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Post-Soviet Residential Neighbourhoods in Two Second-Order Ukrainian Cities: Factors and Models of Spatial Transformation

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Abstract

Post-socialist urban transformation constitutes an important segment of the contemporary urban studies. In this paper we focused on transformation processes in two typical post-Soviet residential neighbourhoods, built in the period of mass construction in the second half of XX century and located in the Ukrainian cities of Vinnytsia and Kherson. Our goals were to reveal the spatial and temporal transformation patterns, to identify the factors of transformation, and to delineate certain transformation mechanisms and models. The assessment of morphological and functional changes of urban objects was carried out via field observation according to a specially developed methodology with the further comparison of results with urban planning documents reflecting the reality in the beginning of 1990s. Our findings permitted to identify key transformation processes (deindustrialization, commercialization, revitalization, functional diversification), to list a set of factors promoting more intense transformations, and to explain mechanisms defining existing spatial pattern of transformations within the test neighbourhoods. Private commercial activity, including rapid development of retail sector, was the main source of transformation, thus defining its partial, fragmented and somewhere controversial nature. Since the probability of further transformation in each point of the territory is determined by the already existing pattern, the existing heterogeneities tend to enhance with a lapse of time, and therefore the initial stages of transformation are especially important for the further development of the neighbourhood. Despite the similar starting conditions, two neighbourhoods demonstrated different outcomes in terms of modernization, explained by the differences in the urban spatial structure, spatial and sectorial structure of industrial zones, position (importance) of the neighbourhood in the whole city, as well as the economic dynamics of the city. Based on detected factors and mechanisms, we proposed models for further transformation intended to maximize the level of modernization within the entire test neighbourhoods.

Keywords: post-socialist city, post-Soviet residential neighbourhood, spatial transformation, transformation factors, transformation models, Ukraine

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Introduction

The question of post-socialist urban transformation and adaptation to the new competitive market conditions on the background of globalization processes holds a prominent place in the modern scientific discourse. This process has quite diverse forms and consequences. Transformations are not always progressive; in particular, sometimes they are destructive and lead to negative demographic processes, degradation of the city-forming economic base, destruction of the balance between certain functional or morphological components, deterioration of the improvement and aesthetics of urban space, reduced life quality. However, the process of transformation can stimulate positive changes in the functioning of the city: modernization of economy and infrastructure, growth of life quality and reinforced resilience to heterogeneous external and internal challenges. Therefore, the process of urban transformation requires thorough analysis, reasonable evaluation and scientifically sound management.

It is widely acknowledged that the socio-economic transformation of post-socialist economies, resulting in the return of the land and housing market mechanisms paralleled by the withdrawal of the welfare-state principals, triggered the process of socio-spatial polarization (Marcińczak, 2007; Marcińczak & Sagan, 2010), which can be further described in terms of suburbanization, gentrification, segregation and separation (Węcławowicz, 1998). The listed processes have been well known in Western cities and nowadays have penetrated the post-socialist cities (Matlovič et. al. 2001). Nowadays, a wide scientific literature is dedicated to each of the processes. E.g. manifestations and peculiarities of gentrification in post-socialist cities were described on the examples of large cities, including capitals, like Prague (Sýkora, 2005), Budapest (Kovács, 1998; Kovács et al., 2012), Moscow (Badyina & Golubchikov, 2005), Warsaw (Węcławowicz, 1998), Poznan (Kotus, 2006), Vilnius (Standl & Krupickaité, 2004), Tallinn (Feldman, 2000), Tbilisi (Gentile et al., 2015). Issues of ethnic and socio-economic spatial segregation are reflected in contributions of Gentile (2003, 2004), Blinnikov et al. (2006), Stoyanov and Frantz (2006), Marcińczak et al. (2014). Some authors focused on more precise aspects of transition like vigorous commercialization of urban public spaces, including development of retail (Gritsai, 1996; Nagy, 2001; Rebernik & Jakovčić, 2006; Garb & Dybicz, 2006; Sýkora, 2007; Bouzarovski et al., 2014), transformation of industrial areas, including their degradation, rehabilitation and revitalization (Kiss, 1999, 2004; Bárta et al., 2006; Dannert & Pirisi, 2017), metropolitan processes (Borén & Gentile, 2007). Urban development challenges, models and strategies in post-socialist reality, including those related to the urban spatial planning and policy, were discussed by Haase and Steinführer (2005), Axenov et al. (2006), Sýkora (2008), Hirt and Stanilov (2009), Scott and Kuhn (2012), Sýkora and Bouzarovski (2012), Węcławowicz (2013), Golubchikov, et al. (2014) etc. Functional and morphological spatial changes in certain cities were evaluated by Sýkora, et al. (2000), Parysek (2004), Marcińczak (2007), and others.

