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COMPLEX REVITALIZATION OF HISTORICALLY FORMED INDUSTRIAL TERRITORIES IN KYIV IN POST-WAR RECOVERY

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Abstract. The article is aimed at considering revitalization as a complex renewing method and a component of the complex process of restorative-reconstructive transformations of the historical urban environment. The effectiveness of complex revitalization with the involvement of various restoring and renewing methods has been proven. It allows at different system levels to revive and improve the quality of heterogeneous in terms of historical and architectural value and destruction of the historical urban environment, which usually includes the historically formed industrial territories. Such heterogeneity of the historical urban environment, reinforced over the last year by the devastating consequences of the war, today is characteristic of Kyiv and many cities of Ukraine, and therefore the proposed methodology is extremely relevant. The analysis of the experience of revitalizing former industrial territories of Lodz, as the most successful among the cities of Poland – the country with the closest historical, cultural, and architectural ties to Ukraine, is extremely valuable for pre-project studies of neglected and ruined historically formed industrial territories of Kyiv. The proposed concept of revitalizing degraded former industrial territories in Podil and on Radyshcheva Street in Kyiv has demonstrated the effectiveness of the proposed methodology.

Keywords: complex revitalization, historically formed industrial territories, degrees of value and destruction.

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1. Introduction

Today, the issues of neglected and degraded historically formed former industrial territories remain relevant to most historical cities in various countries around the world. These issues can be classified as ecological, historical-cultural, urban planning, architectural, functional and utilitarian, social, and economic. Typically, these issues are addressed through the revitalization of these territories, which involves their revival and activation while preserving and further developing their existing cultural heritage for harmonious integration into modern urban life.

Usually, historically formed industrial territories, with objects of industrial cultural heritage, are currently in the historical centers of cities. Most of them have lost their original industrial function. This mostly happened in the last decades of the 20th century, as well as at the beginning of the 21st century. Many of them remain unused, turning into neglected and deteriorating wastelands in the very heart of the city. However, despite varying degrees of preservation, they are significant historical assets of these cities, by shaping their identity and providing potential for their development. Revitalization of these territories results in their functional, urban planning, volumetric, ecological, social, and economic integration into modern urban life.

Ukrainian cities are no exception. Until the last two years, according to the general plan for city development, Kyiv alone had 7.38% (6912 hectares) of neglected historically formed former industrial territories (Kyiv-landuse, 2020). Because of Russia's aggressive war, a number of destroyed territories have also appeared in it. Thus, for Kyiv, as well as for many Ukrainian cities, there will be entirely new challenges in their post-war recovery, within which revitalization gains a somewhat different, more complex meaning. It is not just about their revival, but also about addressing various destructions that have occurred on different levels. Therefore, they need complex revitalization with the involvement of other restorative and reconstructive methods for integral and systematic solutions to the currently existing problems.

2. Theoretical base

Many theoretical works of scientists from different countries have been devoted to the revitalization of historical

cities and, in particular, former industrial enterprises and their territories. They have studied various aspects of this problem, such as urban planning, architectural design, functionality, infrastructure, and social and economic issues, which can serve as an analytical basis for this research. Thus, research by Rybchinsky (2017) is devoted to urban planning and social issues of revitalization in the middle of historical cities of Ukraine. The functional and planning restructuring of the territories of former industrial facilities of Ukrainian cities is shown in the work of Senkovska (2017). Leshchenko and Tovbych (2019) analyzed modern approaches to revitalizing historical ex-industrial architecture. Bryx investigated financing and managing property in revitalization processes, as well as the experience of revitalizing cities in Germany (Bryx, 2009).

The experience of Polish architects-scientists regarding the revitalization of historical urban environments is valuable. Ziobrowski considered revitalization to preserve the material and spiritual heritage of historical Polish cities and to achieve their sustainable development (Ziobrowski, 2010). Skalski considered revitalization in urban policy and provided recommendations for its implementation in Polish cities based on the French experience (Skalski, 2009). The results of Guzik and Domański's (2010) research on the possibilities of using foreign experience for the revitalization of historical cities in Poland are also valuable. The proposals of Kobylarczyk, Kuśnierz-Krupa, and Paprzyca regarding the revitalization of neglected industrial architectural landmarks into art clusters are also interesting, as well as the specific features of such functional transformation (Kobylarczyk et al., 2018). It is worth mentioning the work of Polish urbanist Bald, who developed concepts for sustainable development of urbanized areas in Polish cities (Bald, 2002), and the research by Pawlowski, who focused on social and cultural aspects of architecture, considering the needs of people and the characteristics of the environment (Patora, 2013). Ptaszycka-Jackowska made no less significant contribution, having developed a series of strategies for the revitalization of Polish cities with the involvement of all possible multifaceted specialists (Ptaszycka-Jackowska, 2000).

