

THE MAIN TRENDS AND DIRECTIONS OF THE SUSTAINABLE DEVELOPMENT AND REGENERATION OF THE HISTORICAL ENVIRONMENT

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ABSTRACT

Objective: The purpose of this study is an attempt to reveal and analyze the modern trends and directions of the sustainable development and regeneration of the historical environment from the point of view of the harmonious combination of new and historical architecture and to define some methodological principles of its design at the different hierarchical levels.

Theoretical Framework: The study is grounded in a thorough literature review that examines existing research and is based on international scientific publications, reports, scientific papers. Diverse practical materials in the area under study were used as well as own experience in designing urban complexes and buildings in the historical environment.

Methods: This study is based on a set of scientific research methods, using an extensive review of literature, Internet resources, and the views of stakeholders. Preference was given to methods such as comparative analysis, synthesis, generalization, complex and systemic approaches.

Results: Research identifies key areas of the development and regeneration of the complexes and buildings in the historical environment, which can be divided into several directions. The features, conditions, and directions of such implementations on various examples are examined in this study. Some methodological principles of designing in historical areas at different hierarchical levels are considered.

Research Implications: Implications of the study: The results and recommendations of this study will be useful for contemporary design practice, may increase awareness of project management in the field of architecture and urban planning, and help to manage practice in this field more effectively.

Keywords: historical environment, development and regeneration, social sustainability, modern trends, directions.

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PRINCIPAIS TENDÊNCIAS E DIREÇÕES DO DESENVOLVIMENTO SUSTENTÁVEL E REGENERAÇÃO DO AMBIENTE HISTÓRICO

RESUMO

Objetivo: O propósito deste estudo é uma tentativa de revelar e analisar as tendências e direções modernas do desenvolvimento sustentável e regeneração do ambiente histórico do ponto de vista da combinação harmoniosa de arquitetura nova e histórica e definir alguns princípios metodológicos de seu design nos diferentes níveis hierárquicos.

Estrutura teórica: O estudo é baseado em uma revisão bibliográfica completa que examina pesquisas existentes e com base em publicações científicas internacionais, relatórios, artigos científicos. Diversos materiais práticos na área em estudo foram usados, bem como experiência própria em projetar complexos urbanos e edifícios no ambiente histórico.

Métodos: Este estudo é baseado em um conjunto de métodos de pesquisa científica, usando uma extensa revisão de literatura, recursos da Internet e as opiniões das partes interessadas. Foi dada preferência a métodos como análise comparativa, síntese, generalização, abordagem complexa e sistêmica.

Resultados: A pesquisa identifica áreas-chave do desenvolvimento e regeneração dos complexos e edifícios no ambiente histórico, que podem ser divididos em várias direções. As características, condições e direções de tais implementações em vários exemplos são examinadas neste estudo. Alguns princípios metodológicos de design em áreas históricas nos diferentes níveis hierárquicos são considerados.

Implicações da pesquisa: Implicações do estudo: Os resultados e recomendações deste estudo serão úteis para a prática de design contemporâneo, podem aumentar a conscientização sobre gerenciamento de projetos no campo da arquitetura e planejamento urbano e ajudar a gerenciar a prática neste campo de forma mais eficaz.

Palavras-chave: ambiente histórico, desenvolvimento e regeneração, sustentabilidade social, tendências modernas, direções.

LAS PRINCIPALES TENDENCIAS Y ORIENTACIONES DEL DESARROLLO SOSTENIBLE Y LA REGENERACIÓN DEL ENTORNO HISTÓRICO

RESUMEN

Objetivo: El objetivo de este estudio es intentar revelar y analizar las tendencias y direcciones modernas del desarrollo sostenible y la regeneración del entorno histórico desde el punto de vista de la combinación armoniosa de la arquitectura nueva e histórica y definir algunos principios metodológicos de su diseño en los diferentes niveles jerárquicos.