In Ukraine, a series of studies, focused on spatial transformations in topologically, functionally and morphologically distinct cities has been carried out, including the capital (Melnychuk et al., 2012; Melnychuk & Kovalchuk, 2015), regional centre in industrial region (Gnatiuk, 2017), regional and sub-regional centres in agrarian regions (Melnychuk & Khmelnytskyi, 2015; Melnyk et al., 2016; Oreshchenko, 2016; Gnatiuk & Oreshenko, 2017; Kryvets, 2017), small mono-functional industrial (Gnatiuk, 2017) and agrarian (Melnyk & Batychenko, 2016, 2017) towns, satellite cities of Kyiv's suburbia (Batychenko, 2016; Koroma, 2016; Kryvets, 2016; Melnyk, 2016). Recently, special attention is paid to the transformation of public spaces in big cities as an inherent and dynamic part of urban environment (Mezentsev et al., 2011; Mezentsev & Mezentseva, 2011, 2017; Mezentseva & Palchuk, 2016; Mezentseva, 2017). The review of metropolitan processes in Ukraine and forecast for their future dynamics and spatial patterns were given by Denysenko (2012).

Most of studies in Ukraine, as well as in the other post-socialist countries, are focused on specific aspects of transformations, and cover predominantly the central parts of cities. However, transformation of the post-Soviet residential neighbourhoods, where the majority of the Ukrainian urban population live (and also work and recreate), remains scarcely investigated and deserves more attention. There is also a lack of comparative studies, opening the possibilities to find common essential patterns and, simultaneously, draw comparisons between different alternative development models.

The significant decline in the housing stock after the Second World War and the accelerating growth of urban population encouraged urban planners to search for cheap housing construction methods (van Kempen et al., 2005). The practical realization of such ideas became possible in the late 1950s as a result of new technologies that allowed the massive construction of panel and brick houses. Although such pro-

jects have been implemented in most countries of the Central and Eastern Europe, the Soviet Union had a tremendous scale of such a construction. In order to maximize cost savings and increase the speed of construction, the building was realized according to typical projects without any architectural decorations and minimal technical equipment.

This mass construction typically was carried out in the form of separate residential neighbourhoods, divided by a street network into large quarters, so-called microrayons, usually planned for 5,000-15,000 inhabitants (Smith, 1996). Usually, such microrayons were built after development of a specific and complicated detail plan, including not only residential development, but also health, educational, cultural, sports and retail services. Thus, microrayons were planned to be self-sufficient territories with their own residents and maintenance structures (Ušča, 2010). Typically, the neighbourhood was located not far from one or several industrial enterprises (industrial zone), where most of its economically active inhabitants were employed.

The construction of such neighbourhoods has stopped with the collapse of the Soviet Union. Today, in the process of post-socialist transition, these residential areas are facing many diverse problems and challenges. First of all, due to the collapse or decay of the relevant industrial enterprises, a significant part of the residents lost their jobs. Increasing unemployment and reducing welfare have caused such negative phenomena as the growth of crime, alcoholism, and use of drugs. Respectively, such neighbourhoods have become more dangerous and less prestigious. Consequently, people with higher incomes are trying to leave such areas, while younger population consider such neighbourhoods as a temporary residential place. However, the older residents, predominantly pensioners with low incomes, have the strategy to live in their apartments until death. This contributes to further spatial social segregation.

Moreover, post-Soviet large residential neighbourhoods have typical engineering and technical problems: exhausted water supply, sewerage and central heating networks, poor sound and thermal insulation, dangerous balconies, leaking roofs etc. (Musterd & van Kempen, 2007). Much of the buildings (especially early series of 1950-1960s) were not designed for such a long lifetime. In addition, residents' low incomes limit their ability to invest in housing modernization. Underdeveloped infrastructure including lack of enough parking spaces for private vehicles, playgrounds, sidewalks, benches etc., is also a typical thing (Dekker & van Kempen, 2004). There is also a question of aesthetics: individual buildings and entire microrayons are looking similar, creating the impression of a monotonous and grey city landscape (Murie et al., 2005). Many neighbourhoods have peripheral location on the city outskirts, which impairs the transport accessibility to the city centre and other important locations. All these factors reduce the prestige of these neighbourhoods in the housing market.