The aim of this article is to examine revitalization as a complex method (complex revitalization) and as a component of the complex process of restorative-reconstructive transformations (RRT) of the historical urban environment at various systemic levels. Its determination as a renewing reconstructive method and its use together with other restorative and reconstructive methods from a discrete complex of RRT methods will make it much more effective, at different system levels, in recovering and improving the quality of heterogeneous, different in historical and architectural value and destruction, urban environment, which usually includes historically formed industrial areas. Such heterogeneity of the historical urban environment, which has been further exacerbated by the destructive consequences of war over the past two years, is now a characteristic feature of most cities in Ukraine, including Kyiv. Therefore, the proposed methodology is extremely relevant. In addition, the existing experience of various cities in European countries is very valuable. A detailed analysis of the revitalization of the former industrial areas of Lodz, chosen as the most representative and successful among the cities of Poland – a country with the closest historical, cultural, and architectural ties to Ukraine, will be extremely valuable in pre-project studies currently abandoned and destroyed historically formed industrial territories of Kyiv, as well as for other Ukrainian cities, in their post-war recovery.

3. Methodology

Revitalization means bringing it back to life. For reviving the historical urban environment, the question of complex revitalization at different systemic levels becomes relevant for bringing about necessary qualitative changes. These changes should solve urban planning, volumetric, functional, and socio-economic issues at once. This means that they should be systemic and address questions of improving the quality of the existing urban environment at different systemic levels (urban planning, volumetric, functional, and socio-economic) – from the overall to individual elements, where a change (improvement) in the quality of some, seemingly insignificant, detail will ultimately lead to a change (improvement) in the quality of the entire system (the historical urban environment), by the property of transitivity. For the recovery of the historical urban environment which is heterogeneous by historical and architectural value and destruction, the most effective approach will be to apply the method of complex revitalization together with other preserving and restoring, renewing, and transforming respectively, restorative and reconstructive methods, depending on value and destruction of this urban environment. The methodology for determining the degree of historical-architectural value and destruction of the historical urban environment was proposed and discussed in the previous author's research (Leshchenko, 2022).

The methodology of the studies carried out is stage-based and is based on the aforementioned methodologies for determining the degree of historical-architectural value and destruction of the historical urban environment.

Methods of critical source, logical, comparative analysis, generalization, and systematization were used to determine the problem, its study, and tasks to be solved. The determination of the qualitative indicator of the existing state of the studied degrading industrial territories due to their degree of historical and architectural value and destruction was carried out based on the above-mentioned author's methodologies, using historical analysis, analysis of the current state and comparative analysis, field survey, generalization, classification, and systematization. A qualitative indicator of the existing state of a certain territory (its degree of value and destruction) is the basis for the restorative-reconstructive transformations in it using appropriate restorative (preserving and restoring) and

reconstructive (renewing and transforming) methods. According to the methodology for determining the degree of historical-architectural value of the urban environment, four degrees of its value are distinguished. Territories with historically valuable planning, architectural monuments, and significant historical buildings have the I-degree of value. Territories with historically valuable planning and ordinary historical buildings (without monuments) are classified as the II-degree of value. Territories with historically valuable planning and modern buildings, without monuments and historical buildings are classified as the III-degree of value. Territories with modern planning and buildings belong to the IV-degree of value (Leshchenko, 2022). According to the methodology for determining the destruction of the historical urban environment, its four degrees of destruction are distinguished. The I-degree of destruction includes territories with fragmentary destruction, and the absence of disharmonious buildings. Destructive changes concern only fragments and details of some buildings. The II-degree of destruction includes territories with point destruction and single disharmonious buildings. These are territories with minor destructive changes, which include the loss of parts of ordinary historical buildings that do not destroy the overall composition of the building, and do not change the planning, shape, and size of squares, blocks, and street directions. The III-degree of destruction has territories with significant planning and volume-spatial destruction, and disharmonious buildings. This destruction occurred because of the loss of historical dominants, accents, parts of ordinary buildings, or the appearance of new ones, which disrupted the overall composition of historical buildings and deformed the shape and size of squares, blocks, and street directions. And the IV-degree of destruction has territories completely simultaneously destroyed as a result of military operations or gradually degrading because of modern non-use, with disharmonious buildings. These are territories with the destruction of historical buildings, which led to the loss of historical planning, and the disappearance of historical quarters, squares, and streets (Leshchenko, 2023).

