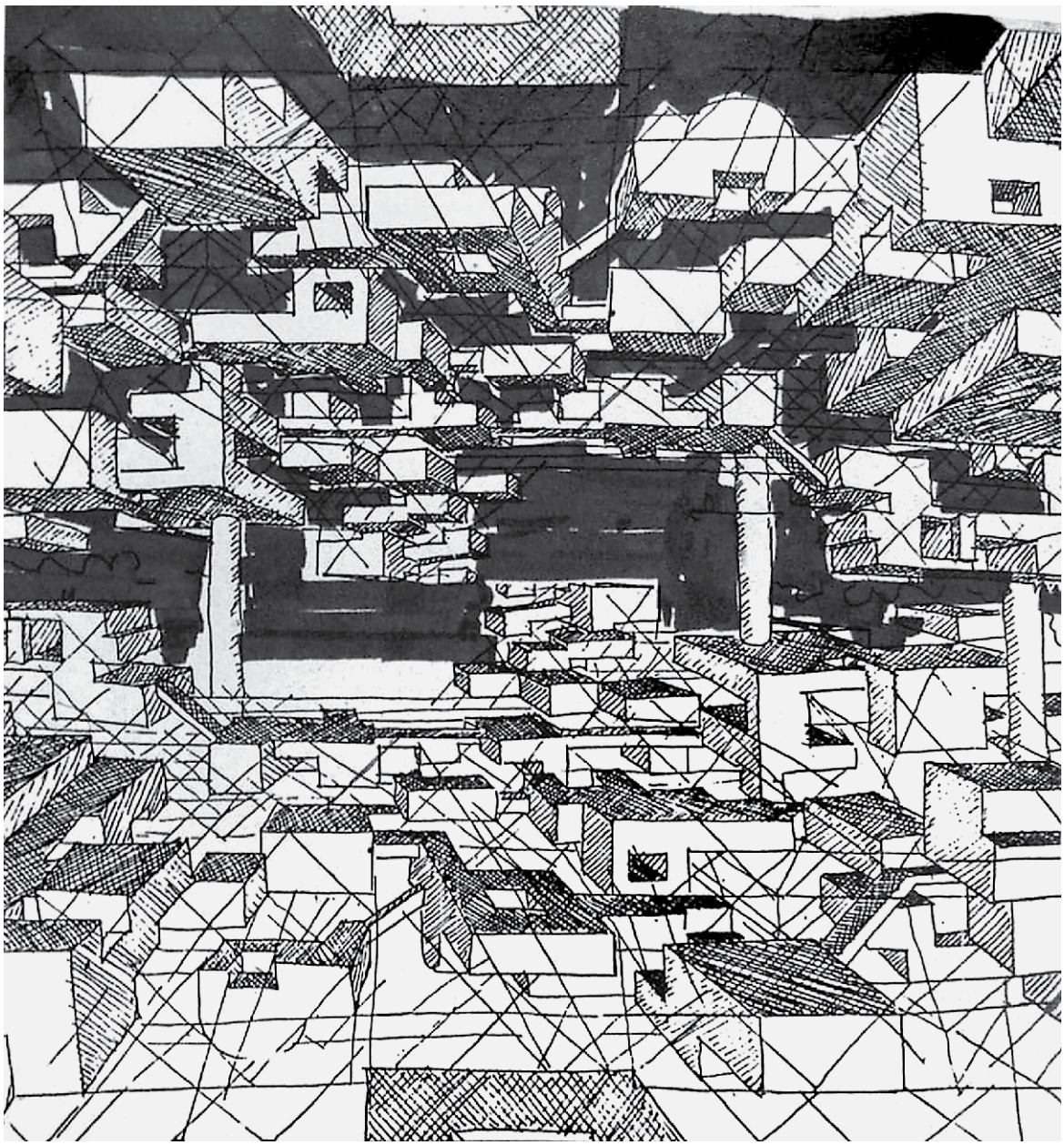

Fig. 1 Drawings of La Ville Spatiale by Yona Friedman, 1958; Courtesy Yona Friedman Archives, Paris

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Influence of Technology on Socio-spatial City Development

Reflections on some 20th Century Ideas

CITY DEVELOPMENT
DIGITALIZATION
INFORMATIONAL CITY
SOCIO-SPATIAL ASPECT
TECHNOLOGICAL INFLUENCE

This paper explores the influence of new technologies on city development with an accent on the socio-spatial dimension. The primary goal of the paper is to point out the reflections of earlier ideas in the context of modern technological processes in cities. All social, technical and technological components of a community, and finally civilization, are reflected within the space of the city. Although it has remained the greatest consumer of many material goods, the city has also become a "producer" of many technical-technological and spiritual values of civilization. Taking into account the acceleration of the development of phenomena in the world of technology and technology featuring modernity, it is reasonable to broach the question of the realistic chance of the prediction of their further course and related social changes that are about to cause it. In many scenarios of urban future, one can sense the idea of the city as a result of high technological achievements of civilization. Special attention is paid to the information city which, connecting a lot of people into systems of interactive information technology, change the way of their mutual communication, as well as their social life and culture of behaviour. The measure of the organization and function of a city is set by telecommunication technologies, information, and computers. If the city is a "print of a society in space", the contemporary moment then refers to the "digitalization" of human beings and their interactions, new aesthetics, value and other criteria. The tendency of this paper is to contribute to the understanding of new technologies on 21st century cities interpreted primarily through the prism of certain theoretical and experimental ideas and concepts of the 20th century.

