

# **Architectural and City-Planning Aspects of Innovation Hubs Formation in the Context of Creative Urban Regeneration (On the Case of Ukrainian Cities)**

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# Architectural and City-Planning Aspects of Innovation Hubs Formation in the Context of Creative Urban Regeneration (On the Case of Ukrainian Cities)

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**Abstract.** Cities have become the key arenas of territorial competitiveness in the context of creative economy development and continuous innovation processes in all the spheres of social life. Functioning as a community of knowledge, innovation, creativity and learning, modern cities are becoming more dynamic, complex, diverse and open. In this context, new urban strategies and trends need to be taken into account. The concepts of "innovation hub" and "creative city" as a result of the process of creative urban regeneration are covered in the paper. The article states that innovative creative spaces provide unique opportunities to accelerate the generation and diffusion of innovation, especially through effective communication channels and a positive innovation ecosystem. The article covers the topic of architectural and functional aspects and design tendencies of innovative hubs in the structure of a creative city. The research material includes the architectural analysis of existing innovation hubs in Ukraine.

## 1. Introduction

In the face of globalization challenges, technological boom and the rise of creative economy and innovation, the competition increases not only at the international but also at the regional level [1]. Recent studies in the field of regionalism show that the region's competitiveness is based on its innovative ecosystem, integrating scientific, technological, investment and human potential on the basis of the network organization of innovation activities [1-7].

Today the dominant factors in the development of a modern post-industrial economy are human capital, knowledge, creative potential and the ability to generate ideas, and this has accordingly led to the transition of the global economic system to innovative tracks of economic development [8].

Therefore, the competitive development of countries at the present stage is based on the consolidation of innovative achievements, creative and intellectual potential and the formation of a number of strategic directions for the effective and rational use of this potential and the formation of creative urban centers (innovative hubs), which are the key elements of creative cities.

The American scientist Charles Landry, who is considered to be the author of the "creative city" concept, describes new urban planning strategies of transforming a city into a creative space. According to his theory, a creative city is a nucleus where "different types of cultural activity become an integral part of the economic and social life of the city, and include intellectual capital" [3]. Creativity is the key factor that enables modern city to respond to contemporary challenges and provide technological



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innovation. This will become more essential as we respond to the opportunities and challenges of Industry 4.0.[4].

Cities are becoming the nucleus of communication, creative collaboration, spaces for learning and creative expression despite the growth of virtual communication. The trend of dynamic growth in the number of innovative spaces and the creation of a network of "creative cities" worldwide confirms this development. However, the lack of theoretical basis and academic research on the impact of innovation and creative economy on the architectural and urban solutions of such spaces, as well as the lack of coverage of the phenomenon of the creative city and its importance for regional development in the case of Ukraine determine the relevance of the study.

As the global economy places the greater value on innovation, the essential role and value of innovation creative spaces will equally rise, becoming "a locus of experimentation in design and architecture" [9].

Thus, the purpose of the research is to outline the concept of a creative innovation hub and creative city, as well as to reveal the architectural and urban features of their formation.

To achieve this goal, the following tasks are formulated:

- to reveal the role and importance of creative industries in the territorial and socio-economic development of cities;
- to formulate a conceptual apparatus that defines the main terms of the study - creative city, innovative hub, creative cluster;
- to identify the architectural and urban planning features of the formation and functioning of innovative spaces in modern conditions of urban and regional development on the basis of analysis of global and Ukrainian experience;

The theoretical significance of this study is to develop strategic directions for the effective use of the region's creative potential and the organization of urban space by creating innovative creative spaces and further shaping creative cities.

## **2. Creative Economy as a prerequisite for the creative cities' emergence**

### *2.1. Theoretical Discourses*

The national and regional level of innovative development and creative urban regeneration has attracted a lot of attention of foreign and Ukrainian scientists in recent decades. The theoretical basis of the research is formed on the basis of the theory of creative economy of J. Howkins [5], the theory of creative class of R. Florida [6] and the concept of creative city of Ch. Landry [3]. Based on the theories of these three authors, the urban creative economy can be described as a system consisting of three elements: the creative city, the creative class and the creative industries.