Depending on the determined degrees of value and destruction of a certain territory, it is recommended to apply appropriate combinations of restorative and reconstructive methods to it. Preserving methods are mainly relevant for territories of the I-degree of value and destruction. Restoring methods can be used for territories of the I and II-degrees of value and II and higher degrees of destruction. Renewing methods are most effective for territories of the II and III-degrees of value and II and III-degrees of destruction. Transforming methods – for degrading territories of the III and IV-degrees of value and IV-degree of destruction. Adjustment of the application of certain methods can occur after comparing the schemes of degrees of destruction and degrees of value of territories. The latter is decisive. In addition, for each subsequent, greater degree of destruction of the territory, it is possible to use, together with the main corresponding methods, additionally, the methods recommended for previous, smaller destructions.

Through generalization and systematization, the most characteristic combinations of degrees of value and destruction were selected for all 49 studied degrading former industrial territories of Kyiv. Accordingly, recommendations were made to apply appropriate restorative and reconstructive methods to improve their quality, and the method of complex revitalization was determined as key. It will be effective in combination with a number of restoring and renewing methods. It should be noted separately that during the war, various destructive changes can occur and a well-preserved building can immediately receive significant destruction. Especially for such objects, if they are historically valuable, as part of complex revitalization, it is relevant to use such a restoring method as re-creation.

With the use of questionnaires, a social survey of residents of the adjacent territory to the selected areas of complex revitalization in Kyiv was carried out to determine their new actual functional and physical content for transformation into multi-comfortable – interesting, and convenient for various people.

Complex revitalization is a renewing reconstructive method that can be applied both at the urban planning and volumetric levels. At the functional level, such methods as functional filling and adaptation correspond to it. Together, they contribute to increasing the value, integrity, as well as socio-economic attractiveness of this urban environment and its transformation into a multi-comfortable one.

Complex revitalization (at the volumetric level, for buildings) can be defined as a reconstructive method that characterizes the processes of their revival by providing new functions with renewals (tactful addition) to the layout, construction, engineering structure, and mandatory preservation of historical facades. At the volumetric level, objects of revitalization can be neglected buildings that are currently insufficiently actively used or not used at all (are abandoned). After complex revitalization, these buildings gain new socio-cultural and economic value because of their new purpose and improved external and internal characteristics.

Complex revitalization (at the urban planning level, for the historical urban environment) is defined as a reconstructive method that characterizes the processes of renewing its viability, activating and preventing degradation by providing new functions that do not disrupt the historically formed view of existing valuable buildings and spaces, the urban context, and enhance their quality. For a neglected historical urban environment, this is its revival and "rejuvenation" through a complex of qualitative changes that make it suitable for modern use. The "rejuvenation" of the historical urban environment occurs through:

- construction of new functional, infrastructural, social, and economic connections, which contribute to the transformation of a "frozen" or closed degrading territory into a new place of attraction for residents;
- adapting existing historical buildings to a new function with renewals to their layout, construction, engineering structure, and mandatory preservation of historical facades;

- providing new socio-cultural and economic value to neglected, historical former industrial and warehouse buildings and territories while preserving the "spirit of the place" and material memory of the past;
- introducing new buildings with various new functions that will attract the attention of residents and activate the historical environment, provide its multifunctionality and convenience through balanced functional filling;
- applying energy-efficient technologies for new buildings and the operation of historical ones;
- the creation of city-wide recreational zones on the site of abandoned and empty territories;
- improving the quality and transforming it into an interesting and convenient place for long-term stay for different people (functionally filled, with active pedestrian zones, arranged open public spaces, and well-organized "green" places for relaxation and leisure activities).
- optimization of pedestrian and transport infrastructure (moving transport-intensive enterprises outside the boundaries of the historical center and reducing transport load; adding necessary driveways to serve new development; organizing underground parking; separating transport and pedestrian flows; creating landscaped active pedestrian areas).

The functional filling can be characterized as introducing various functions for existing and new buildings and open spaces to prevent the monofunctionality (impoverishment and degradation) of the historical urban environment and to ensure its socio-cultural and economic activity. Adaptation is the provision of new functions to ensure activity while preserving and restoring the historical architectural-planing, and structural system of the building (planning, volumetric-spatial, and compositional integrity of the urban environment), with the point introduction of necessary compensatory new elements.