Marco teórico: El estudio se basa en una revisión exhaustiva de la literatura que examina la investigación existente y se basa en publicaciones científicas internacionales, informes y artículos científicos. Se utilizaron diversos materiales prácticos en el área de estudio, así como la propia experiencia en el diseño de complejos urbanos y edificios en el entorno histórico.



Métodos: Este estudio se basa en un conjunto de métodos de investigación científica, utilizando una revisión extensa de la literatura, los recursos de Internet y las opiniones de las partes interesadas. Se dio preferencia a métodos como el análisis comparativo, la síntesis, la generalización, el enfoque complejo y sistémico.

Resultados: La investigación identifica áreas clave del desarrollo y la regeneración de los complejos y edificios en el entorno histórico, que se pueden dividir en varias direcciones. En este estudio se examinan las características, las condiciones y las direcciones de tales implementaciones en varios ejemplos. Se consideran algunos principios metodológicos del diseño en áreas históricas en los diferentes niveles jerárquicos.

Implicaciones de la investigación: Implicaciones del estudio: Los resultados y recomendaciones de este estudio serán útiles para la práctica del diseño contemporáneo, pueden aumentar la conciencia de la gestión de proyectos en el campo de la arquitectura y la planificación urbana, y ayudar a gestionar la práctica en este campo de manera más efectiva.

Palabras clave: entorno histórico, desarrollo y regeneración, sostenibilidad social, tendencias modernas, direcciones.

1 INTRODUCTION

In the terms of UNESCO there is the concept of "living cities". Along with protection and preservation of cultural heritage, historical areas and urban centers should live and develop in time. History and modernity not only can, but also should coexist (Butlin, 1987). The revival of cities and the development of their historical environment is one of the key areas of urban planning policy around the world. The most outstanding urban ensembles of historical environment and public spaces were those that developed over time.

The phenomenon of urbanization included the quality of the adaptation process by becoming a concept about the emotions, thoughts and behaviors of individuals trying to live in the city completely from the physical definition of urbanization. The concept of 'sustainable city' has emerged as a new urban design model due to the increasing pressure on the rapidly growing city horizontally and vertically with the increasing population and technological developments. In cities designed with this perspective; both spatial sustainability, which minimizes negative impacts on nature and transfers natural resources to future generations, as well as many spatial planes that diversify the daily social life of the city's inhabitants and support social sustainability (Akyildiz, 2020). And social sustainability (an area of research which has, until now, been comparatively neglected) ensures the creation of sustainable successful places and the harmonious development of space for people and the architectural environment to support social and



cultural life. Thus, Colantonio and Dixon (2010) analyze its meaning and examine the extent to which social sustainability is incorporated within urban regeneration projects, but also investigate how local authorities, developers, investors, and other key stakeholders approach sustainability.

Intervention in the historically established architectural environment is associated with the need to update or replace buildings that are subject to moral and physical deterioration. Also, the need for the reconstruction of the building and the construction of new parts of it may be due to the re-profiling of the building or the expansion of its areas for new functions. The protection of the architectural historical environment as part of the cultural heritage acts in these conditions as an urgent issue of our time, requiring deliberate decisions. The main task of preserving the architectural historical environment is the transmission to subsequent generations of information about the history of their homeland through the reflection of historical eras in architectural objects. Modern city planners are faced with the difficult task of preserving the architecture of past eras for future generations and supplementing it with new objects, without destroying the integrity and originality of the existing historical environment. Designing a new architecture in a harmonious combination with the existing architecture is not possible without some theoretical basis, certain principles, knowledge of which will allow you to avoid many mistakes (Pronina, 2021). Currently, there are different concepts and approaches and, accordingly, scientific research and publications to the development, renovation and regeneration of public spaces of the existing historical environment (Abyzov, 2004; Abyzov, 2023; Akyildiz, 2020; Kirichkov, 2017; Leshchenko, 2018; Stanley et al., 2012; Wojnarowska, 2017; Zagroba et al., 2020). They highlight various aspects of this complex problem. Publication (Abyzov, 2023) summarizes ways of recreation of cultural heritage in historical environment. Research (Akyildiz, 2020) examines the sustainable urban design of public spaces. The city's history, culture, silhouette, local economic activity, social interaction, and its contribution to the city's development are described and discussed. In the study (Stanley et al., 2012) explores examines a transdisciplinary typology of urban open spaces in historical perspective. The studies (Wojnarowska, 2017; Zagroba et al., 2020) focuses on the analysis of regeneration projects of selected Market Squares in historical cities and urban centers of Poland. The authors of the book (Colantonio & Dixon, 2010) offer a comprehensive European perspective to identify best practice in sustainable urban regeneration in five major cities in Spain, Italy, Netherlands,