The creative economy aims to create an attractive investment climate, increase the region's competitiveness, promote the development of the social sphere, modernize the education sector etc. [1]. Within the creative economy, new economic models, new types of social relations and new cultural paradigms are emerging, as well as a new value, communication and instrumental sphere, in which consumption of goods and services fades into the background and the provision of opportunities for the creative expression and self-realization of each person comes first. The creative economy influences the image of cities and stimulates the urban community to a new, better life, to the interpenetration of different spheres of thinking and employment. Thus, cities become an immense space for communication, generating new ideas and economic growth [10].

A number of scientists from different fields such as S. Davymuka and L. Fedulova [1], A. Hautamäki [7], A. Scott [11] affirm that creativity and innovation, the generation of new knowledge are now the only ways to improve the competitiveness of each country and its regions.

Theoretical and practical issues of the development of creative economy in Ukraine, the concept of creativity in the context of territorial and socio-economic development of cities, as well as the parameters of creativity of territories and the possibilities of its assessment are covered in the works of Ukrainian scientists S. Davymuka and L. Fedulova [1], Y. Ushkarenko, A. Chmut, and K. Syniakova [2], I. Skavronskaya [12]. Challenges and prospects for the development of creative industries in Ukraine as well as an analysis of successful creative hubs were described in the research project conducted by C. Farinha [13].

However, the study of regional creativity, and in particular its architectural and urban planning aspects, cannot be considered complete because of the short study period and the pace of economic trends. In particular, it is rightly emphasized that the influence of individual factors on the formation of a creative environment in the region and the favorable conditions for the development of a creative economy may complicate the development of a regional policy of creative economy development [1]. Therefore, there is a need to investigate the relationship between innovative development and the creation of a creative environment in ensuring the socio-economic development of regions and updating their strategic orientations. In particular, there is a lack of theoretical base and academic research on the impact of innovation and creative economy on the design and architectural-urban solutions of innovative hubs. This is exacerbated by the lack of coverage of the phenomenon of the creative city, its importance for regional territorial and economic development and the possibility of its implementation in the conditions of Ukraine which determines the relevance of the study.

## 2.2. The concept of “Creative City”

Today, more and more European cities embrace a number of creative strategic approaches for economic development. This is confirmed by the trend of dynamic growth in the number of innovative spaces and the creation of a network of "creative cities" worldwide.

Bradford's paper 'Creative cities structured policy dialogue backgrounder' defines the key features distinguishing the creative city: “Creative cities are dynamic locales of experimentation and innovation, where new ideas flourish and people from all walks of life come together to make their communities better places to live, work, and play” [14]. The author finds that creative cities make a significant contribution to meeting national and regional policy goals of environmental sustainability, economic innovation and social inclusion. This gains additional relevance in current engagement with the Sustainable Development Goals [15].

Charles Landry [3] describes a new method of strategic urban planning in order to attract human creativity, imagination, talents and transform the city into an innovative creative environment. He defines creativity as the key enabler for a modern city to respond to contemporary challenges, provide technological innovation and rediscover its cultural heritage. A creative city is a place where "various cultural activities become an integral part of the economic and social life of the city and include intellectual capital in relation to products, processes and services" [3].

In the “Creative City” study the author defines the concept of urban circulation as a theoretical concept and a dynamic tool aimed at creating renewable urban energy that can govern the city. According to the researcher, creative urban spaces, wherein ideas are exchanged, generated and communicated, as well as the favourable atmosphere that promotes openness to new ideas are some of the factors that should be taken into account when identifying the creative potential of the city [3]. This creates a clear demand of urban design.

According to J. Verwijnen [16], "the notion of a creative city draws our attention to the fact that, beyond the traditional forms of urban renewal and regeneration, cities show a growing interest in creating centers that are saturated with an atmosphere of innovation and creativity" [16, 17].