However, post-Soviet residential neighbourhoods also have a number of advantages deriving from the obligatory functional zoning and strict observance of building and sanitary norms in the Soviet times. First, all basic social infrastructure is available for residents, including kindergartens, schools, hospitals and outpatient departments. Second, a developed network of public transport, typically buses, trolleybuses, trams and, in the largest cities, underground railway, alleviates the disadvantage of peripheral position. Third, the residents have easy access to basic public utilities: electricity, gas and water supply, central heating. Finally, the presence of significant green yard spaces between houses, which make the neighbourhood similar to the "garden city"; the importance of this factor is confirmed by sociological surveys (Dekker & van Kempen, 2004; Musterd & van Kempen, 2007; Mezentsev & Stebletska, 2017).

Although some scholars argued that the high-rise housing estates may represent the future slums of the 21st century (Szelényi, 1996), more recent studies point out that post-socialist neighbourhoods are relatively stable. Social stratification and segregation in the countries of Central and Eastern Europe, especially in the post-Soviet space, are not so pronounced, on the contrary: post-Soviet residential neighbourhoods are characterized by a social mix, when one block of flats is inhabited with people having significantly different incomes (Kährik & Tammaru, 2010; Neugebauer & Kovacs, 2015; Mezentsev & Stebletska, 2017). Only the blocks inhabited by older people (pensioners) suffered from impoverishment (Węcławowicz, 1998), while similar neighbourhoods with a younger economically active population have maintained their status (Ruoppila & Kährik, 2003). The main reason for this is the fact that the apartments are privately owned by residents after the privatization (free or at reduced prices), so the mechanism of rental price difference, which determines the overwhelming trend of gentrification in traditional capitalist world, practically does not work in the post-Soviet countries. Numerous studies show that the level of satisfaction with residence place is quite high (Bernt, 2007; Herfert at al., 2013), often much higher compared to the central areas of the city (Kovacs & Douglas, 2004).

The total demolition of post-Soviet neighbourhoods, or at least their most declining parts, in modern Ukraine is not on the agenda, as it require significant funds and create a number of social risks. Therefore, real strategies will be limited to less radi-

cal means of revitalization and regeneration (Dževrus, 2013). In this context, the analysis of really existing more or less successful transformation models of post-Soviet residential neighbourhoods becomes very important from the practical side.

Thus, the aim of this paper was to reveal manifestations, factors and models of morphologic and functional transformations in the residential post-Soviet neighbourhoods. In particular, we posed the following research questions:

1. What functional and / or morphological transformations have taken place in post- Soviet residential neighbourhoods, and by what basic processes these transformations are driven?
2. What are the nature / pattern of transformations in time and space: continuity or discreteness? In other words, was the process of transformation uniform in nature during all post-socialist transition, or differentiated between certain periods? And, is a whole neighbourhood covered by transformations, or they are concentrated in certain topological or functional areas?
3. What factors have influenced the observed transformations? Are these factors identical for different cities / neighbourhoods? How much the character of transformation is determined by the general features of post-socialist urban development, and how much it is shaped by the individual characteristics of a particular city or neighbourhood?
4. Is it possible to delineate certain transformation mechanisms and to define general transformation models, which, if successful, could be considered by urban planners for the further development of post- Soviet residential neighbourhoods?

Data and Methods

The changes in urban space in this study were characterized by fixing changes in urban spatially localized objects that are relatively stable and immovable in the system of geographical coordinates: residential and non-residential buildings, public and sacred spaces, infrastructure objects, etc. We distinguished between morphological and functional changes of spatially localized objects. Morphological change is a change in the spatial configuration of an object, its size, appearance, or internal structure. Functional change is a change in the type of human activity for which this object is intended and used. An assessment of the current morphological and functional state of urban objects was carried out by field observation according to a specially developed methodology, some elements of which were taken from the paper of Melnychuk, et al. (2016).