Introduction

The city, as a feature of a certain civilization, is an expression of its material and spiritual achievements and potentials. In regards to many phenomena and processes trying to be perceived in the future, it seems that this one regarding city is the most complex one. Not only is it the most complex social phenomenon, but it is at the same time both a technical and a spatial system excluding the possibility to observe its phenomenon as a set of different processes and functions. That raises the question: which elements of its future should be seen? Social frames of development, especially political ones, population, technical possibilities of construction, technological progress of civilization or spatial? Or altogether? Although the city has remained a consumer of many material goods, at the same time it has also become a "producer" of many technical-technological, spiritual values of civilization.

The modern society and the city as the biggest consumers constantly look for more sophisticated technologies and accordingly, there is more and more need for a more precise and narrowed specialization of jobs. The influence of new technologies on the development of cities in the future will be undoubtedly great, as well as the social consequences following it. Electric energy, elevators, skyscrapers, the car, the phone, the underground – all achievements of the 20th century which have radically changed the way of organization, construction, and functioning of the city. All of them, as well as many other technologies had a great influence on the whole precomposition of traditional, preindustrial life in the city, as well as the social organization, place and role of an individual and social groups and classes. During just one century there were radical changes caused by technical-technological progress.

However, it shouldn't be concluded that changes of the social being of the city appear exclusively as a consequence of technological changes. The need to build as much as possible, faster, cheaper, is a result of, among other things, the demographic explosion and pressure of population on cities, regardless of whether it comes to flats, the communal infrastructure or environment pollution. In the second indirect circle, new technological solutions are needed in order to prevent or repair the consequences (the polluted environment, for example) caused by excessive construction or the excessive concentration of people. In other words, technology appears as an operative regulator of the needs which appeared in another sphere or as a response to urban changes.[1] Therefore, for example, the imaginary telematic city represents an expression of technology's influence in pre-industrial age. It means that the measure of the city organization and functioning has been set by telecommunication technologies, information, and computers. Advocates of such a city find that the primary effects of the above-mentioned technologies are already reflected on the functioning, structure and organization of the city.[2]

At the moment, the issue of informational, smart cities, i.e. advanced conceptual visions for the city of the future, has been additionally strengthened due to the global dominance of the covid-19 virus pandemic. This moment requires the need for a better understanding of earlier, technologically advanced, urban concepts and theoretical discourse in the context of contemporary spatio-social transformation. New forms of networking and the parallel search for humane concepts of cities have once again become the main focus of interest in cities all around the world.

1 In many scenarios of urban future, the idea of a city as a result of high technological achievements of civilzation could be sensed.

2 New kinds of jobs, fading of old jobs from industrial age, "changes in the way of work, place and the way of living, social live, the way and quality of communication among people, changes in family life, forms of social segregation and spatial differentiation, greater isolation of an individual or maybe new quality and forms of neighbourhood, the way of using free time, influence of mass media – they are all consequences brought by telematic future into which, as it is considered, the cities of developed part of the world have already stepped" (Pusic, 1997: 419).

3 A pamphlet Manifesto de l'Architecture Mobile of Yona Friedman, Congrès International d'Architecture Moderne nr. 10 (CIAM X) in Dubrovnik, 1956. Available at: http://www.yonafriedman.nl/?page_id=225 [Accessed: 15 April 2021].

Networking

The need for alternative concepts of cities has always existed while technologically advanced visions have come to the fore in the 20th century and stem from the need to develop alternatives to the industrial city. Responses to the early industrial revolution were recognized in the works of Howard, Gropius, Garnier, and others. From the middle of the 20th century, experimental concepts of cities such as *Mobile architecture* being adjusted to the user[3] and *Vile Saptiale* (Figs. 1 and 2) by Yona Friedman (Friedman and Orazi, 2015), *Walking city* (Fig. 3) and *Plug-in city* by the avant-garde group Archigram (Sadler, 2005) and others have referred to the need for development of new spatial structures of high technology and interaction. Those were dominantly reactions on the industrial society, the industrial city, using principles of parameter architecture, modular technologies and robotics in the search for new, more advanced forms of life in the community. At that time, there already existed hints to the appearance of a new revolution that would later empower tendencies from the fifth and sixth decade of the 20th century.

In the 1920s Castells (1989, 2009) made the claim that the information age brings primacy to the so called "space of flows" (Castells, 2008: 314-321) over traditional physical space as the most important aspects of human action have the tendency to be organized through networks. The logic of nets, according to Castells, also forms social morphology, and its open structure, defined by a series of linked hubs, has an ability of unlimited expansion and integration of new spots capable of achieving communication with network-mainstream. Networks are a reality today, but their significance, role and nature are multiple.