Formation of creative cities is also a priority of the Government of Ukraine in “Strategy 2030”. Namely, it is planned to realize positive dynamics in the formation of human capital, economic development and improvement of the quality of the urban environment through the development of the creative cluster [18, 24]. However, the Ukrainian experience of spatial-economic and urban development of most cities is characterized by imbalance, narrow profile orientation and the development of traditional industries. A promising way out of this state of affairs is to encourage and develop creative industries that have been recognized in foreign practice *for decades* as a powerful driving force for national and regional economic development and an effective tool for solving a number of key territorial and economic challenges within regional development. This position, along with the emergence of new forms of innovative creative spaces, namely innovation hubs, raises the question of exploring them in the context of architecture and urban planning – how and where they are most often formed, how they interact with existing buildings and environmental functions and what are their architectural peculiarities.

### **3. Innovation hubs as the key elements of a creative city's ecosystem.**

#### *3.1. Creative environment - the key component of the innovative ecosystem. Innovation hub concept*

The essential condition for creating a creative city is proper infrastructure whether intuitive and organic or structured and planned. One of the key tools for the realization of the concept of a creative city is the formation of creative clusters and innovative creative spaces. These are new structures represented in their wide typology - creative hubs, coworkings, fab-laboratories, business incubators, accelerators, which in their totality form a positive ecosystem for the development of innovation.

Creativity is an important characteristic of an environment conducive to innovation: the use of non-standard approaches to eliminating difficulties leads to the emergence of innovative results (qualitatively new technologies, products, etc.). S. Davymuka and L. Fedulova [1] note that creative activity acquires the characteristics of a self-developing process and initiates economic development, thus leading to the formation of innovative ecosystems. Generating and attracting creative ideas is the first prerequisite for a successful ecosystem to function: the existence of communities that create ideas and have the opportunity to come together and discuss them on an appropriate physical or virtual organizational platform, where the boundaries between the physical, digital, economic, social and cultural space blur [17]. Therefore, the need to provide a creative environment characterized by the presence of conditions that stimulate creative people to seek new, non-standard, more effective solutions to problems, and to implement measures that contribute to achieving their goals through rapid and successful adaptation to changing reality is becoming increasingly urgent.

Innovation hubs, being important centers of integration of education and art, research and business, generate a wide range of positive effects on the city's economy, its attractiveness and image, the creation of new products and innovative services, the support of talents and startups, fostering networks at regional and international levels and the provision of high-level educational opportunities which in general leads to the better quality of life. An inherent feature of innovation hubs is their multifunctionality and multidisciplinary, which are supported by the lack of boundaries between social, economic, physical, digital and cultural space. In many cases, these spaces bring together creative class members, entrepreneurs and companies in one building, creating mixed spaces that lead to natural collisions and the sharing of ideas that foster innovation [6]. The main idea behind innovation hubs is to use technology, arts and science as the driving force for the revival and redevelopment of the city.

These are places where people can improve, learn and express themselves. But, of course, the greatest effect can be achieved when all these features are harmoniously combined physically and virtually through design and architecture. Therefore, the architectural analysis of the concept of innovation hub in the context of creative city regeneration requires careful research.

#### *3.2. The architectural and design features of innovation hubs*

Different aspects of the influence of architectural organization of innovation hubs on the enhancement of creativity, innovations and overall development of creative economy are explored by I. Cunha and C. Selada [17], M. Osborne, [19], M. Meinel [20], A. Savanovic and M. Orel [19], B. Moriset [22], J. Matheson and G. Easson [23], K. Holubchak [24], V. Mulas [25], L. Narum [18].

The first recorded hub was founded in 2005 on the basis of an old warehouse in London, as a cross between a professional membership community, a learning lab and a business incubator [27]. The concept of the hub was architecturally designed with the aim to provide a collaborative space where people could meet, work and learn within a modular and flexible structure. The planning structure included a semi-open meeting room, co-working space with transformable leaf-shaped tables, kitchen and library [27].

Innovation hubs are rapidly becoming a worldwide phenomenon. In the last ten years, thousands of innovative spaces where people can design, test, scale and launch enterprising new ideas have popped up around the world. Nowadays, innovation hubs throughout the world designed to facilitate and foster collaboration are becoming powerful support environments for creative individuals who are creating collaborative communities and interconnected networks [21].