Complex revitalization is effective for neglected, degrading, or abandoned parts of the historical urban environment, especially historically formed former industrial and warehouse areas that are currently within the historical city center. They can be part of a complex protection zone, as well as zones of buildings regulation and a zone of protected landscape (Leshchenko, 2020). This method is one of several renewing reconstructive methods of the complex process of restorative-reconstructive transformations of the historical urban environment. In previous authorial research, restorative-reconstructive transformations (RRT) were defined as a complex process of interrelated restoration and reconstruction changes in buildings, open spaces, and the urban architectural environment aimed at increasing their historical and architectural value, integrity, and moving to a new qualitative level (Leshchenko, 2022). In the complex process of restorative-reconstructive transformations of the historical urban environment, revitalization will be expediently applied in combination with such restoring methods as revalorization and regeneration, as well as the renewing method of sanitation. Also, if we are talking about the monuments, then at the volumetric level, revitalization can be supplemented by restoring methods, such as fragmentary and integral restoration, as well as re-creation (if we are talking about a monument that was simultaneously destroyed as a result of military actions). And, if we are talking about a low-value or poorly preserved historical building, then its modernization (renewing reconstructive method). At the functional level, these methods will increase by functional filling and adaptation. Such application in a complex of various restoring and renewing methods allows for effective recovery at all levels of the historical urban environment, which is heterogeneous by historical and architectural value and destruction, which today are the historically formed industrial territories of Kiyv.

4. Research results

Receiving a new life during complex revitalization, the currently degrading historically formed former industrial buildings and urban areas should preserve the authenticity of their architecture, improve the quality of their image, and gain a new purpose that will become relevant for today and will be in demand by residents and guests of the city. They should receive new functional and physical content that will contribute to the revival of their historical and cultural value, social activity, and economic attractiveness. Also, various existing destructures, both temporal and simultaneous, should be eliminated. And in this sense, the example of Kyiv is unique, because its former industrial territories carry both the destruction that was gradual over time and the significant destruction that has occurred in the last two years.

Considering the experience of various cities in European countries: Estonia, Great Britain, the Netherlands, Germany, and Poland, we should highlight the extremely successful revitalization projects of the former industrial quarter of Rotermann in Tallinn and the abandoned King's Cross area in London, the projects of transforming the former power plant and the territory of the Philips factory into an innovation center in Eindhoven and the old depot building into a center for the "creative economy" in Amsterdam. A special mention should be made of the revitalization and adaptation of the riverside area of the Spree and the complex of the former sewage pumping station, an industrial architectural monument, in the center of Berlin for the "Radialsystem" cultural center. This is an example where one-third of the complex of the former sewage pumping station remained unrecovered for more than half a century after the destruction during World War II. It was only at the beginning of this century that the preserved part of the monument was supplemented with a completely new volume on independent structures, forming a dialogue between the old and the new.

It is proposed to consider in more detail the examples of revitalization of historically formed former industrial

territories of Lodz, as well as projects for Kyiv. These cities were not chosen by chance. The historical center of Lodz, as a center of many monuments of industrial architecture, is distinguished by high-quality examples of their revitalization and modern adaptation. Its industrial buildings have also gone through various stages of neglect and restoration, including as a result of destruction after World War II. Moreover, the experience of Poland in carrying out such transformations in the historical environment of cities, as the country whose history and culture are closest to Ukraine, is of interest. Kyiv, as the capital of Ukraine, has a significant number of historically formed former industrial territories in the central part of the city. They are currently not in use and some of them have the effects of the war. However, they have the potential for transformation into active and attractive areas for use and investment in the post-war recovery. The experience of Lodz in this direction is precious.

Today, Lodz is one of the 72 largest cities in the European Union, with a preserved unique history and culture (Kotlicka, 2012). It received city status in 1423 during the reign of the Lithuanian prince Vladislav II Jagailo (Zashkilniak & Krykun, 2002). However, for four centuries it remained a small remote town in the middle of forests and swamps, and its inhabitants led a mainly agricultural lifestyle (Piech, 2002). Radical changes took place at the beginning of the nineteenth century when Lodz rapidly began to grow and develop as a factory city. Rapid industrialization, population growth, and multicultural and multinational composition influenced the city's development and architecture. The characteristic manufactories formed the multifunctional and active center of Lodz.

The decline of the city after World War II, reinforced by the decline of the last decade of the previous century, transformed it into a completely hopeless and neglected place by the beginning of the 21st century. The revitalization of regressive, former industrial historical areas should ensure their social and economic revival, adapting them to the current needs of residents, making them attractive to potential investors, and improving the overall quality of life in the city.

The most successful project is the transformation of an abandoned former textile factory of the 19th century into a multifunctional complex called "Manufaktura". After the revitalization, which involved adapting historic buildings to new functions and building new necessary compensatory structures, the modern "Manufaktura" now includes a hotel, a shopping and entertainment center with shops, bookstores, restaurants, and cafes, museums, a theater, a cinema, a bowling alley, a casino, a parking lot, a children's play center and an experimentarium (Figure 1). On its territory, there is also a square with an interactive fountain – the main attraction, where various urban activities take place, everyday permanent and onetime short-term (Figure 2). The place is interesting and convenient for everyone, regardless of age, preferences, physical and cognitive abilities. For outdoor enthusiasts, there is a skate park, roller rink, climbing wall, laser tag arena, dance studio, and fitness clubs. For a peaceful rest, there are convenient green areas, places for meetings, and quality leisure time.