First, a function was determined for each urban object detected within a test neighbourhood. We considered 8 main functional types of urban objects which certain subtypes (Table 1). The same object may have several functions simultaneously, however, almost always one of them will be the main one; this is the function without which the existence of the object as such would not be possible. E.g., placing a store on the ground floor of a residential building would be impossible without the existence of a residential building: thus, residential function in this case is the main, while service function - an additional one. Estimation of the functional dynamics was carried out by comparing the results of field observation with urban planning documentation of the late 1980s.

Then, morphological changes were studied by assessing the level of modernization of spatially localized objects in relation to their condition fixed by the urban planning documentation of the 1980s. For each spatially localized object, we made an assessment of its condition, and, if possible, the level of improvement of the facade and courtyard areas (Table 2). The integral modernization index was calculated according to the formula: $MI_{int} = (C + F + Y)/3$, where MI_{int} – integral modernization index, C – condition of the spatially localized object, F – level of façade territory improvement, Y – level of level of yard territory improvement. Consequently, the value of MI_{int} for each spatially localized object lies between 0 (the lowest possible index) and 1 (the highest possible index). Then the test neighbourhoods were covered with a 200 m grid, and mean values of the integral index of modernization were calculated for spatially localized objects located into each grid quadrangle. Based on these mean values, we created isoline maps, reflecting the spatial differences in the level of modernization within each test site. Such an approach allowed to abstract from purely local fluctuations in the level of modernization but to capture more general patterns.

In this study we focused on two rather typical post-Soviet residential neighbourhoods - Vyshenka and KhBK, located in two second-order Ukrainian cities, Vinnytsia and Kherson respectively (Figure 1).

The construction of Vyshenka began in the 1960s. At the moment, Vyshenka is the largest residential neighbourhood of Vinnytsia, accounting for about 120,000, which constitutes almost one third of the total city population. The neighbourhood occupies area of about 10 km2 and is divided by streets and avenues into 10 microrayons. The neighbourhood encloses mainly residential development, however, its substantial part is

occupied by industrial zones, vocational and higher educational establishments (in particular, Vinnytsia National Technical University) and scientific institutions. Residential development of Vyshenka consists of panel and brick 5-storey "khrushchevkas" of the 1960-70s, panel and brick 9-storey houses of improved planning of the 1970-80s, and modern buildings of the 2010s, represented by brick high-rises. In Soviet times, the residents of Vyshenka were employed mostly in machine-building enterprises (precision and electrical engineering), built in industrial zones in the eastern and western parts of the neighbourhood.

The KhBK neighbourhood (pronounced as "khebeka") started to be built in the mid-1950s near the Kherson Cotton Factory (Khlopchatobumazhnyi Kombinat), from which the neighbourhood got its name. In addition to housing development, the neighbourhood

Table 1. Functional assessment of spatially localized urban objects

Functional types	Functional subtypes
Residential development	• high-rise apartment buildings (over 5 floors) • low-rise apartment buildings (1 – 5 floors) • low-rise private buildings and cottages
Public services	• Education • Culture • Trade • Catering • Social Security • Sports • Science • Administration • Financial institutions • Medical institutions • Legal institutions • Tourism and travelling • Housekeeping services • Lotteries • Security
Infrastructure	• Roads • Communications • Municipal utilities • Public utilities • Institutional infrastructure
Sacral space	• Cemeteries • Memorials, monuments • Religious buildings
Open space	• Public gardens • Parks • Forests • Squares • Pedestrian streets • Areas unsuitable for development due to the natural conditions
Industry	• Local significance • Citywide and regional significance • National significance or unique
Office centres	Office centres of all kinds
Public organizations	Public organizations of all kinds