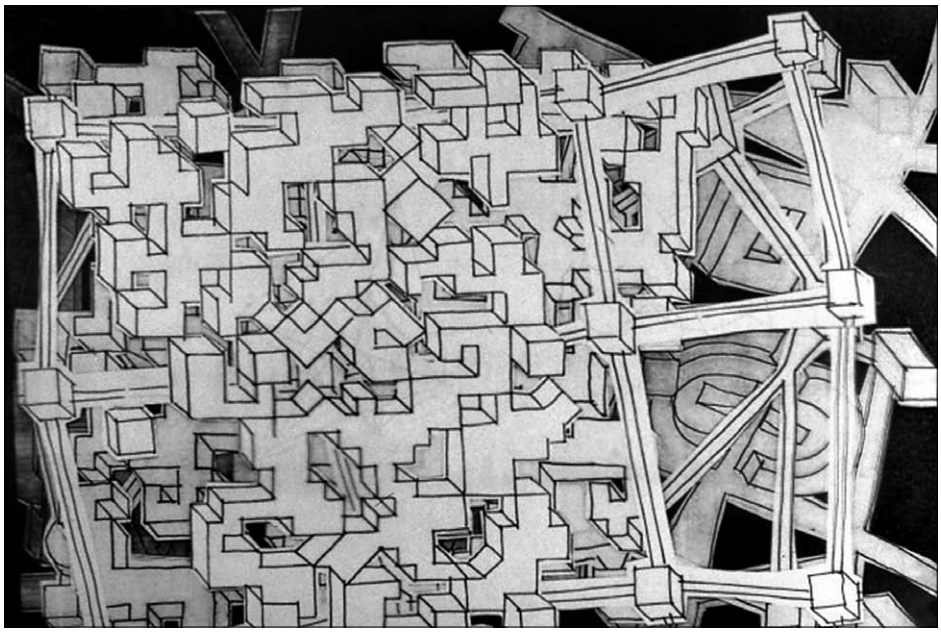
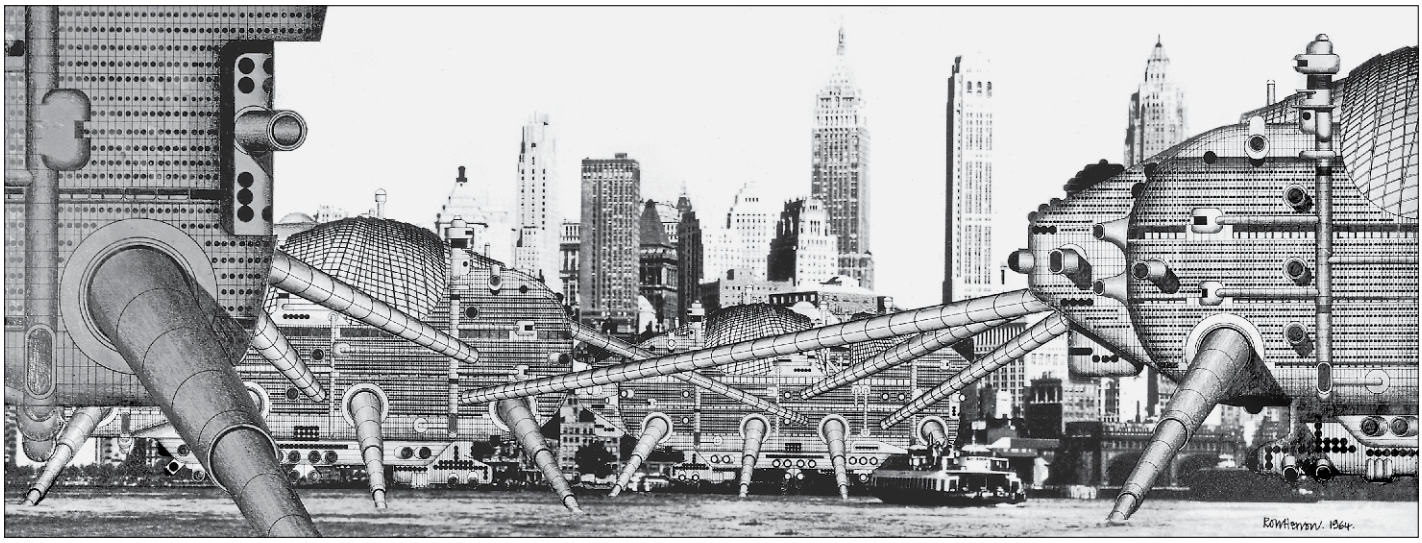


Fig. 2 Ville Spatiale: Details of the concept, 1958-1962

Seen through the prism of electronics, networks provide increased speed, productivity and reduced expenses, reaching a desired level of efficacy. These basic determinants are largely followed by principles of globalization which successfully define them as one of its imperatives, elevating them to the level of myth. In accordance with the indisputable value ever more gained by the concept of network, the phenomenon also takes more and more space in analyses and research attempting to penetrate its true nature and its influence on society and space. Observing the networking trend, Batten (1995: 313-327) made a comparison of central spots systems and network systems. That way, the quality of network systems is reflected in the existence of

Fig. 3 The Walking City concept by Ron Herron in 1964



several node points, neutrality about size, tendency to flexibility and complementarity. At the same time, the dominant heterogeneity of goods and services, as well as bidirectionality of flows is emphasized. Horizontal attainability has been opposed to vertical attainability of the central concept, the importance of transport expenses has been replaced with information expenses, as imperfect competitiveness and price discrimination has been emphasized.

The development of new information and communication technologies has brought to formation a completely different type of infrastructure, enabled to support the development of urban economy and bring the city closer to the global scene, providing it with a privileged status. Smith and Timberlake (1995: 287-302), emphasizing multilayered global networks, recognize four key functions that modern inter- urban flows rest on (economic, political, cultural and social reproduction), as well as three basic types of flows-human, material and informational. They all simultaneously cover not only local, but also metropolitan and intercity levels that the global range has. However, telecommunication networks also require support of other networks – from transport and security, to a symbolic one, manifested at the virtual, as well as the physical level.

The distribution of power isn't equal even in this case so, besides the most important world centres-hubs in the global telecommunication networks, polycentric formations of complementary networked city, which overcome individual shortcomings that way, also have their role. Unfortunately, such a structure leaves space for the so-called technological gaps and black holes, i.e. spaces that haven't been included in the world systems of information exchange yet. Thus, they are excluded from the race for one of the competitive positions on the global hierarchical scale. Therefore, the basic information structure of cities (telematics) becomes one of the important investments for the future, although some authors (Graham and Marvin, 1996) find that its implementation inevitably leads to disruption and disintegration of city economy sucking in global telematic networks. Anyway, connecting local branches into numerous international systems becomes inevitable in the spirit of globalization, and the importance of networking, i.e. connectivity and availability, is also noticed in the field of local (self) government, civil participation, in the case of isolated groups or when grouping on the basis of common interests. Virtual communities formed in that way can get a chance to exercise their right. The final outcome, however, could be the exact opposite and could bring to their spatial isolation and polarization.