When adapting historic buildings to new functions, their authentic red brick facades, which are a symbol and identifier of the place, were completely preserved. New compensatory buildings were created in contrast, with glass facades. And they have become the background against which the sights of industrial architecture that have been integrated into modern city life stand out vividly. Also, historical and new parts and details combined in contrast look extremely effective in their interior spaces.

Overall, the "Manufaktura" revitalization project was successful because it provided a new active life to a significant

Figure 1. The side facade of the shopping center and an example of preserving the original decoration in its interiors (source: authors)

Figure 2. Interactive fountain on the main square of "Manufaktura" (source: authors)

and historically valuable former industrial area that had long been neglected and degraded. The historical character of all buildings and the context of the place were preserved, while their functionality was updated and enriched, and the quality of the urban environment was improved, transforming it into an attractive destination and making it a new center of gravity for residents and tourists. The project significantly strengthened the social and economic prospects for the city's development, and filled and continues to fill the municipal budget.

In Kyiv, unlike Lodz, there is no such concentration of historically formed industrial territories and objects in one place of the historical center. In addition, they are heterogeneous in historical-architectural value and destruction, having I-IV degrees of value and destruction, which determine the qualitative indicator of their currently existing state. They are mainly in the zone of buildings regulation.

The authors studied 49 degrading former industrial territories in Kyiv. According to their location in the city, they were systematized into three groups, and their number in each group and the percentage of their total number were calculated. The following figures were obtained: degrading former industrial territories and their buildings within the boundaries of the integrated protection zone account for 8% (4 territories); those within the boundaries of the zones of buildings regulation account for 61% (30 territories); and those outside the zones of buildings regulation account for 31% (15 territories).

All the studied former industrial territories were also systematized by the degree of historical-architectural value and the degree of destruction, with 4 degrees of value and 4 degrees of destruction. The following results were obtained. The I-degree of value includes 8 territories (16%), the II-degree of value – 10 territories (20%), the III-degree of value – 16 territories (33%), and the IV-degree of value – 15 territories (31%). The territories of the I-degree of value are located within the integrated protection zone and the first category buildings regulation zone. The territories of the II and III degrees of value are included in the buildings regulation zone of the second and third categories. The territories of the IV-degree of value are located outside the zone of buildings regulation. The I-degree of destruction includes 8 territories (16%), the II-degree of destruction – 11 territories (22%), the III-degree of destruction – 14 territories (29%), and the IV-degree of destruction – 16 territories (33%). Over the past two years, the number of territories of the IV-degree of destruction has increased due to the war and the emergence of new simultaneous destruction. At the same time, these territories have varying degrees of historical-architectural value. This has further strengthened the heterogeneity of the qualitative indicator of their existing state.

For all the 49 degrading former industrial territories of Kyiv studied, characteristic combinations of their degrees of value and destruction were identified, which is a qualitative indicator of their existing state. The vast majority of them (61%) are located in the zones of buildings regulation and have combinations of the II and III degrees of value and the II-IV degrees of destruction (53%), as well as the I-degree of value with the II-III degrees of destruction (8%). Accordingly, to improve their quality, it would be advisable to use a combination of restoring and renewing methods.

So, for historically formed industrial territories with such a heterogeneous quality of existing state, complex revitalization as a key renewing method with a combination of other restoring and renewing methods, as outlined in the second part of this article, is the most effective way

to improve their quality at different systemic levels (urban planning, volumetric, functional and socio-economic, as a summary of all restorative-reconstructive transformations at the previous three levels).

As an example, an illustration of the proposed methodology, there are the author's concepts of the complex revitalization of the territory of the former M. Richert brewery and a historically formed, former industrial territory along Radishchev Street in Kyiv.

The first plot (the territory of the former M. Rickert brewery) is located in the first category buildings regulation zone. It belongs to the I-degree of value and has the II-III degrees of destruction. It contains two architectural monuments, one ordinary historical building, and low-value and disharmonizing buildings. They are currently not used in any way. The territory is closed and abandoned.

The concept of complex revitalization envisaged its transformation into a multifunctional, open to all, urban space. The following combination of restoring and renewing methods was proposed. As part of the revitalization of degrading industrial architecture monuments (the main building of the former brewery with a drying tower), it is necessary the integral restoration of their facades with the recovery of damaged parts and fragments and the adaptation of their interior spaces to new functions, as well as the continuation and development of these functions to the space in front of them. It is also advisable to modify the historical original function, which will become part of the new cultural, educational, and entertainment functions, and to transform the drying tower space into an interactive museum of brewing art. This will help preserve the historical and cultural memory of the place. For this purpose, it was also proposed to stylize the unique elements and details of the existing industrial architecture monuments and extend them to the new arrangement of the surrounding space. As for the degrading low-value buildings of the former brewery, it will be relevant to apply such renewing methods as sanitation in combination with modernization. It was also proposed to unite them with each other by adding new volumes and giving them the main shopping and entertainment function, which is sorely lacking in the area.