Germany, and the UK.

The practice of regeneration of historical cities has evolved over time and now involves a range of approaches and methods to preserve cultural heritage while promoting sustainable development. Today, the regeneration of historical cities involves a range of approaches, including adaptive reuse of historic buildings, sustainable tourism development, and community-led initiatives. Researches (Moazzeni Khorasgani & Haghghatbin, 2023; Moazzeni Khorasgani & Asadi Eskandar, 2024) explore the evolution towards a landscape approach in regenerating historic cities. The analysis focuses on understanding the evolution of the landscape approach, identifying regenerating opportunities, and lessons learned from the case studies. The paper concludes that the evolution of historical city regeneration reflects a growing recognition of balancing economic development with preserving cultural heritage and the need for community involvement and participatory planning in the regeneration process.

At the same time, it is extremely important to conduct a comprehensive analysis of the development practice of the historical environment, taking into account all its nuances, in order to fit the new building into it organically and harmoniously, taking into account the preservation of the spatial integrity of the existing environment.

Some studies consider various aspects and methods of such an approach, in particular method of contrast of modern architecture in the historical environment of the city (Kirichkov, 2017; Leshchenko, 2018; Pronina, 2021). The most complete and delicate is the contextual approach, which allows to provide a comprehensive analysis of the existing urban environment, considering all its nuances in order to organically fit a new building into it.

It's not just about the existing architecture and urban planning situation, and as well as about the factors under the influence of which they were formed throughout the history of the city, and how these or some other factors affect the modern architectural and urban planning situation in the city. Therefore, the main task of this approach is to consider as much as feasibly the possible ways and sequence of implementation, all the existing features of the environment, which will allow integrating the new building into it as harmoniously as possible (Abyzov, 2004; Leshchenko, 2018).

In the modern conditions of the development of historical city centers, it is important not only to preserve and use the existing buildings, adapting it to the needs of residents and tourists, but also to ensure its harmonious combination with the features of



modern architecture. For this, it is important to identify modern trends and directions for the development of public spaces of historical cities, as well as the principles of a harmonious combination of new and historical architecture, which will ultimately contribute to their social and cultural sustainability.

2 RESULTS AND DISCUSSIONS

Based on the analysis of the existing practice of development and regeneration of historical city centers, as well as the study of scientific publications on this topic, the key areas of the development and regeneration of the architectural environment of historical cities can be divided into the following areas:

- imitation of historical buildings;
- stylization for the existing historical environment;
- disregard and/or significant transformation as opposed to the existing environment;
- creation and organization of a modern and at the same time contextual environment for historical heritage (innovative solutions that correspond to the existing building);
- partial or complete concealment of new buildings in the historical environment.

The first area is a complete *imitation of historical buildings*, when the architect's imagination is completely subordinate to the existing historical environment, and a solution appears that does not argue with the environment either in height or in style. This is a painless path (Fig. 1). In this case there is no doubt about the scale of development and the structure of the facades. Everything seems to be fine, but only a complete repetition of what happened. Such decisions are most justified during the restoration of architectural monuments, including an extension of the building (Fig. 2).