One of the important networks is related to air traffic as well, which is, at the same time, a rare field in which there are available data measuring the level of global connection. Besides telecommunication, air traffic has significantly contributed to expansion of world economic activities, thereby retaining the possibility of personal contact. As the most important point of this kind of network, London stands out, followed by Paris, Frankfurt, Tokyo and New York, according to centrality and connection. However, these positions are relative and they change over time. The expansion of the global social network during the last two decades of the 20th century was a reflection of urban globalization. However, the drastic decrease after 11 September 2011 revealed the other face of this process – terrorism becomes a global category in it, and modern networks become its most common target. Observing the cultural dimension of networking and its basic instrument – electronic media, we can define five basic variants of global cultural flows as stated by Appadurai (1996). The first type would be "ethnoscapes" creating movement of tourists, immigrants, manpower and refugees. "Mediascapes" would be the world distribution of information in all manifestations, as technologies distribution would be represented in "tachoscapes". According to this classification, capital flows would be embedded into "finansscapes", and flows of spreading political ideas and values into "ideascapes".[4]

From the semantic point of view, networks are also brought in connection with distribution, connection, communication, the society and fencing. Therefore, the fact that expert attention is paid to the relation network-city space-identity is not surprising, as it is certain that the networked society changes our personal and global perception. Thereby, attention is diverted from the traditional backbone of society (for example family and state) to new forms of connecting individuals and their multiple identities. Modern networks represent a complex combination of decentralized and centralized acting, physical and electronic flows, as they embody completely new relations between cities, basic space-time matrices and the question of power. Their functioning causes many contradictory effects, enables much greater operability of different systems, as well as very sophisticated methods of control and manipulation. One of the paradoxes of the networking myth lies in a more and more conspicuous feeling

4 Using a suffix landscape, Appadurai (1996) wants to say that those processes have a fluid, volatile and fickle form. Individuals and groups shape and direct those landscapes based on their own interpretation. In other words, they are imaginary worlds, and those imagining them could be those who control them, those who live in them, even those who pass through them.

of disorder and chaos of the world opposing the basic network concept-its order. At the same time, the growing possibilities of different kinds of integration fall into the shadows of an individual's isolation and society fragmentation, which are all effects that could be caused by modern technologies. The myth of networks is ambivalent in relation to the globalization process itself and its real effects cannot be fully seen yet. Only from a greater historical distance should it be possible to say how big is its real share in the expansion and functioning of the new world order. It is very possible that global sharing, instead of one of the strongest globalization weapons, shall become its weakest point. The vulnerability of networks is their biggest flaw and the intertwining and possible interruptions might lead to (un)expected consequences.

Multilayers and ambiguity of city space

Although the city has always been a multidimensional product of social processes, its modern nature is growing into hitherto known patterns. Just because of that, the new form of urban existence is synchronized with the needs imposed by globalization, and memorized artefacts are interpreted in terms of getting a new character and meaning. Numerous identities connected and confronted in cities, as well as dynamics of diverse expenses crossed in them and functioning simultaneously, lead to a new level of urban metamorphosis. New urbanism based on the ontology of expenses, flow, mobility and complexity is trying to deal with a new space-time character of world cities. Foucault (1986: 69-83) thinks that the future lies in the world personified in the spatial metamorphosis of the network, a concept questioning categories such as local and global, near and far. Flows of such networks open possibilities of non-linear experiences which are simultaneously connected, free from concrete and abstract proportions. The economic driver of the city, placed in the business zones of national and international significance, is developed on networks made by lines and points of telecommunications, services and business space. Their role is the transmittance and exchange of information and knowledge used to get control of economic flows, in order to provide capital accumulation and set up a new system of power, decision making and managing.

Changed economic, technological and social frames lead to feedbacks in space attempting to adjust to an un(expected) acceleration of modern life and a different understanding of the urban regime role. Many studies of global centres indicate that the most important groups of activities are financial-business groups, activities of political power and influence i.e. international commands and tourism. Together, they carry a very synergic effect based on the benefits of new information technological systems, but also the need for the location near the source and the exchange of information. However, a reduction of communication expenses also brings to their relocation to suburbs and/or towns, which is a trend especially referring to finances, operating and management (la Défence, Paris; Craydon and Redding, London; Greenwich and New Jersey, New York; Omiya and Kawasaki, Tokyo).

Visionary urbanism suggests cities-objects located above the ground, underground, under the sea, releasing Earth surface, denaturalized, of miraculous shapes and dimensions for use of the most modern technical achievements. Boundless faith in technics and technology often leads into technicism and technolatery. Settlements turn into an instrument or a facility and lose the peculiarity of an urban type of settlement. Francoise Choay, rightly names this concept technotopia (Fig. 4), not technopolis place or a city of technics (Šoe, 1978).

The so-called information economy alternatively sets its focal points along the road lines and routes at airports, which gives a boost to the development of different kinds of tourism, and especially to business development. Thanks to these locations, which allow the possibility of mobile jobs and easy traffic availability of all categories, there is an open perspective of historical centres preservation, which could provide similar services only with huge expenses. Outskirts remain intended for mass media production (film, TV studios), entertainment (stadiums, amusement and theme parks, for instance, Disneyland in Paris), as well as science and business (technological parks, exhibition space, conference complexes, etc.), so we can say that urban space is no longer removed from the city towards the outskirts, but on the contrary, it moves – from the outskirts to the centre.