It was proposed to organize new open spaces in front of the main building of the former brewery with a drying tower and around the former chimney from 1895 and to connect them. The chimney is to become a street art object and also has an additional entertainment function. The interactive lighting on top of the chimney will illuminate the surrounding paving, displaying significant dates from the history of the former brewery, thereby attracting attention and preserving the history of this place. All pedestrian connections should lead to these monuments, focusing on them as the main ones in this space. New pedestrian spaces, inclusive and well-equipped, should become convenient communications between the separate functions of the transformed territory, uniting them into a single whole. In addition, the functional filling of these spaces will transform them from transit zones to open, high-quality places to stay. This will attract many people who want to spend time in such a place and engage in various social activities.

This will activate the currently degrading territory, increase its architectural quality, social activity, and economic attractiveness, and also restore the memory of the place.

The second plot (the former industrial territory along Radishchev Street) is located in the second category buildings regulation zone. It belongs to the II-degree of value and has the III-IV degrees of destruction. Its level of destruction has increased recently, as a result of the war. It has historically valuable planning. Existing former industrial buildings are valuable historical buildings. They are brick, two-story with decorative gables and gable roofs. There are also many low-value buildings, mostly brick, one- and two-story, with pitched roofs. Some of them are used as warehouses. Most are not used, which causes their degradation and destruction. There are also completely destroyed buildings on the territory. In addition, the plot is closed and separated from the surrounding residential buildings. So, there is an empty degrading, and partly destroyed territory in the center of the residential area.

The concept of complex revitalization provided for the following strategies. The territory should be transformed into a multi-functional public urban space open to all, which would combine the places and functions of mandatory and optional social practices, namely work and quality leisure time (Figure 3). This territory should become an addition to the existing surrounding residential quarters, enriching them functionally and physically. Quality living conditions must be created for all people, with different preferences and capabilities, and their active participation in city life in different roles, both as users of this space and as its producers, as well as investors.

To increase the architectural value and attractiveness of abandoned historical former industrial buildings, fragmentary and integral restoration of their authentic facades was proposed. The territory currently has temporal destruction (those that occurred over a long time in the prewar period) and simultaneous destruction as a result of the war. The latter concerns both low-value buildings and historically valuable ones. The facades of these historically valuable buildings, which were simultaneously destroyed, should be fully re-created to recover the integrity of the territory and preserve the memory of them. To preserve the memory of the temporal disappeared parts and historic industrial buildings, it was suggested to identify them by revalorization, which will also contribute to the preservation of the memory of the place by strengthening its authentic compositional integrity. It was also proposed to sanitize the degraded and partly destroyed territory from disharmonious structures and completely destroyed low-value buildings, adding new necessary compensatory volumes and creating a public green zone. The existing preserved low-value buildings were proposed to be modernized and functionally renewed. As for historically valuable former industrial buildings, their modern functional adaptation had to preserve their authentic facades.

Figure 3. Concept of the complex revitalization of the former industrial area along Radishchev Street in Kyiv (source: authors)

The increase in social activity and economic attractiveness of the degrading and partly destroyed environment was carried out by its functional filling with such functions as trade, service, office, tourist, cultural and educational, exhibition, entertainment, and recreation. The unused existing historical industrial buildings were proposed to be adapted for offices, catering establishments, a cultural center with a co-working space and a media library, exhibition spaces, and a space of the "creative economy", where everyone can express themselves creatively, share experience and crafts. Functional filling and new adaptations were primarily aimed at ensuring the multifunctionality of buildings and the environment, and their active involvement, both in everyday and festive city life. Such functional transformation will attract people with different needs and preferences to this place, which will ensure its activity.

In addition, it was proposed to transform the former industrial area into a predominantly pedestrian by arranging an underground parking lot under the recreational zone. The recreational area was equipped with small architectural forms for an exciting and comfortable long stay in it. The space was also proposed to be filled with branding elements for its recognition. This way, the neglected, degrading, and partly destroyed space can be transformed into a successful, multifunctional, in-demand, and active space.

And importantly, preserving the historical context and authentic design code of valuable historical buildings is crucial when undertaking transformations to activate the degraded and recover the partly destroyed environment. When adapting to the new functions, the layout and partly a constructive solution for degrading buildings were renewed. Valuable authentic elements were preserved as much as possible.

