Art-Clusters as a New Type of Buildings: the Specificity of the Spatial Solution and the Features of Restoration during the Redevelopment Process (The Experience of Poland)

Abstract
The article is devoted to the specific character of the formation of art-clusters as a new type of buildings. Today, the theme of redevelopment of unprofitable industrial enterprises for art objects is extremely relevant for Ukraine and Poland (where a powerful experience of such complexes is accumulated). A feature of such modern establishments is that this is a space of a fundamentally new type, based on fundamentally new principles, where the preserved in its original form, facade and the modern functional content are combined. Since such industrial buildings are often architectural monuments, a complex of the restoration and renovation measures becomes important.

Keywords: art-cluster, new modern space, revitalization, gentrification, restoration, preservation.

1. Introduction
The theme of modern redevelopment of unprofitable industrial facilities is extremely relevant for the conditions of Ukraine. Today, in large, medium and small cities of Ukraine, most industrial enterprises do not work, but these enterprises occupy large areas, often in the central parts of cities where the cost of land is high. As foreign experience has shown, there is a way of modernizing of unprofitable industrial facilities, including for elite housing, hotels, shopping galleries and art-clusters.

Gentrification (sometimes referred to as urban recycling) is the reconstruction and renovation of buildings in unrepresentative quarters or in accordance with the planned urban rehabilitation program, or as a result of decisions taken by professionals and owners. As a result of gentrification, the average level of incomes of the population of the district increases. The term of gentrification was introduced by Ruth Glass in 1964. She used it to determine the displacement of the working class from separate districts of London by the middle class in her work “London. Aspects of Change”. The same processes took place in separate areas of US cities in the Gulf of San Francisco, Boston, Chicago, Seattle, Portland, Atlanta, Washington, Denver.

To revitalize means to give a new life to something. There is development and redevelopment – this is construction, new construction and renovation. Revitalization is a broader concept. From the industrial production zone, the revitalizer makes a “third place” where you can comfortably spend time – and see the exhibition, and buy clothes, and meet friends, and work on a project.

The issue of revitalization of unprofitable industrial facilities is very relevant for the entire post-Soviet space and for the large cities of Ukraine, where as a result of changes of the economic conditions and the political situation since the 1990s, a significant part of the industrial facilities located in the city has proved to be unprofitable. Taking into account the fact that these establishments occupy large areas in the central districts of cities, and the fundamental structures of the former workshops and technical facilities remained intact, the question of granting these territories a “second life” in accordance with the present realities, arises. “An art cluster – cultural and business association located on the territory of an industrial zone, uniting exhibition space, a showroom, a theater or cinema site, an audience for seminars, food courts and other similar elements,” the scientific association SibAC notes.
The development of industry in the nineteenth and twentieth centuries fundamentally changed the appearance of cities in different parts of the world, and it was then that a great number of pipes and industrial buildings became an integral feature of the landscape of industrial cities. However, over time, intellectual production replaced industrial production, which became particularly tangible on the threshold of the 21st century, and this gave rise to the issue: how to use old plants and factories, which in present conditions were unnecessary? At the end of the 20th and beginning of the 21st century, urban space began to become popular. Although art clusters began to appear relatively recently, but the idea of providing a "second life" to unprofitable industrial enterprises, called "loft", appeared much earlier, back in the 1940s in Manhattan. However, in those years this term envisaged the conversion of the industrial objects to the objects for housing and artists' studios, taking into consideration the sharp increase in land prices in the central districts of the city. This led to the removal of industrial enterprises on the outskirts of the city, and former industrial areas, where the cost of renting premises was low and the premises themselves could be used for any function, with the possibility of changing them, were occupied by artists of different directions.

2. Art clusters as a means of modern gentri- fication of urban space

The territory of the former factory for the production of marmalade and canned food, which was functioning since 1889, was a project to turn a former obsolete building into a modern art-platform for music festivals, concerts and exhibition events. The project Fabryka Traciny took two years. The peculiarity was the preservation of the industrial objects, and the spaces around it – fit into space and vice versa to destroy it with certain aesthetic means (supergraphic, volume completion, etc.) If the building is a bearer of aesthetic qualities, it is desirable to preserve its condition, and vice versa.

On the contrary, the modern art-platform can obtain expressiveness through intentionally destroying spaces by supergraphic means. When creating modern art-clusters, it should be borne in mind that the objects can be in the register of monuments of immovable heritage and their facades can be objects of protection, so in this case it is worth keeping them in their original form. But in connection with the change in the function of the object you need to change the space a whole, including the needs of scuserographics, and also make adjustments to the organization of the yard and interior spaces.