Positive developments in this area have also been felt in Ukrainian practice in recent years. Currently, there is a successful network of creative spaces on the territory of Ukraine, which are represented in



their wide typology - from small coworking's and business incubators to huge creative centres. In a short span of time, they have gained popularity and have been fully implemented in urban life, and their numbers are steadily increasing. There are many successful examples of projects implemented in Ukraine, including: UNIT city (Kyiv), Creative Quarter (Lviv), Art Factory (Lviv), Innovation Center "Promprylad. Renovation" (Ivano-Frankivsk), Platforma Art Zavod (Kyiv), iHUB, the network of centres of innovation and entrepreneurship in the IT sphere (all over Ukraine) [13].

One of the most impressive in scale is UNIT City - the first innovation park in Ukraine (Figure 1) - a unique platform for business, education, cutting-edge technologies and creative economy development. The project is sponsored by Ukrainian architectural company TSEH, architectural firm MONO Architects and other architectural teams that have worked on individual objects, landscaping and interior design. Construction on 25 hectares of territory of the former motorcycle factory in Kyiv started in 2016 and now the business campuses, coworking, IT-school, a number of creative spaces for various events, cafes and gyms and a wide spectrum of entertainment facilities are functioning successfully, producing a wide range of economic and social values [28].



**Figure 1.** UNIT city innovation park project [28].

The project envisages the formation of a so-called “city in a city” – a full-fledged infrastructure for various purposes: innovative educational institutions, housing, offices, IT centres and accelerators, VR and AR laboratories, the medical centre, the kindergarten, production workshops and laboratories. The total area of UNIT City will reach the final stage of about 860,000 m<sup>2</sup> and it will become one of the largest in Europe, intended to integrate into the international innovation ecosystem [28]. All the buildings will be LEED-certified, which will confirm the environmental friendliness and energy efficiency of the innovation centre by one key criterion.

Innovation Hubs should be shaped by “the needs of local creative economy and are inserted in particular cultural context, supporting local creative industries and promoting their own values” [29].

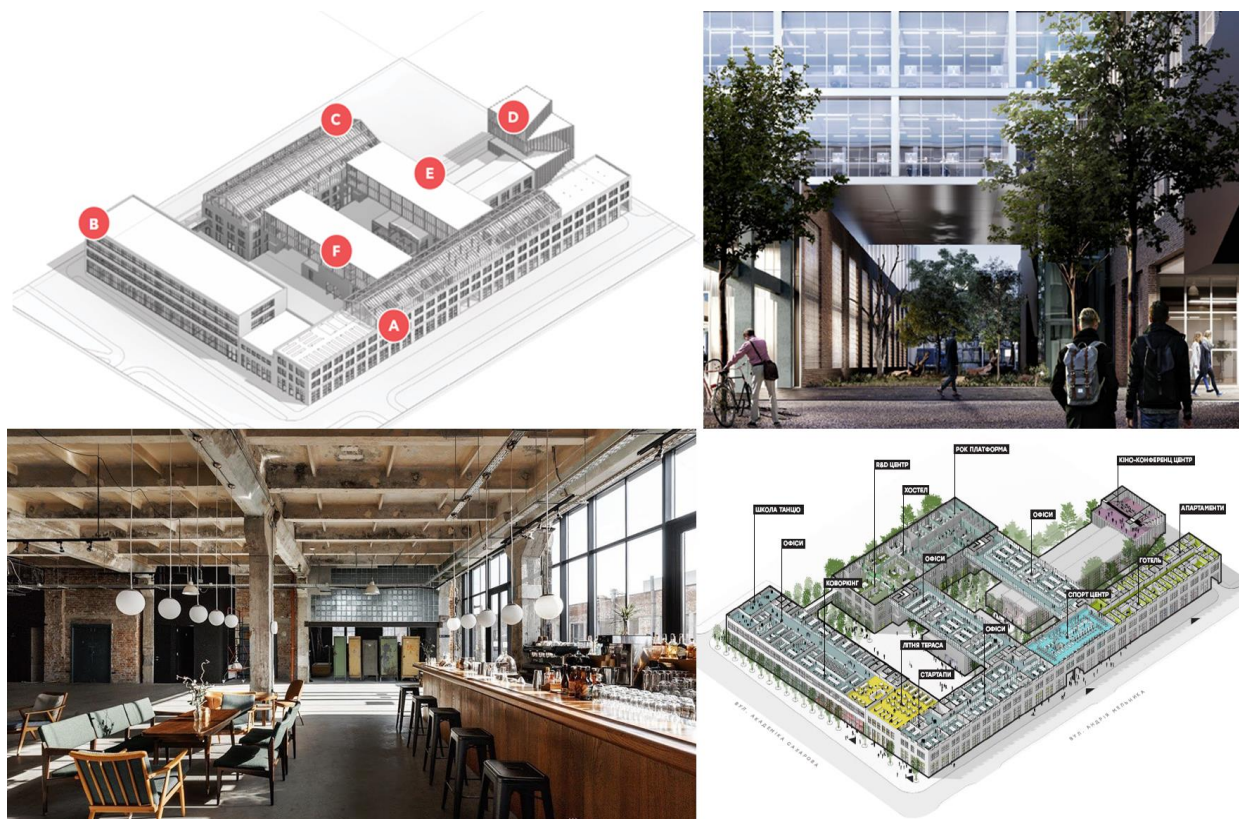
In many cases, innovation hubs locate their functions inside abandoned buildings and former industrial sites, gradually renovating them. In this way these forgotten territories are inhabited and brought back to life making a huge contribution to urban development and renovation [13].