Both of the proposed projects also provided for the involvement of residents, in the process of complex revitalization of the degrading and partly destroyed environment. The conducted questionnaires made it possible to systematize the desired functional and physical filling to transform it into a really popular, active, inclusive urban space.

Therefore, through revitalization, renewal, and modernization, and by implementing restorative methods such as revalorization, fragmentary and integrated restoration, and re-creation (for valuable historical buildings destroyed by the war), all of which will be accompanied by their respective functional methods, it is possible to effectively adjust the existing inert state of the historical, cultural, and architectural resource at various systemic levels (urban planning, volumetric, and functional). This will revive and enhance the attractiveness of the neglected and degrading historically formed former industrial territory for its prospective cumulative development (by activating the existing best historical assets, supplemented with the best modern ones) and transforming it into a multi-comfort urban environment. In doing so:

- the restoration of the authentic facades of existing architectural monuments and valuable historical buildings through the removal of disharmonious extensions will contribute to the increase of their historical and cultural value and that of the historical environment; the re-created facades of historically valuable buildings that were simultaneously destroyed will recover the integrity and preserve the memory of the place;
- their adaptation to new functions will increase their socio-economic value, as well as the interest, attractiveness, and activity of the environment;
- the modernization of low-value buildings will improve their technical condition and level of comfort, allowing for new functions, which will contribute to the development of traditional multifunctionality and increased quality;

- their thermal modernization and transition to renewable energy sources will improve their energy consumption, increasing their economic viability for residents, and the environmental state of the city;
- the renewal of the degrading territory will allow for the development of the historical city center infrastructure, increasing its convenience; contextual corrective new construction will ensure its continuity and uniqueness, while physical and functional filling will improve the quality of living.

As a result, the convenient open spaces, beautiful buildings, and interesting functions will together provide an active "urban performance". The revived or created new traditions (crafts, events) that underlie its content will enhance the uniqueness and attractiveness of the revitalized historically formed former industrial territory, attract tourists and investors, provide employment for the locals, and promote the economic development of the city and improve the life quality in it.

5. Conclusions

Therefore, for the degrading, partially destroyed, historically formed urban environment that is unused, such as many former industrial territories, complex revitalization is its revival through a complex of qualitative changes that integrate it into modern urban life. In doing so, adaptations, functional and physical filling, along with the maximum preservation and restoration of the existing cultural and architectural heritage, promote the activation and improvement of the quality of this environment, and its social and economic attractiveness, which stimulates a city's economic growth and improves the lives of its residents.

The proposed use of the complex revitalization method as a component of a complex process of restorative-reconstructive transformations of the historic urban environment allows for effective activation and improvement of the quality of the urban environment with varying degrees of historical and architectural value and destruction, such as neglected and destroyed from war former industrial territories of Kyiv. Based on the study of 49 degrading former industrial territories of Kyiv, the article identifies characteristic combinations of their degrees of value and destruction, which are a qualitative indicator of the existing state and the basis for restorative-reconstructive transformations in them. Accordingly, the most effective combination of restoring and renewing methods from a discrete complex of restorative-reconstructive transformation methods has been identified for the revival of such territories. Complex revitalization together with sanitation, renewal, and modernization, coupled with revalorization, fragmentary and integral restoration, and re-creation, which will involve adaptation, functional renewing, and filling, together will become an effective tool for the perspective cumulative development of currently neglected and degrading, and partially destroyed historically formed former industrial territory and its transformation into a multi-comfort urban environment.

The analysis of the experience of revitalization of historically formed former industrial areas, including the example of Łódź, showed how abandoned buildings and structures of old factories and warehouses can be transformed into an attractive and active multifunctional high-quality urban space with creative workshops, hotels, cultural, scientific, educational, and trade and entertainment centers, demanded by different people with different preferences, physical and cognitive abilities. This contributes to the revitalization of degraded areas and their transformation into socially active and economically attractive spaces that are integrated into modern urban life. Collaboration and partnership between various stakeholders, including government, businesses, and civil society organizations, have a synergistic effect in creating favorable conditions for the revival and development of their cities. The experience of Poland can become a successful example of similar revitalizations in Kyiv, as well as in other cities of Ukraine in the post-war recovery, as both countries traditionally have close historical, cultural, and architectural ties.

The developed concepts of revitalizing the degraded and partially destroyed former industrial territories in Kyiv have demonstrated the effectiveness of the proposed methodology of complex revitalization as a component of a complex process of restorative-reconstructive transformations of the historic urban environment. This methodology is most effective for recently significantly changed qualitative indicators of the existing state of the urban environment of many cities in Ukraine.

Author contributions

Nellya Leshchenko conceived the study and was responsible for the proposed methodology and concept of the complex revitalization of the former industrial area along Radishchev Street in Kyiv, developed conclusions. Daryna Gulei was responsible for data collection and analysis of the existing theoretical base and practical example of the revitalization of historically formed former industrial territories of Lodz. Nellya Leshchenko and Daryna Gulei were responsible for the proposed Figures.