Figure 1

Imitation of historical buildings and shapes. New buildings in the historical center of Kyiv.



Source: Adapted from "Kyiv History Museum: Where It Is Located and Why It Is Worth Visiting." (2023, September 15). Rupor. <https://rupor.com.ua/news/muzey-ystoryy-kyeva-hde-nakhodytsia-y-pochemu-ehostoyt-posetyt-foto/>

Figure 2

Restoration with extension of the building. A detailed rendering of the expansions multiple facets of the New-York Historical Society.



Source: Adapted from Public Building in Historic Center. (2017). Behance. <https://www.behance.net/gallery/59268975/public-building-in-istoric-center>

In this regard, the direction of *stylization for the existing historical environment* seems more appropriate. The solution of a modern and harmonious addition to the public existing space is aimed at ensuring the sustainable development of the historical urban environment. The new, attached building takes on new forms, but is subordinated to

historical buildings (Fig. 3).

Figure 3

Stylization for the existing historical environment.

a) Vienna.

b) London.



Source: Adapted from "Zhdanie na Sagaydachnogo." (2020, September 21). Focus. https://focus.ua/culture/460950-zdanie_na_sagaydachnogo

The new buildings should be regulated and subordinated to historical buildings by composition, scale, number of stories, forms and parcels of facades. Herewith, it is correct to use regional features in the formation of the volume of the new building (traditional forms of roofs and facade details). The issue of a harmonious addition is easily solved if the new building needs to be placed on the same line with existing historic buildings. A much more difficult task is set before the architect when a new house insert must fill an empty corner of a historic street or square (Fig. 3b). A new building at the same time should not be just a regular insert, but insert an accent. The principle of continuity allows preserving the unity and integrity of the historical environment. The new buildings are considered as a harmonious continuation of the historic buildings. They get the traditional sizes and shapes that are typical for the buildings in this historical urban environment (Leshchenko, 2018). Such stylization of characteristic forms and details of existing architectural monuments and historical valuable buildings allows to maintain the established stylistic direction of the central spaces of historical cities.

Successful examples of such solutions include the architectural stylization of modern buildings in new developments in the historical centers of Chinese cities (Fig. 4).



Figure 4

Stylization of modern buildings in the new development of the historical center of Beijing.

Photo by V. Abyzov.



Another direction or extreme is a complete *disregard for the historical environment*. Examples of such solutions are shown in Fig. 5. Some of these solutions are very interesting and original, but when such things appear in the living historical fabric of the city, they sometimes discourage both architects and city residents with their inadequacy and aggression. It's kind of a challenge. True, the Eiffel Tower in Paris was also a challenge in its time. But in order to realize such a decision, one must have, in addition to great courage, great talent. And, of course, a professional "flair", which allows organizing a modern and at the same time contextual environment for historical heritage.

Figure 5

Disregard and/or significant transformation as opposed to the existing environment:



a)

b)

a) Source: Adapted from "New Buildings in the Historical Center of Kyiv." Bird in Flight. <https://birdinflight.com/ru/architectura/25-hudshih-sovremennyh-zdanij-kieva.html>

b) Source: Adapted from "Royal Ontario Museum in Toronto." Askaniis. <https://www.askanis.com/when-the-old-meets-the-new/>

And this already applies to the next direction, the most interesting and, in our opinion, promising, namely *the creation and organization of a modern and at the same time contextual environment for historical heritage*. In other words, the creation of innovative solutions that correspond to the public spaces of historical cities. In modern urban and architectural practice, there are many interesting solutions that are modern and innovative, and at the same time are consistent with the historical environment (Fig. 6). Among them, the following types of decisions can be distinguished: neutral (Fig. 6a); nuance (Fig. 6b); contrast (Fig. 6c). If we will form a living environment in a completely traditional way, then we risk forever or for a long time to remain in the past centuries.