The complexity of urban space subject to capitalist principles was originally manifested in the intensive vertical use of land, as underground parts were intended for garages, commercial activities, public and private transport, as well as installations. Big zones are also a consequence of maximizing economic value and forced consumption culture requiring a lot of accompanying content. Such spatio-economic concept, as a symbol of expansive global capital, leads to parcels increasing, which in turn improves economic efficacy of the investor (in the reduction of expenses) and strengthens its competitiveness on the market. However, monumental buildings meeting economic requirements of the investor do not offer an adequate level of

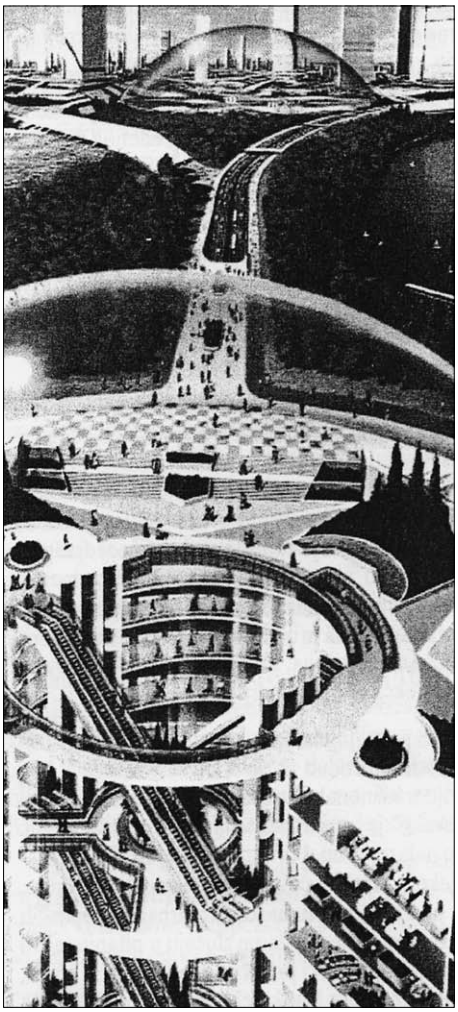


Fig. 4 City of the future technotopia

physical perception to the users, unable to fully view neither megalomania forms, nor an emerging, complex urban image.

Although the main characteristics of the new urban incarnation become, first of all, imperative for competitiveness, specialization, increase of spatial dimension, as well as the processes of deconcentrating and reconstruction, they can also be unexpected catalysts for farther changes whose result would be acceptable to all.

Lines of movement and communication

As the material world nowadays is not interpreted as a thing, but just as information or an idea, urban space, as the most complex human artefact, becomes a real image of a constant process of space-time aggregation. Just because of that, lines of movement and communication provide greater urban and global efficiency, becoming an important characteristic of urban centres ready to accept the new dynamics and logic. Although the initial conditions of urban genesis are related to the local level, the system of urban organism owes its sustainability to the incorporation into a wider, global scale in the scope of which it functions itself. This way, the city connects in itself many simultaneities realized through various expenses. Their movement enables communication on the physical, information and symbolic level, and the way in which local and global proportions relate to each other defines the essence of (desirable) urbanity.

Each moving path in the urban system "has three basic elements-the beginning, the end (destination) and a series of spaces passed through to the final goal. This pattern is even kept in the case of electronic expenses treating space in a different way, whether as a bundle of cables, a direction of telecommunication signal or an ambient of virtual reality" (Stupar, 2009: 96). The new term of the so-called "economy of movement" i.e. reciprocity of space and movement effects, at the same time means multiplying effects of activities distribution and pollution density, all under the influence of the relation between space and movement. This interdependence gives the city a recognizable structure in accordance with actual social-economic patterns.

Research on urban configuration enables the defining of the most favourable model of the physically functional structure which would balance economic, social and ecologic factors, indicative for the effects of new urban space and predicting the distribution of integration points and lines. At the same time, models that have appeared this way could reveal us the data on multidimensional dynamics of cities which become more and more important in the encouragement and preservation of all kinds of urban sustainability and their synchronization. The key of successful city space existence does not only lie in the reinterpretation of traditional historical urban environment but first of all in defining principles of its functioning. Considering that space does not direct events, but offers many possibilities, more and more attention is paid to the shaping that allows for an opening of strategic visual fields.

The idea is that spaces can be analysed as "networks of choices" along with other principles of space syntax (Hillier et al., 1976: 147-185) which represents a good platform for understanding the relation between society and space. A good example of this new understanding of the city structure shaping represents a series of urban development projects realized in the space syntax laboratory.[5] The new regeneration techniques of urban areas that they use are focused on the creation of physical relations that have accomplished a permeation of people and places. Factors such as connectivity, integration and permeability are processed and objectively measured on the basis of multidisciplinary analyses installed in a new software computer. With it, it is possible to move factors graphically so that the urban context and its potentials are explained, regeneration possibilities are identified and potential solutions are tested. The system of public transport, systems intended for business movement (airlines, routes of fast intercity railways, highways), as well as those intended for the exchange of information (telecommunication connections) open new possibilities of urban regeneration.

Informational city infrastructure, with its connection lines, currently represents the most expansive way of communication at all levels, providing intensified circulation of knowledge, symbols and signs. Thereby, equipment of cities with information-communication technologies becomes an important element of competitiveness on the global market as it enables a simultaneous process of messages (information) centralization and decentralization of their reception (Castells, 1993: 247-257). The implementation of these systems supported by growing globalization also affects the disintegration of urban space and its functions in the simple set of units of different importance. At the same time, economic and political importance of all types of connection is visible at local as well as at regional and global level. Their role in increasing necessary urban connectivity is growing, and therefore the solutions combining different ways of communication are resorted to.