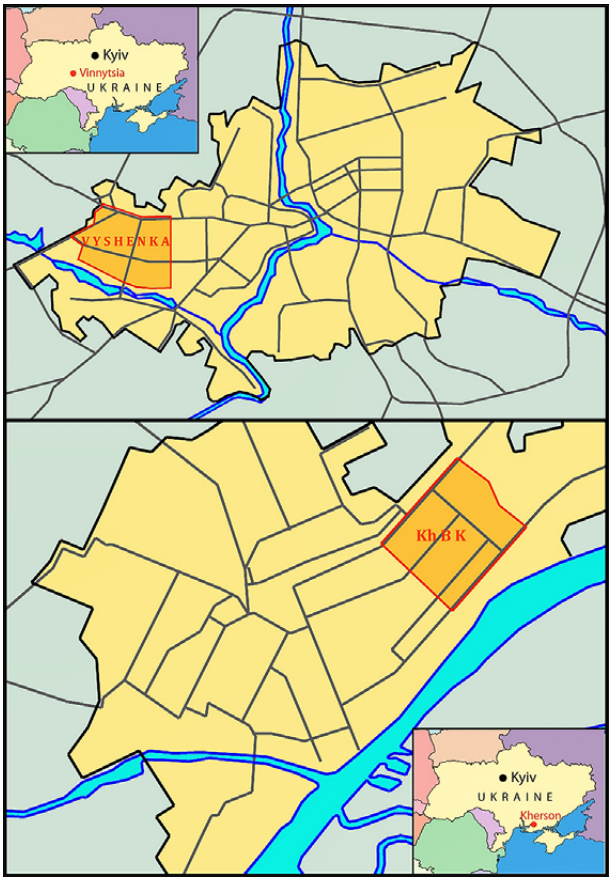

Figure 1. Location of the tested neighbourhoods

Table 2. Morphologic assessment of spatially localized urban objects

Condition*		Façade territory**		Yard territory***	
Valuation	Score	Valuation	Score	Valuation	Score
Exclusive or innovative	1.00	High improvement	1.00	High improvement	1.00
New or modernized	0.75	Partial improvement	0.50	Partial improvement	0.50
Partially modernized	0.50	Low improvement	0.00	Low improvement	0.00
Requires modernization	0.25				
Distressed and wreck	0.00				

** save for sacral and open urban spaces; ** save for infrastructure, and services in cases when impossible to evaluate (e.g., if a shop is located on the ground floor of residential building, the level of improvement was assessed for the residential building in general only); *** save for infrastructure, sacral and open urban spaces, and services in cases when impossible to evaluate (e.g., if a shop is located on the ground floor of residential building, the level of improvement was assessed for the residential building in general only)*

includes an industrial zone, a number of vocational schools, and also Kherson National Technical University. KhBK still remains one of the largest neighbourhoods in Kherson accounting approximately for 70,000 residents and occupying area of about 9 km2. Residential development is made up of brick Stalin-era buildings of 1950s, panel and brick 5-storey "khrushchevkas" of the 1960-70s, panel and brick 9-storey houses of improved planning of the 1970-80s, separate fragments of low-rise private buildings, which existed on the territory before the mass construction, as well as individual samples of modern development represented by brick multi-story buildings and cottages. The neighbourhood is broken down by streets into about 14 residential microrayons and the industrial zone.

Results and Discussion

Functional changes

The first glance at the maps of functional changes (Figure 2) shows functional diversification that occurs within both housing and industrial zones.

The industrial zones of both neighbourhoods experienced the most dramatic functional changes. Special aspects of functional diversification within the industrial zones are determined by the process of deindustrialization, resulting in partial disappearance of the industrial function with the simultaneous emergence of new functions. As of today, within the industrial zones, operating industrial enterprises neighbour on different service facilities, warehouses, residential houses and religious buildings.