Types of means of expressiveness of the art-cluster are described. Each of these objects has developed its own approaches to the transformation of the industrial areas in the form of nets of cables on the walls and production equipment in the premises.

Galeria OFF, city of Lodz, Piotrkowska 138/140

Galeria OFF is an all-Polish cultural project, aimed at assembling creative artists – fashion designers, designers, architects, music studios and clubs, inexpensive restaurants, art studios, showrooms, art cafes in one territory [7].

11. Nowadays, this is the most modern fashionable institution of Lodz for informal communication, located in the heart of the area.

12. Galeria OFF originated from the former Frantishkiv Ramish factory of cotton fabrics, which worked since 1889. Reconstruction took place in 2011. The main goal was to transform the object into the cultural and communicative needs, including. Today, traditional establishments such as cinemas, theaters, cultural centres, art houses, palaces of schoolchildren are often perceived as obsolete, which not to the fullest extent meet all contemporary social tasks. The object can be in the register of monuments of immovable heritage and their facades can be objects of protection, so in this case it is worth keeping them in their original form. But in connection with the change in the function of the object you need to change the space a whole, including the needs of scuserographics, and also make adjustments to the organization of the yard and interior spaces.

3. Art clusters as a means of modern gentri- fication of urban space

3. Art clusters (or clusters) can take different form and structure, which are determined by the complexity of the functional and volumetric orthogonal. Today, there are different variants and themes. Advantages of the art-cluster as a modern multi-functional intellectual space are the following

- the effect of interaction of elements - components, which is several times higher than effect of their separate activities from each other;
- a positive impact on the social and cultu- ral atmosphere of the city as a result of the emergence of a new public space, the con- ditions for the creative development of all interested, and then the development of the internal cultural potential of the city;
- the emergence of a new communicative space, especially for artists of different di- rections, new forms of their creative self- expression;
- the emergence of an updated dynamic spa- ce that is capable of mobility, development and transformation in accordance with changing needs;
- a positive impact on the behavior and activity of the inhabitants of the city;
- the development of urban cultural environment, the urban environment moder- nization.

4. Analysis of the existing experience of the art-clusters creation

Today, the world has accumulated significant experience in the redevelopment of industrial facilities for art-clusters, museums and art galleries. A great experience in creating art clusters accumulated in Poland, in what of the authors was convinced personally. The experience of adapting industrial objects to art- clusters was analyzed in more detail by the example of such objects:

1. Fabryka Traciny (the city of Warsaw)
2. Galeria OFF, city of Lodz, Piotrkowska 138/140
3. Art-inkubator / Fabryka Sztuki, city of Lodz, Ksiezna Biskupa Wincentego Tymienieckiego 3
4. Malopolski ogrod sztuki, city of Krakow, Raj- ska, 12

Each of these objects has developed its own approaches to the transformation of the indus- trial complex into a modern art space.
Art-Inkubator / Fabryka Sztuki is a member of the two international cultural and creative fields within the framework of Art_Inkubatora. The centre’s activities are focused on the development of art, culture and education within the city and the region as a whole. To solve this activity, two main tasks are set: education through art and therapy through art. There is a media library focused on the collection of the theatre and visual arts (music, theatre, cinema, multimedia), a music hall for 290 visitors, a gesture theatre for 98 seats and a courtyard for outdoor events and exhibitions [8].

5. Restoration activities in the redevelopment of industrial facilities for art-clusters
In many instances, art objects are located in historic industrial buildings, so it becomes urgent to carry out a complex of repair and restoration measures, since the main feature of the art-cluster is the complete preservation of the facade, and sometimes – partially – of the interiors. Since the majority of industrial enterprises of the 19th-20th centuries, which might be redesigned for art-clusters, were built of bricks, often with the use of metal elements and structures, it is necessary to focus on those activities that deal with the liquidation of an emergency condition or damage of the walls brickwork and metal structures.

The walls could be made up of ocher, pink, yellow bricks of different sizes on the lime-stone, lime-stone and sand, cement – lime, cement-sand, cement-lime-sand and cement mortar.

The purpose of conservation and restoration of the surfaces of brickwork is the maximum approach to the authentic outside of the building. Under the influence of the aggressive external factors it happens peeling of bricks and loss of its separate pieces; cracks and salt efflorescence on the outer surface of the brick appears.

The lack of waterproofing, raising the level of groundwater (especially if it is aggressive water, entering into a chemical reaction with mortar solution and leading to its destruction), cycles of freezing – thawing of the wall, leaking roof are the causes of damp walls. The dampness of walls occurs in the point of drainpipes and gutters damages. Some types of damage are determined visually: in particular, a noticeable slope of roofs or stairs indicates the presence of destructive elements and structures that require replacement. Due to subsidence of the foundation, cracks or visual disturbance of the straight brickwork lines appear in the walls, there may be cases of brick spalling.