For example, the innovative centre "Promprylad. Renovation" in Ivano-Frankivsk (Ukraine) [30], formed on the basis of the former industrial manufacturing plant, is a connecting link between business and startups and makes an important contribution to the local economy by offering a platform for generating and testing new ideas leading to innovation, gradual job creation and urban regeneration (Figure 2).

The activity of the “Promprylad. Renovation” center focuses on the intersection of four areas of innovative development - informal education, contemporary art, urban planning and the new economy [30]. The building is currently undergoing revitalization and only the restored third "pilot" floor of the plant is fully opened, and has already confirmed the efficiency and the invaluable potential of the project. There is a wide range of amenities for the city's residents - educational and children's attractions, a conference room, coworking area, the workshop space, art gallery, offices of innovative enterprises and

even the city's investment policy department. The Promprylad “city” is gradually becoming a hotbed of communication, creative collaboration, a space for learning and creative expression.

This project is a clear testament to how innovative centers and creative spaces are able to give new breath to undeveloped urban areas, industrial spaces and abandoned buildings. Therefore, this positive experience can become a successful model for implementation in other territories of Ukraine with unfavourable starting conditions, including those amongst industrial dereliction and outside the biggest Ukraine cities.



**Figure 2.** The innovative centre "Promprylad. Renovation" in Ivano-Frankivsk (Ukraine) [30].

The ideal architectural organization of a modern innovation hub from a social value perspective [31] aims to provide the community with a multifunctional collaborative environment with basic amenities such as open learning space, conference rooms and private offices workstations, lounge areas alongside self-service bars and a wide range of art and culture facilities such as exhibition halls and galleries or entertainment events' spaces [32]. Therefore, innovation hubs are perceived not only as interactive spaces, but more as "hybridized work and habitation ecosystems of inventive and productive communities" [21].

The analysis allows us to formulate the main trends of architectural and planning organization of innovative spaces:

- *Multifunctionality.*

The emergence of new forms of leisure, the need for communication, creative realization and the new demands of modern society require innovation hubs to be more diverse in their functional structure and list of premises. In addition to traditional planning elements, the planning solution of a modern innovation hub should include: lecture and multimedia classrooms, state-of-the-art technology rooms (AR and VR), children's rooms, creative studios and workshops, exhibition halls, coworkings, recreational greenhouses and atriums. Empowering the hub with new types of functional processes and activities will ensure the creation of a new image of the building as a socially important cultural center.