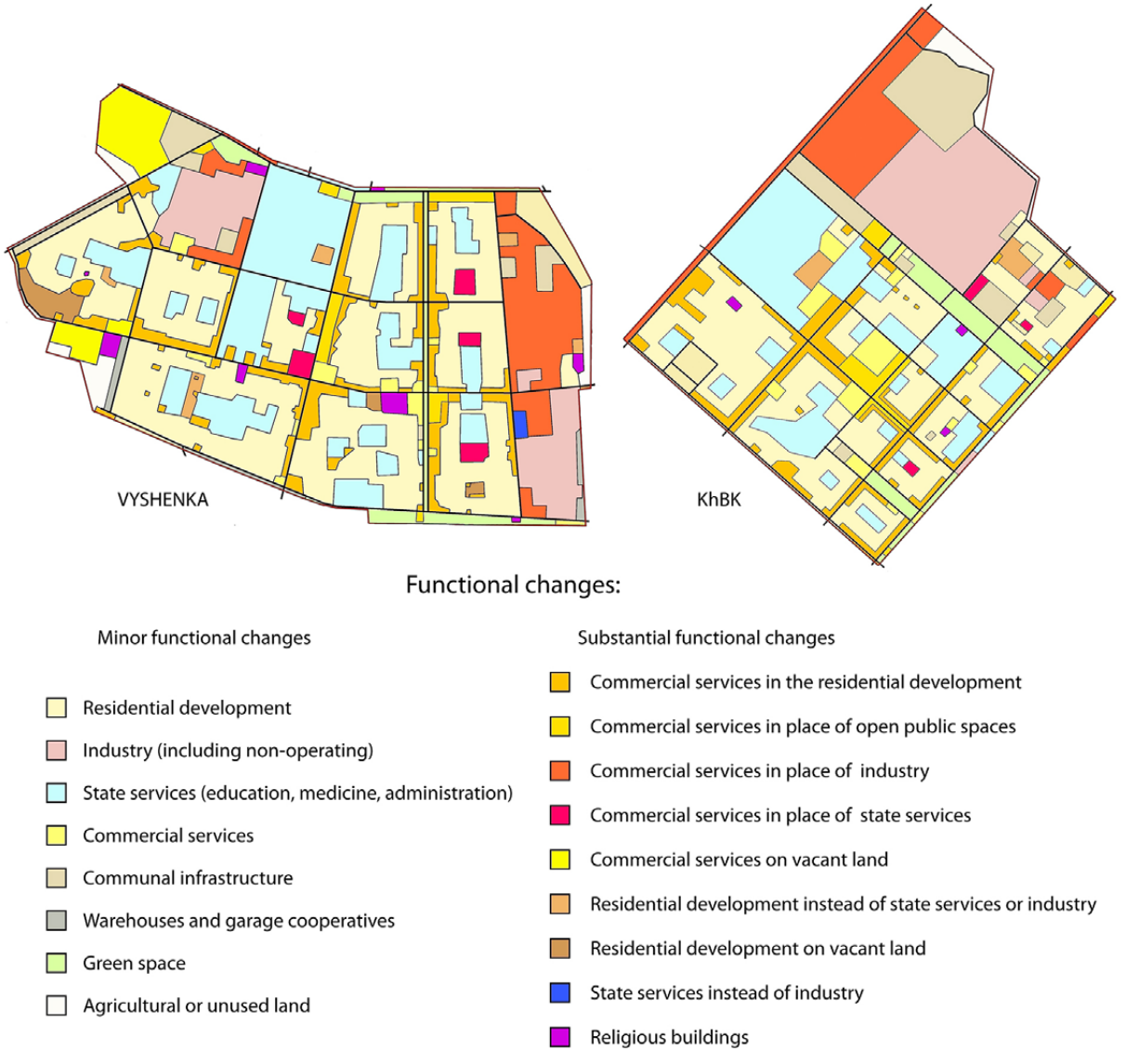

Figure 2. Functional changes within the tested neighbourhoods

Development trajectories of the industrial enterprises within the test neighbourhoods are described, firstly, in terms of preservation or loss of specialization, and secondly, with relation to the level of preservation of the industrial function. The majority of industrial enterprises have undergone partial or complete conversion in accordance with new public queries and market economy requirements. Simultaneously, some enterprises managed to maintain their initial specialization. In respect to the level of preservation of the industrial function, the following three trajectories are possible: 1. Complete preservation of the industrial function; 2. Partial deindustrialization with the partial transfer of assets (including the landsite) into ownership or lease to other businesses; 3. Complete disappearance of the industrial function with the subsequent parcelling of the former industrial site between other economic entities.

Since the owners of surviving industrial enterprises primarily try to get rid of facade parts of industrial site, stretching along the streets and therefore promising to accommodate service sector facilities, industrial enterprises are apparently hiding inside the quarters, disappearing from the urban landscape for the innocent observer. Simultaneously, the change in the functional structure is clearly visible along the streets, where often clusters of specialized services are shaped.

Although the general trends of functional transformation of industrial zones are similar in both test neighbourhoods, there are also significant differences. Compared with Vyshenka, KhBK is characterized, first, by a significantly higher level of deindustrialization and a significantly lower level of functional diversification. Apparently, this is due to the differences between sectorial and organizational structure of the two industrial zones. The presence of many enterprises with different specializations in Vyshenka resulted in greater resilience of the industry to challenges and greater potential for functional diversification compared to KhBK, where one huge factory constituted the core of the industrial zone.

However, the most noticeable functional transformation within the industrial zones of the two neighbourhoods was the emergence of large shopping and entertainment malls in the converted buildings of the former large enterprises: MegaMall in Vyshenka and Fabrika ("Factory") in Kherson. The opening of these facilities led to further changes in the functions of the adjoining territory within the former industrial zones due to the concentration of smaller service facilities.