The main causes of the walls and old masonry destruction are: a violation of the static nature of the basis-foundation-structure system, changes in hydrogeological conditions, an increase in the level of groundwater with an aggressive environment in which lime mortar can not be applied, unorganized wastewater or the emergency condition of the roof, aging of masonry mortar, a decrease in the strength and load-bearing properties of stone, brick, plinth, increasing the load on the wall as a result of the re-building or building of additional storeys, changes in the functional purpose of the building and therefore the placement of equipment in the building, which creates a vibration.

Problems of emergency condition of walls are associated with the occurrence of the through cracks, the destruction of masonry mortar, damage and impurity of bricks and rows of masonry with detachment of plaster and moisturizing, biofouling. The main cause of the emergency condition of the building is the uneven subsidence of basis and foundations, which leads to deformations of walls and structural elements, therefore restoration measures are directed to eliminate deformation of foundations.

The methods of reinforcing brick walls with their severe accidents can be reduced to the following. The historical "skeletons" of the emergency walls are dressed in corsets made of metal ties, in addition, the walls are additionally covered with a white wash, on top of which a concrete "shirt" is put. The general strengthening of the walls and the reinforcement of the brickwork in many cases make it possible to eliminate the emergency condition of buildings, however these works should, as a rule, be carried out together with measures to strengthen the basis and foundations, which in many cases are the primary causes of the walls deformation. In some cases, you should first reinforce and strengthen the walls (above-ground part of the building), and then move on to strengthening the basis and foundations (underground part of the building).

The methods of brickwork strengthening are as follows:
1) the rebuilding of the brick walls (if the loss of brick exceeds 1/3 of the thickness of the fragments of the masonry, with the removal of destructive parts and the insertion of new brick fragments, is carried out by highly skilled masonry specialists). In the presence of stone facing, the existing condition is fixed by appropriate engineering and chemical-technological measures (collection of stone blocks with metal bandages, prosthetics, filling, thorough injection and the like).
2) Arrangement of the outer casing of the "corset" with bandage metal ties, which prevents horizontal sprawl of the masonry,
it's stratification, and post-center crimp. The disadvantages of this method of strengthening the walls of architectural monuments include the presence on the facades or in the interior of metal strings, the possibility of corrosion and weakening of bandages, screws, the concentration of loads on brick walls leads to crushing in the attachment area of the bandage;
3) replacement of load-bearing elements of walls and separation walls of masonry on concrete or metal frame (the old masonry at the same time fulfills the function of cladding);
4) injection of brick or rubble masonry with solutions (cavities and joints [seams] in the masonry are filled, between the stone or brick are consolidated, the destroyed mortar is reconstructed, the permissible effort on the structure is increased;
5) reinforcement of brickwork with cementation (the Italian method “cemented mesh”, “Raticolo cementato”) is carried out to increase the strength and stability of the structure, counteract tensile forces by inserting steel reinforcing bars through the drilled holes into the wall, which are filled with masonry mortar. At the same time, permissible efforts on the construction are increased, the structural integrity of the masonry is restored. The steel bars of the armature are firmly connected with the masonry in which they are cemented. The bulk integrity of the reinforcement mesh is ensured by the fact that the reinforcement that enters the masonry overlaps each other. The insertion of the wall, the easier it is to strengthen it with this method;
6) replacement of destructive and significantly saline brick. Capillary moisture and moistering of stone more than 5% with the saturation of stone with salts leads to destruction, humic acids in capillary water and salts of chloride of sodium, sulfate, calcium and magnesium are crystallized into salt efflorescence;
7) reinforcement of brittle brick with putty on outer surface of masonry and filling of joints are performed, if the cavity sizes are less than 5 cm.

The nature and extent of the damage determine the way of restoring the brickwork: sometimes the bricks are replaced by similar new ones, sometimes the fragments of losses are supplemented with special solutions. Before that, the surface of the brickwork is cleaned of dirt, remove the salt efflorescence and old paint layers, then proceed to puttying chips, cavers in the surface layer of the brick and filling with solutions close to authentic, masonry seams.
Loose brittle brick is fixed with strengthening solutions based on polymeric materials, the surface of the brick is covered with hydrophobic substances.