- *Flexibility and mobility of the functional structure.*



Flexible planning is an integral feature of the innovation hub, as it maximizes functional and psychological openness that promotes communication and interaction, allows users to easily adapt and navigate the services offered, freely choose the type of activity and be able to design the space around themselves.

In this case, the zoning of the space is not made by walls, but by visual distinction using color, floor level, ramps, lighting, furniture and transformed wall structures. Transformation of space and adaptation to specific activity is achieved due to modular equipment and furnishings, which are transformed into small areas for individual work or enlarged cells for co-working and group work according to the requirements of its users.

The planning solution should provide opportunities for adaptation to the dynamics of social processes, new trends and functions.

– *Creativity enhancing interior design*

Innovative creative spaces are aimed to foster idea generation, facilitate inspiration, skills' development, innovative thinking and communication. This is achieved by increasing the proportion of communicative space and space for creative realization, by filling the space with inspirational virtual and physical elements, like white boards for sketches, ideation cubes and others. The emergence of the latest design and digital technologies has greatly expanded the design space of architecture. The spatial structure of modern innovation hubs cannot be formed by physical material only, but it must incorporate a wide range of digital and light components, as well as new structural elements [24].

– *Inclusiveness and openness for everyone.*

The architectural planning of an innovation hub should ensure its accessibility and convenience for all age and social groups (children and pensioners, youth and disabled people), as well as for each individual user with their own needs and motivation, thus reducing social exclusion and preventing segregation [33]. Many of the innovation hubs are designed for the non-existent "average" user. However, it is important to take into account the needs of a wide range of users, the model and the specifics of their behaviour, thereby ensuring the high social performance of the building.

To solve this problem, local sociological surveys should be conducted and profiles of potential users and scenarios of their activity should be formed on the basis of them, alongside adopting key principles of accessible design.

– *Technology and interactivity.*

Technological innovations that permeate both the physical and virtual components of such hubs provide visitors with a wide range of opportunities for incubation of ideas, communication, learning, and information exchange [19]. The optimum functioning of an innovation hub is impossible without incorporating the innovative virtual, digital and information technologies and recent developments in the field of searching, storing and broadcasting information, multimedia stands, communication facilities and other high-tech equipment in its structure. The modern user requires a full range of the latest technological developments for a comfortable stay and full implementation of all requests, said developments being embedded in the structural elements of the building, furniture and the entire space of the hub.

– *The architectural expressiveness and aesthetics of the innovative space*

This feature implies the building's ability to meet the requirements of time and to reflect the aesthetic ideals of a society. World examples show original facade interpretations, the use of the latest structural technologies and building materials. The emotional and psychological expressiveness of innovation hubs becomes an instrument of its actualization and popularization among the population.

Facade and interior design should reflect the specifics and spirit of the place, and the building as a whole should position itself as an integral part of this place.

#### 4. Conclusions

Creative cities and innovation centres that have been dynamically emerging throughout the country over the last few decades are called to underpin urban regeneration strategies in modern conditions, and are able to generate a wide range of positive effects, such as:

- significant economic growth and cultural development of the population;
- talent support and new jobs creation in the sphere of creative industries;

- production of innovative products and educational services;
- creative urban regeneration and branding of the city;
- promotion of Ukraine in the international arena.
- increase of investments and tourist attractiveness;
- development of continuous innovation.

However, it is important to place high demands on the architectural organization of innovation hubs in order to fully realize aforementioned positive effects. The article outlines the main trends that should be taken into account when designing an innovation hub, but it should be understood that there is no standard recipe on how to design the innovation hub correctly. The architectural organization of each individual project requires careful research and consideration of the cultural, economic, demographic characteristics of the local context. The architect needs to understand feelings, dreams, challenges of the communities this space is designed for. Thus, the architectural environment of the modern innovation space is a subject-space framework designed and co-designed to facilitate the implementation of a wide range of processes and activities: science and creativity, information exchange, communication, leisure, saturated with the processes of interpersonal communication.

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