Figure 6

Creation and organization of a modern and at the same time contextual environment for historical heritage (innovative solutions that correspond to the existing buildings): a) neutral decision, Copenhagen; b) nuance solution, Copenhagen; c) Contrasting decision, Szczecin.



Source: Adapted from "Zakordonni Pryklady." UrbanUA. <http://www.urbanua.org/dosvid/zakordonni-pryklady/149>

In the architecture of the XXI century, the contrast method has received one of the central places. Having declared itself at the beginning of the twentieth century, the contrast method got the opportunity to be fully implemented in practice only in recent decades, in the context of a revolutionary leap in construction and design technologies. The opposition of modern deconstructivist buildings to traditional architectural aesthetics is based on the use of new building technologies and structures, materials, innovative technologies of digital parametric design. This base allows you to create irrational forms that are impossible for the usual understanding of architecture and the work of the supporting structure. Technologically advanced architecture sometimes exhibits a defiant or ironic disregard for the natural laws of gravity and shaping. This is how the effects of extraordinary expressiveness are achieved. Inclined supports, sloping sharp-angled or curved walls and roofs that blur the line between them in their usual sense, incredibly long consoles, unexpected cutouts or inclusions of unusual shapes, imitation of traditionally heavy materials in the facing of unnatural fragments of the building for their location, disregard for the concept of architectural scale, making it difficult to perceive the natural size of the building, exploitation of the effects of optical illusions – here is the incomplete arsenal of basic deconstructivism techniques that provide a bright contrast



with the usual environment (Kirichkov, 2017; Pronina, 2021). The most striking and textbook examples of contrasting architectural solutions include “Dancing House” in Prague, designed by F. Gehry, V. Milunich and delicate reconstruction of the historical museum complex of the Louvre in Paris by architect Pei Yu Ming.

And finally, the last direction of the development and regeneration of the architectural environment in historical cities is *partial or complete concealment of new buildings in the historical environment*. The practice of the development of public spaces, taking into account this direction, shows that in many cases it is justified and allows solving many utilitarian problems of the functioning of central urban historical territories without their significant transformation. A good example is a newly built new public building in the historic center of the city of Radom in Poland (Fig. 7). It is "hidden" underground and partially emerges on the surface of the central square, and its amphitheater-like cover is used as a public recreational space of the historical center.

Figure 7

Partial or complete concealment of new buildings in the historical environment. New public building in the historic center of Radom in Poland. Photo by V. Abyzov.



Renovation, regeneration, reconstruction and development of the historic part of the city with the creation of aesthetically valuable environment depends on the overall creative idea and concept of development of the central city area, matching its spatial and compositional structure to the design of functional processes and environment and provide the special recreational environment with unique multifaceted sound. Process of the development and regeneration of public spaces in historical cities is quite complex and the result largely depends on the subjective abilities of those who work in this space. Along with the individual culture and professionalism of architects, a good legislative and regulatory framework is needed for working in a historical environment. Master plans,



historical and architectural reference plans, zoning with zones of protection of architectural monuments, boundaries of historical areas and modes of their use, master plans for historical reserves, certification of cultural heritage sites, regeneration concepts of the historical territories, historical and urban planning justifications and various pre-project developments should be taken as the basis for project documentation.

As an example of such an approach, there are project proposals for the regeneration and reproduction of the historical environment and individual buildings around the Bakhchisarai Palace of the Crimean Khans (fig. 8, 9) during the preparation of the project for the nomination of this well-known in Ukraine and abroad object to the preliminary UNESCO World Heritage List under the leadership of the author of this article. The Khan's Palace in the Crimea is the only example of Crimean Tatar palace architecture in the world and a complete architectural complex of the Middle Eastern civilization circle unique to Europe.

Figure 8

The Grand Mosque and the yard of the Khan's Palace (Hansaray) in Bakhchisaray, Crimean Peninsula.