5 Space syntax laboratory. Available at: https://www.ucl.ac.uk/bartlett/architecture/research/space-syntax-laboratory [Accessed: 15 April 2021].

The connection of air traffic systems, railway and road networks with new information-technological flows, enables more efficient organization and control of this complex mechanism, as well as a constant improvement of its components. Each of these subsystems has its own operating range and represents a key physical, functional and symbolic connection to the urban power organism with global life impulses (Fig. 5).

Mankind has always functioned in two parallel kinds of reality: the first one representing a continuous world of objects and the space where we move, and the second one, equally important, making a discontinuous world of expressive forms, signs and symbols. Their synthesis, as a complex web of rational and irrational fragments, gets its maximum cognitive importance just in the urban space. However, in order to make this essential value of urban environment an active part of the global screen, it is necessary to create, transmit and receive information which does not even exist without connection lines.

Modern technologies greatly facilitate this task, disregarding the kind of movement and communication. Therefore, it is not just a phrase to say that the world is really getting smaller, and the hypothesis by American psychologist Milgram that there are only six degrees separating us from any person in the world, nowadays gets its confirmation (Milgram, 1977). Namely, research at Columbia University focused on social connections (networking) has shown that it is possible to send a message on the Internet to a completely unknown (given) person over six persons in a chain in which we know only the first one. However, direct encounter still holds its importance in the world of communication, and through movement different configuration get formed on the route airport-highway (railway) – car park (metro station) -office building (hotel) flat. This series becomes an image of the new lifestyle and a symbol of a different view on time and space, one which leave enough space for differences, sustainability and continuity regardless of doubts and contradictions.

Although every city tends to emphasize their peculiarities and extrication from the conception, it is necessary to provide a complex economic, technological and cultural base for the global race. It represents the starting point of an uncertain way of urban development in which positions of winners and losers are quite easily changed and therefore, there is a tendency to raise attractiveness. Global network hubs are competing for the presence of command functions as well as the organization of world spectacular events bringing recognisability, opening the possibility for business progress, increased inflow of investments, as well as psychical and symbolic flywheel to urban development.

Fig. 5 Narita International Airport, Tokyo, Japan: the space of the future, a picture of reality or an architectural pseudo-heterotopia

Informational city

The modern society has been greatly adjusted to the information age and network operation system taking over autonomous connections. The urban society, due to the global availability of information, emphasizes the space of virtual reality, which is no longer an alternative to the physical and material, but it's an equal social product to material. That way, space as a social product (Lefebvre, 1991) is radically transformed, as Castells states from the "space of place", which functions in physical terms and interprets local processes, into a "space of flows" with the concept of interactive, network and electronic functioning (Castells, 2008: 314-321). The overlapping of virtual and real space generates new patterns. Stock talks about the informational city as a prototype of a complex phenomenon "knowledge society" (Stock, 2011: 963-986). There are many world cities labelled as "knowledge society", which build competitiveness on the principles of intellectual capital (Carillo, 2011). The authors indicate that the perspective based on knowledge is crucial in the process of economic, social, cultural competitiveness. The informational city questions the term "user" pointing out the need for redefining its role. It could be assumed that the cities of next generation will have features of dominantly intel-

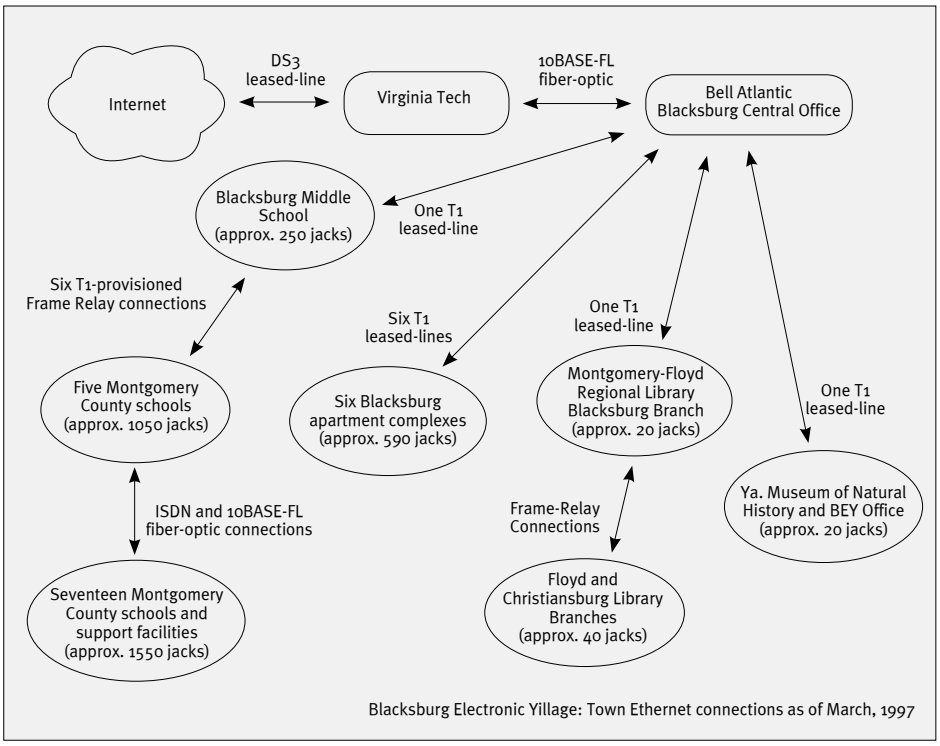


Fig. 6 Blacksburg electronic village: Network topology

ligent centres and innovation centres (Raj and Raman, 2015). Maybe Hilier's pointing out of the need for a new space science, in order to better understand the interaction between local and global scale (Hillier, 2008: 292-295), is completely justified, especially if we consider these new phenomena related to the term of the city of the future.[6]