Restoration of the masonry walls provides for mechanical and chemical cleaning of the wall surface from contamination, injection of cracks in the masonry, conservation and restoration of the surface of brickwork, restoration of plaster, use of weatherproof facade paints.
Restoration of entrances and vehicular entrances includes fastening of masonry around entrance and vehicular entrance parts, reinforcement of entry and vehicular entry structures, restoration of gate architectural metal, forged and cast art grilles of black metal, preservation of damaged wood doors, roof antiseptic, insecticide treatment, modern paint and decorative coatings for wooden surfaces and restoration of metal doors and frames.
Metal (namely, iron and cast iron) elements of the entrances (lattice, gates) are considered by their form and purpose as the products of architectural and enclosing elements; stand for hanging gates, lattices, doors – as structural elements. Ferrous metals have an increased sensitivity to corrosion, which can be linear, stress, breaking, fretting-corrosion, crevice, electrochemical, gas, atmospheric, chemical. By the nature of the process, corrosion of iron can be superficial, ulcerative, uneven, selective, spots, points, intergranular, internally crystalline and subsurface.
Restoration of forged and cast art lattice of black metal involves visual observation, cleaning of the lattice surfaces from corrosion products and old paint layers with the help of sand-shot blasting, hydroblasting, mechanical, thermal and chemical cleaning.
The recovered fragments of the lattice from cast iron are fixed by pins or soldering and welding methods, aluminium – by pins with insulating of various metals. For the purpose of protection from corrosion and creating the decorative appearance of the lattice, it is painted in such a sequence: filling of the defective metal parts with the red lead oxide, rubbed in oil varnish, degreasing of surfaces with white spirit, coloring.
As the experience of practical restoration shows, the walls of most architectural and enclosing elements monuments contain water-soluble salts, the content of which is determined by the age of the site and the conditions of its existence. Most of the salting is observed at the level of the socle sections of the walls to a height of up to two meters from the ground. The walls salting leads to a sharp increase in the sorption properties of the walls, the formation on the high humidity, which leads to the gradual destruction of the surface layer. The process of demineralization of a thicker masonry precedes the restoration of monuments.

6. General Conclusions
1) The concept of "an art-cluster" has long ceased to be a neologism, although it is still rarely found in the dictionary. From a social point of view, an art-cluster is an association of people with the same interests in the same space. According to Dmytro Boyrov, the development director of the GC “Oventa”, the mechanism for creating an art-cluster is in the high interest of the representatives of creative professions in being together and some kind of estrangement from the usual way of tenants. The latter is caused by a number of reasons – this is an informal dress code, noisy activities, and an unresolved work schedule.
2) From a urban-planning point of view, art-clusters are a real breakthrough in the rethinking of urban fabric, its gentification. It happened so that most art-clusters in the world are located namely in old buildings, which had storage or industrial purpose. Over time, the cities are growing more and industrial areas that were on the outskirts, now, though not in the center, but in the middle. As a result, similar areas were beginning to be populated by representatives of different subcultures and persons without a specific place of residence. Representatives of countercultures quite often interact with people of different creative trends and professions, which led to the growing popularity of these spaces among artists, art managers, musicians and the like. Prices for real estate began to grow for a large demand, which gave the cities new attractive areas with quite an interesting direction.
3) As the foreign and national experience shows, approaches in redevelopment of the unprofitable industrial facilities or fortification structures for art objects differ in accordance with the tasks set. The options for solving the facades are reduced to three main ones:

- full preservation of historical facades of architectural monu-
ments;
- partial preservation of historical facades and construction of new volumes;
- complete modernization of facades in accordance with new requirements.

The solutions for interior spaces are as follows:
- maximum preservation of the original interiors and tactful inclusion of new furniture and equipment;
- fragmentary preservation of accent fragments of primitive interiors and industrial equipment incorporating them into a new concept of solutions in the interior;
- complete modernization of interior spaces without referen-
cence to the original interiors.
In objects transformed under art-clusters, such as a set of
promises is possible:
- museum halls, exhibitions, amateur theaters, lecture ro-
oms, media folders, exhibition halls;
- artists’ workshops, shops, galleries, showrooms, art cafes, restaurants;
- small theaters, galleries, art spaces, premises for celebra-
tions, workshops;
- workshops, showrooms, coworking, cafes, small hotels,

exhibition, shops;
- offices and workshops of artists and media, design
studios, creative courses, children’s club, showrooms, events, theatrical spaces, coworking, craft work-
shops, coworking, open space, pop-up direc-
tions.
4) Since art-clusters are often located in old industrial buildings (an illustrative example is Large industrial enterprises both in the cities of Poland and in Ukraine were built of bricks, the measures related to the restoration of brickwork as well as metal structures and elements are relevant.

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