Source: Adapted from "Bakhchysarai Palace Grand Mosque" (n.d.). Wikipedia. https://en.m.wikipedia.org/wiki/File:Bakhchysarai_04-14_img14_Palace_Grand_Mosque.jpg

Figure 9

The area opposite the central entrance to the Khan's Palace (Hansaray) in Bakhchisarai.

Photo by V. Abyzov.

a – photo of the existing architectural environment;

b – the concept of regeneration and reproduction of the historical environment

a)



b)



At the same time, for an effective and targeted solution for the development of the architectural environment in historical areas, it is necessary to consider it according to a systemic approach at the appropriate hierarchical levels, where the system of the architectural environment is not a simple sum of individual building elements and fragments of the landscape, but a single integral whole. With the system approach, the core of which is the implementation of the requirements of the general theory of systems, the object of research is a set of interconnected elements and components that form a system, connecting the components of a common goal. Moreover, each element of the system or subsystem should be considered as a complete system of a certain level.

Thus, the sustainable development of the historical environment should be considered in accordance with the following hierarchical levels:

- at the city level as a whole (at the level of the master plan of the city);
- at the level of development of individual urban areas and structures;
- at the level of individual buildings;
- at the level of territorial and spatial fragments surrounding the new buildings in historical environment;
- at the level of interiors.

Consistent and professional design of an architectural environment in historical cities will ensure their sustainable development, systemic and at the same time



comprehensive solution of the tasks set for each specific situation. Urban development conditions of design objects together with natural and geographical factors play the primary original role in the formation of both open and closed spaces of the historical environment. Thus, the master plan opens up the possibility of transition to the next stages of urban planning work and systematic revitalization of historical territories and, on this basis, their public spaces with the creation of various forms of architectural and structural-planning organization of individual buildings and structures and their spatial surroundings.

Wherein, it is necessary to take into account a variety of conditions and factors, such as: socio-economic, urban; natural and climatic; ecological; typological; technical and technological; cultural; aesthetic (Abyzov, 2017). Moreover, it is important to study and take into account public opinion and the comprehensive reaction of local residents in the process of regeneration and development of tourist infrastructure.

The aesthetic quality and effectiveness of the historical environment development, taking into account national traditions and values, largely depends on the material and technical means of its implementation, where the prominent role belongs to the construction products and materials. Skillful use of traditional building materials (natural stone, ceramic, wood, metal) provides a special natural artistic characteristics and, at the same time, the ethnic and cultural identity of environment, reflecting historical and cultural traditions of the people. Meanwhile, the high development of scientific and technological progress and the introduction of nanotechnologies reveals broad aesthetic and artistic features, along with traditional, innovative products and materials for the creation of extraordinary environmental compositions and implementation daring creative design ideas.

3 CONCLUSION

Along with the preservation and adaptation of architectural monuments for the present needs, in the conditions of increasing building density, it is necessary to harmoniously combine cultural heritage sites with sustainable development of the architectural historical environment. Currently, there are many different solutions, opinions and concepts of such development, among which the most promising is the creation and organization of a modern and at the same time contextual architectural



decisions for historical environment (innovative solutions that correspond to the existing building), considering diverse factors. Depending of the specific urban conditions, the general artistic, figurative and stylistic concept of the development of the existing building, as well as the personal skill and courage of the architect, the priorities of the decision of the development and regeneration of public spaces in historical cities are determined. The most common of them are neutral, nuance and contrast solutions, examples of which are given in this study.

The proposed hierarchical levels of formation and regeneration of historical areas are important for the correct understanding of the phenomenon of the architectural environment as a system and can be effectively used for its development and creation of various concepts and solutions. Such methodological approach will help to create a holistic view on the historical and cultural identity of architectural environment of the modern city, will allow to systematize existing concepts, knowledge's, and practices on the means and methods of its formation, and determine trends and prospects of development.

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