It seems that today there are successful attempts at designing an informational city. In 1993, with a collaboration of the city of Blacksburg in Virginia, the Virginia Polytechnic Institute and State University of Blacksburg, the Blacksburg electronic village with about 35 000 inhabitants came to life. Connecting many people into systems of interactive informatics technology, an attempt was made to change from the root the way of their mutual communication, social life and behavioural culture (Fig. 6). As much as 60% of the population in this community have emails, 40% of them are involved in the "Internet", shopping and business arrangements are done exclusively over the Internet. This way, local issues are discussed, from the way of organizing and giving a counter-proposal to the government about planned action or finding the best solution to remove some city slums, to reducing some mutual expenses for city community functioning (Carroll and Rosson, 1996: 69- 74). Such projects obviously lead to the "digitalization" of human beings, digitalization of their interrelationships, a new aesthetic and other phenomena.

Smart city in the light of pandemic (Covid-19)

Throughout history mankind has been faced with many epidemics which left lasting consequences on societies and cities. At the same time, these situations often served to reconsider the existing and develop new spatial moments of evolutionary reach. In the light of the Covid-19 virus pandemic, some key issues in the context of the sustainability of existing urban systems have been further focused on, such as resilience, urban health, socio-economic inequality, security, transport, and others. Research has shown that the new challenge to the Covid-19 virus pandemic has further popularized concepts from the 1980s, such as 'cybercities', informational cities', 'digital cities', 'wired cities', 'virtual cities', with the concept 'intelligent ', 'smart cities' being the most dominant one. (Abusaada and Elshater, 2020: 417-424).

In his paper, Batty poses the question of what cities shall look like after the pandemic, giving directions to finding a solution for them (Batty, 2020: 547-552). A new reality, that society on the global level has found itself in, has additionally strengthened the need for questioning conventional concepts of the cities on whose principles urban spaces still dominantly function. Continuous evolution of the city followed by revolutionary changes and many challenges suggests the need for continuous research and the questioning of urban concepts in the evolution and development process of the city. Despite hundreds of recent scientific studies and papers dealing with the issue of "smart city", in the conceptual vision of the city of the 21st century, based on the network infrastructure (Joss et al., 2019: 3-34), the widespread prevalence subject discourse in cities all around the world (Stübinger and Schneider, 2020: 8460) continues to focus on the transformative management versus issues of sustainability, humanity, etc. Nevertheless, the ideas of the smart city have been made official as

6 Mutual permeation of global and local, which in different geographic areas results in unique outcomes, is recognized as a globalization process.

7 Doxiadis defines ekistics as a synthetic science which establishes basic relations between economy, sociology, engineering, architecture, geography, political sciences, mathematics and other sciences and disciplines towards a unique insight into problem solving of all kinds of human habitats.

8 "City as a whole will be a result of good programming and good planning, based on very detailed examination of human needs on one side, and possibilities offered by technology on the other side. Universal city of the future should be, both as a whole and as a framework, a product of creativity of every capable mind enable to understand and define (shape) overall human habitat on Earth. Human community represents a whole in which an ordinary human being will find a chance to express themselves in the best possible way." (Doksijadis, 1982: 307).

strategic in the context of the development of the digital urban society and the discourse of the global urban future. Networking, the synergy of new theories, methods and applications of design in smart cities, through interdisciplinary and transdisciplinary integration of architectural, technological, information and other possibilities, can become a new paradigm of planning and regeneration of post-pandemic cities of the 21st century. In the actual moment of information-communication technologies domination, it is quite certain that they will take over the primary role in all aspects of future socio-spatial transformations.

Is there an alternative to spatial neomodernism of the city?

An answer to this question could be sensed in the ideas of the most influential theorists and architects of the 20th century such as Doxiadis, Alexander, etc. Doxiadis, founder of ekistics[7], defines ecumenopolis as a concept for the city of the future (Doxiadis, 1968: 16). In the method building Doxiadis's thought arc there is a reflection of the general principle implemented in most research on the future. Searching for an answer to many economic, environmental, social and spatial issues of the urban present, Doxiadis reached out for familiar ways of historical experience on the one hand, and scientific analytics about the modern phenomena on the other. In communicating with past ideas, however, there are many traps that even Doxiadis falls into at times. Therefore, for example, among the main reasons for better living in cities, he sees, among other things, their smaller population, and concludes that cities are therefore "tailored to men".

In the part of the analytical approach linking the contemporary to the future, Doxiadis decided to follow the magnitude of changes. His main idea is that in the 20th century we experience the historical ending in which the traditional city definitely disappears and ecumenopolis appears as an imprint of the future. In accordance with the complex system of settlements and the model of antropocosmos, Doxiadis names ecumenopolis the last stadium in the development of human communities, a big agglomeration that will network the country with its population and physical structures. Summing up the data on people and space that will look for their own habitats, Doxiadis concludes that there is no place for optimism and says that the world city being born will be suffocated in its own birthplace. To these quantitative changes, Doxiadis also adds the qualitative ones which arise from an increase in the national income and technical-technological development, but which are not able to replace negative consequences of expected growth of overall and especially urban population. If such a future could be believed in, then it is not difficult to agree with Doxiadis that the evolution, whose contemporaries we are, leads the city and civilization to ruin. In general, social changes that will follow in the case of this scenario will be the dark side of the inability to control many processes, i.e. the city gets turned into a tyrannopolis. Solutions between pessimistic variants of uncontrollable growth and utopian concepts of returning to the idyll of the rural way of life are found in the rational decisions on the development direction in the future, as well as their human principles. Insisting on the need for preserving values of the past, the path towards survival and making new civilization and urban values is seen by Doxiadis in the radical change of the philosophy of trends and a redefinition of mankind's goals. According to Doxiadis, with the maximum of technology being in service of food production, and with good resources use, mankind shall enter a new long-term phase of urban development resulting in the general world static ecumenical city.

