

INNOVATION DISTRICTS – A NEW FORM OF URBAN FUNCTIONAL AND SPATIAL ORGANIZATION

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Introduction. The level of industrial and technology arrangement is one of the most important factors in the formation of the functional and spatial organization of cities, in disposition of residential and industrial territories, the advancement of which defines the improvement of urban areas [1]. The last decades cardinal changes in the production organization, implied in the transition from Fordism - mass production to post-Fordism - innovation-based production, with the crucial importance of knowledge and intellectual abilities, cause serious changes in the organization of enterprises, regions, countries and cities. In particular, the expression of these processes in recent decades was the emergence of a new urban formations – innovation districts in structures of a number of major cities. They are important participants in improving the efficiency of modern R&D and production infrastructure forming and in prosperous development of cities. The designating of these new and promising architectural and town-planning formations is topically actual.

Existing publications survey. Despite the relatively small experience in the development of innovation districts in the world and the pioneering nature of these urban structures, there is a number of researchers who have studied the issues related to the peculiarities of their formation. American economist E. Glaeser studied the advantages of entrepreneurial clustering in urban settings, B. Katz has published a significant amount of research on innovation districts, A. Morrison viewed innovation districts as a way to activate the innovative urban ecosystem, J. Talkington explored self-identifying innovative areas. It is also necessary to note the documents of the United Nations Industrial Development Organization (UNIDO), in which innovative districts are considered as one of the means of developing a competitive economy and ensuring environmental sustainability. The development perspective of innovation district's architectural and town-planning, their impact on urban planning systems are of current scientific interest.

Aims of the study are to determine the prerequisites of innovation districts emergence, their functional content and their influence at urban structures organization.

The research methods include the analysis of scientific and literary sources, graphic materials and the systematization of data obtained.

Statement of main material. The transition to knowledge-intensive production system, caused by socio-economic changes, technological innovations, etc., led to a serious transformation in the location of manufacturing-related facilities, the spatial organization of cities. An expression of this tendency had become a general disintegration of the industrial infrastructure, the active development of small and medium-sized scientific and industrial enterprises, entrepreneurial structures. The shift to the knowledge economy is removing the barriers that once separated innovation from production—the laboratory from the factory—and is reshaping the whole organization of production [6]. Technological parks become the most important link in the chain "knowledge → industry", ensuring the transfer of theoretical knowledge to production, increasing the competitiveness of related enterprises, supporting start-up entrepreneurs and their cooperation transaction, generating a creative environment.

The world experience in the creation of technology parks shows that from the 1970s to the 1990s, local and regional governments were building them outside cities, providing comfortable conditions for creative activity in green areas, away from crowding, congestion, accidents, urban sprawl, pollution, and public fiscal costs [3, 6]. In the beginning of the 21st century, the rise of the global economy and the revolutionary nature of ICT caused innovation to flow back to urban areas [6]. A new direction in the deployment of technology parks is being developed: they are located in the city structure and form a new kind of urban areas – innovation districts (urban type of technology parks). In the knowledge - intensive paradigm, urban areas are more suitable for fostering innovations that suburban technology parks [5]. Located in a dense urban development,

often near city centers, they provide competitive advantages to participants due to their high concentration, close interaction and convenient location in the city. Katz and Wagner defined innovation districts as geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators. They are also physically compact, transit-accessible, and technically-wired and offer mixed-use housing, office, and retail [8]. The basis of business activity of innovation districts are small companies and organizations of various types - business, research, manufacturing etc.

The first innovation district was created in Barcelona in 2000 and named "22 @ Barcelona", later this pattern being replicated in different countries - Silicon Alley (Manhattan, NY), Cyber district (Boston) and Silicon Sentier (Paris). Its varieties are the scientific and technological center of Zhongguancun in Beijing, one-north in Singapore, the multifunctional business districts Kowloon in Hong Kong (Fig. 1). The creation of innovation districts is typical for large cities of economically developed countries, that provide the necessary level of innovative and socio-cultural environment. The innovation districts creation initiative inheres to the city administrations with main aim to facilitate the rise of new productive activities through spinoffs, new ventures, and entrepreneurships, that would sustain the city's competitiveness in the long run [5]. The prime tasks wherein are the development or reconstruction of inefficient urban areas, attraction and cultivation of talented specialists and innovative companies, the formation or support of an innovation center.



Fig. 1 Innovation districts in urban structures: a. - 22 @ Barcelona in Spain; b. - Kowloon multifunctional district in Hong Kong

Innovation districts can be purposefully created by city administrations on the sites of old industrial areas (Barcelona, Boston), of low-value residential development (Beijing, Hong Kong) or on available free territories (Singapore) and can have certain territorial boundaries. Also they may arise spontaneously without exactly defined spatial boundaries in the structure of the existing plots and building as a result of the gravity of start-ups to each other (Manhattan, NY). All of them are formed by multi-story and high-rise buildings with horizontal and vertical integration of functions. Complexes of innovation districts are designed primarily for innovation and for support of start-ups in high-tech industries. At the same time here may dispose the industries, not associated with high technology activities – preserved existing large and small shipbuilding enterprises, food and other industries (Boston). A variety of small industrial enterprises are in the structure of high-rise multifunctional buildings in Hong Kong, etc. [2].

22 @ Barcelona is a sample of an innovation district, organized on the site of old industrial area Poble Nou, abandoned by many enterprises in 1970-1980. The aim was to make at these territories the center of knowledge and innovation of Barcelona. Currently, universities, scientific research and training centers, start-ups and incubators, advanced technology companies are located here. More than 3500 companies have moved to the district since 2000. Five "clusters of knowledge" are active in its structure: information and computer technologies (ICT), biomedicine, design, energy and the media [7]. 80% of all areas in 22@ are occupied by business spaces and 20% - by housing and service facilities [5]. One of the concept objectives is to organize the most attractive urban environment, that will appreciate creative professionals.

The cluster effect is a result of the spatial proximity of companies in different industries and their joint activities stimulate creativity and innovations, improve efficiency through formal and informal channels. Sometimes just informal contacts emerge the most original and powerful ideas. Business meetings in informal spaces, weekends for start-ups, business events, cafes for meetings of venture entrepreneurs and start-ups, occasional meetings with ideas exchange are some of the reasons, why young creative professionals prefer to live and work in urban centers. That's why, twenty-two-hour quarters with city comfortable facilities, valuable for the creative class, are created in 22@, where that specialists can live, work and play in the district. Urban amenities include nightclubs, restaurants, cafes, "third places", green areas, pedestrian areas, spaces for cultural events and museums.

The important elements of such creative and innovative environment are the increasingly widespread co-working spaces for the joint work of specialists in various activities and different industries, for communication and creative interaction. The new economy, based on networking and flexibility, blurs the boundaries between work and personal life [4]. The convergence and integration of work and living places promote the refusal of use the car and the transition to cycling and walking, the use of public transport, that are promising ecological and social trends in urban planning, that optimizes urban structures in general.

Conclusions. The upgrowth of modern high-tech industries, the active spreading of information and communication technologies emerges a new town-planning formations - innovation districts and significantly affects the cities arrangement. The return of innovations to urban areas renews the importance of large cities as places for scientific and production activities, increases their competitiveness. Innovation districts transform the existing typological division of urban areas on residential, industrial and landscape-recreational by terms of their functional purpose, and the emerges the new type of areas - "mixed-used districts". The maximum degree of integration and spatial localization of various city functions, the convergence of places of work and residence are the reflections of the strategic processes of disintegration in science and production, the transition from large enterprises to small and medium-sized enterprises.

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