References

Bald, K. (2002). *Plansza XLIII: miejscowy plan zagospodarowania przestrzennego Łodzi z 1993 r.* Wydawnictwo Atlas Miasta Łodzi. http://www.mapa.lodz.pl/mapa/atlas/P-43.pdf

Bryx, M. (2009). *Finansowanie i gospodarka nieruchomościami w procesach rewitalizacji*. Wydawnictwo Instytutu Rozwoju Miast.

Guzik, R., & Domański, B. (2010). Możliwości wykorzystania doświadczeń zagranicznych w zakresie rewitalizacji miast w Polsce. In Z. Ziobrowski (Ed.), *Założenia polityki rewitalizacji w Polsce* (pp. 21–30). Wydawnictwo Instytutu Rozwoju Miast.

Kobylarczyk, J., Kuśnierz-Krupa, D., & Paprzyca, K. (2018). Art-klaster as the result of revitalization in the urban space. *Urban Planning and Territorial Planning*, *68*, 236–246.

Kotlicka, J. (2012). *Plansza LXIII: rozwój terenów przemysłowych Łodzi.* Wydawnictwo Atlas Miasta Łodzi. http://www.mapa.lodz.pl/mapa/atlas/sup2/P-63.pdf

Kyiv-landuse. (2020). *Rehuliuvannia, vykorystannia i zabudova terytorii Kyieva: heneralnyi plan Kyyeva do 2020 diyuchyy.* Starodavnii Kyiv. http://kyiv-landuse.com/content/genplan-kieva-do-2020-r-diyuchiy#2

Leshchenko, N. A. (2020). *Methodological foundations of the restorative-reconstructive transformations of the historical centers of small towns* [Unpublished doctoral dissertation]. Kyiv National University of Construction and Architecture.

Leshchenko, N. (2022). Methodology of determining the genetic code of the city: A basis for restorative and reconstructive transformations in its historical center. *Wiadomosci Konserwatorskie – Journal of Heritage Conservation*, *69*, 7–14. https://doi.org/10.48234/WK69GENETIC

Leshchenko, N. (2023). Methodology of determining the degree of damage to a historical city center for its comprehensive restorative and reconstructive transformation. *Wiadomosci Konserwatorskie – Journal of Heritage Conservation*, *76*, 23–31. http://www.zeriba.pl/wkjohc/wk/wk76.pdf

Leshchenko, N., & Tovbych, V. (2019). Modern approaches to the revitalization of historical ex-industrial architecture. *Wiadomosci Konserwatorskie – Journal of Heritage Conservation*, *60*, 51–58. http://www.scopus.com/inward/record.url?eid=2-s2.0-85094118461&partnerID=fpDjhFsn

Patora, P. (2013). Prof. Krzysztof Pawlowski bada I ochrania zespoly zabytkowe. *Dziennik Lodzki.* https://dzienniklodzki.pl/prof-krzysztof-pawlowski-bada-i-ochrania-zespoly-zabytkowe/ar/794048

Piech, M. (2002). *Plansza XXVI: przemiany przestrzenne, gałęziowe i funkcjonalne terenów przemysłowych Łodzi w latach 1938–1999*. Wydawnictwo Atlas Miasta Łodzi.

Ptaszycka-Jackowska, D. (2000). Odnowa miast – zarys problemu. In Z. Ziobrowski (Ed.), *Rewitalizacja, rehabilitacja, restrukturyzacja – Odnowa miast* (pp. 9–20). Wydawnictwo IGPiK.

Rybchinsky, O. V. (2017). *The formation and revitalization of the downtown historic towns of Ukraine* [Unpublished doctoral dissertation]. "L'viv Polytechnic" National University.

Senkovska, Ya. T. (2017). *Functional and planning restructuring of the city's industrial facilities territories (in the example of L'viv)* [Unpublished doctoral dissertation]. "L'viv Polytechnic" National University.

Skalski, K. (2009). *Rewitalizacja we Francji – zarządzanie przekształceniami obszarów kryzysowych w miastach.* Wydawnictwo Instytutu Rozwoju Miast.

Zashkilniak, L., & Krykun, M. (2002). *Istoriia Polshchi: vid naidavnishykh chasiv do nashykh dniv.* Ivan Franko National University of L'viv.

Ziobrowski, Z. (2010). *Rewitalizacja miast polskich jako sposob zachowania dziedzictwa materialnego i duchowego oraz czynnik zrownoważonego rozwoju: podsumowanie projektu*. Wydawnictwo Instytutu Rozwoju Miast.