The depth of social changes is still something this technical, rather than social, concept of city development in the future does not grasp. Doxiadis himself is aware of it, so he says that man in ecumenopolis is "the biggest problem that people responsible for construction of the future city shall have to face" (Doksijadis, 1982: 303). In the sense of organization, there is no other option than to make the ecumenic city consist of "cells of human communities whose dimensions will be determined by man himself" (Doksijadis, 1982: 304), and which will be modified by each succeeding generation. Doxiadis closes his thought circle believing that the future of homo urbanit relies on real values of Hellenistic type, its democratic heritage and the Hellenistic ideal of man.[8]

Searching for the new concept of cities for a high technology information society means new patterns, a new paradigm recognized by Alexander in its works as well (Alexander et al., 1977; Alexander et al., 1987). There is a recognized need for new space science which shall be based on interdisciplinary scientific principles. The way to making a balance between order and chaos, simplicity and complexity is seen by Alexander in the theory of wholeness (Alexander, 2002). The logic of space reflection must be reassessed, because the city cannot be interpreted according to the principle of tree structure, as the author states in his work (Alexander, 1965: 58-61). A system is an open network, consisting of patterns containing information on the

forces that created them. In spite of criticizing conventional use of technology and "technological civilization", for Alexander, technological abstraction and software engineering have an important role in designing advanced spatial patterns, as well as interpreting concepts of physical universe "new cosmology". According to this author, a new approach to technology is needed, close to man and the complexity of urban processes, with respecting biology, aesthetics, and order. And finally, we should not neglect the "generative process" new concept developed by the author (Alexander et al., 1987), which could serve in the search for a new space science that will adequately respond to complex issues of cities and the information age civilization, as indicated by Hilier in his work (Hilier, 2008: 292-295).

Discussion and conclusion

Thanks to huge technological progress which enabled easier space mastering and its extraordinary media mobility, the urban way of life has gradually separated from all original urban frameworks, becoming available to everyone reached by global currents. Understood in such an open and independent way, it forms a new, parallel matrix which does not fully correspond to the physical character of space. Before the technological-information revolution, urban lifestyle was considered to be a direct consequence of its physical-functional framework largely defining relationships between people as well. The city as a specific human creation possesses great heterogeneity, a complex, narrowly specialized division of labour, as well as developed economy, finances and social control. City space also offers a high level of freedom of choice, and a strong, multilayered, internal and external connection increase even more the possibility of interaction and operation. Facilitated communications lead to the establishment of new and various networks over which a continuous "regrouping" of society takes place, ever more conditioned by interactions, and less by physical frameworks. Such an absolute and relative pattern of our existence allows us to simultaneously operate and participate on several different communication levels, making us citizens of the global society, ever more dominated by urban values.

New information technologies lead to possibilities for closer cooperation of cities in different parts of the world according to the principle of horizontal networking. Reaching supranational position of the city, the position achieved by the city itself and on the basis of the national state and its institutions, is an effect of the active grab in global flows circulation (capital, information, goods, people; Hočevar, 2005: 691-721). Actually, the concept of network connection opposes a potential logic of the hub (depending on the connection of resource circulation which means their dynamic diffusion), with a more dominant logic of mediocrity (based on fixed resources availability, meaning their constant concentration). Castells talks about a new spatial logic of information society, pointing to the potential of space flows and a network connection of cities, but also about further importance of the (state) policy of space, because flows have spatial materiality (directional centres; infrastructural assumptions of knowledge and information economy) located in the most developed, informational cities (Castells, 1993: 247-257).

Contrary to the wide-spread belief that means of modern telecommunication enable maximal spatial dispersion (decentralization) of economic activities, the historical role of some cities as centres of specific knowledge, information and power has been strengthened, just because the decentralization of activities enabled by well developed telecommunication system requires better central control and coordination (Sassen, 2001). The cities which can afford it, create on their own their global image hoping to attract multinational corporations and global investors. Local authorities invest significant funds in infrastructure development which would be compatible with world networks, and the airport, as a new city gate, is modernized and expanded. At the same time, a series of new zones gets formed and they should provide enough space and technological support to banking, services, entertainment and tourism all over the world.

Anyway, cities all around the world face a number of challenges, such as currently the pandemic, but also the heightened issues of cities' vulnerability, security, resilience, resistance, urban health, humanity, socio-economic inequality. Information and communication technologies and networking have been additionally strengthened in the efforts to find solutions for the 21st century cities. The paper identifies some reflections on the authors' ideas about the 20th century in the context of the impact of technology on the modern city, networking and development of digital urban society. Anyway, cities all around the world continuously search for new development concepts through the use of new information-communication technologies, at which they face many challenges in the process of sustainability and improving their own competitiveness on the global scale.

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Illustration sources

Fig. 1 Bianchini, 2016 (adapted by authors) [Accessed: 15 April 2021]
Fig. 2 https://www.yonafriedman.nl [Accessed: 15 April 2021]
Fig. 3 Banham, 1994 (adapted by authors)
Fig. 4 Pušić, 1997: 412
Fig. 5 Stupar, 2009: 171 (adapted by authors)
Fig. 6 http://www.bev.net [Accessed: 5 June 2021]

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