With regard to the actual residential zone of both neighbourhoods, the main factor for functional diversification was commercialization as a result of the emergence of numerous private small-scale service providers, predominantly retailers. New institutions of the service sector appeared mostly by removing from the housing stock apartments on the first floors of multi-apartment buildings. In addition, a large number of service facilities were located in small architectural forms (vendor stands, cabins, etc.). Some service facilities were located in separate capital buildings, constructed on vacant land plots. The new phenomena were food and non-food markets where trade was conducted mainly in metal trading containers. There was also a change in the functional purpose of educational (primarily preschool) and scientific premises: some of them became used as warehouses, offices or shops. All these newly-appeared service institutions supplemented the existing network of service facilities located in specially designed premises on the ground floors of residential buildings, their annexes or separate buildings.

Especially intensive loci of commercialization in residential zone developed along the periphery of the quarters, along the streets, near public transport stops and major transport interchanges, around the markets and shopping malls, as well as in areas of new residential development.

Besides commercialization, an important feature of post-socialist transformation was sacralisation of urban space, manifested in the emergence of numerous religious buildings located within open green spaces, vacant land plots, former industrial zones and other areas not used for direct purpose. Churches near the hospitals are also typical. As a rule, religious institutions are located in specially constructed buildings, although in some cases - in the reconstructed premises of other facilities.

The development of reserve areas was by means of new housing construction, construction of large stores, including chains, as well as the construction of religious buildings. The intensity of these processes in Vyshenka is much higher in comparison with KhBK due to the fact that Vyshenka has significant spatial reserves for further growth, whereas in KhBK free land plots for development are practically exhausted.

The sites of educational establishments have practically not changed their functions, while green urban spaces were affected by the processes of commercialization and sacralisation: some former open public spaces were converted into markets and later transformed into trade pavilions and shopping malls; some green spaces hosted religious buildings.

Morphologic changes

Three components of modernization were detected within the test neighbourhoods depending on the source and purpose of the investments:

1. Municipal investments in the housing, public utilities and urban infrastructure.

2. Investments of the residents in the modernization of housing.
3. Private investments in commercial activity.

The main contribution to the modernization of the urban space within the two neighbourhoods belongs to the last component. Therefore, areas with a relatively high level of modernization, as a rule, are located in places of concentration of private service facilities, predominantly retail, which, in turn, tend to locate in the most crowded places (main streets, public transport stops, and open public spaces with high level of improvement, markets, large stores and shopping malls). That is why highest levels of modernization within residential zones are typically observed along the streets and around important intersections, while in the middle of microrayons the level of modernization is significantly lower.

This peculiarity of the spatial differentiation in the level of modernization is typical for both test neighbourhoods, but it is especially pronounced in the case of Vyshenka, whereas in KhBK the pattern of isolines is less tied to the street network (see Figure 3). The reason for this, besides the somewhat higher intensity of commercialization in Vyshenka comparing to KhBK, is the difference between the forms of commercialization and the average level of modernization of functionally identical service facilities. KhBK still have large badly organized markets, factually constituting a set of small architectural forms, predominantly metal trading containers. These markets are surrounded by areas of semi-legal or even illegal trade. The road infrastructure around the markets is usually worn out, which also afflicts the inhabitants of neighbouring residential buildings. Public transport stops are usually surrounded by semi-chaotic clusters of kiosks. Simultaneously, in Vyshenka, such markets also existed from the beginning of the 1990s to the middle of the 2000s, but then were replaced with modern shopping malls or rebuilt as covered pavilions. The number of small architectural forms is minimized, and those that are still functioning are stationary structures having satisfactory design. On the whole, there are 2 large shopping malls, 4 large stores and up to a dozen of supermarkets within Vyshenka, while KhBK has only one large shopping mall (Fabrika) and one large chain store (EpiCentr) both located outside the residential zone. However, it should be mentioned that Fabrika rents out premises for many service facilities, including chain stores and caterings, boutiques of well-known companies, cinemas, etc., but all these facilities are all concentrated in one place, while in Vyshenka these services are more or less evenly dispersed within the neighbourhood.

Industrial zones, where private investments were practically the only source of modernization, have expressed variability (patchiness) in terms of modernization: it is particularly high in the areas of successful revitalization (large shopping malls, office centres, residential development, educational institutions, religious

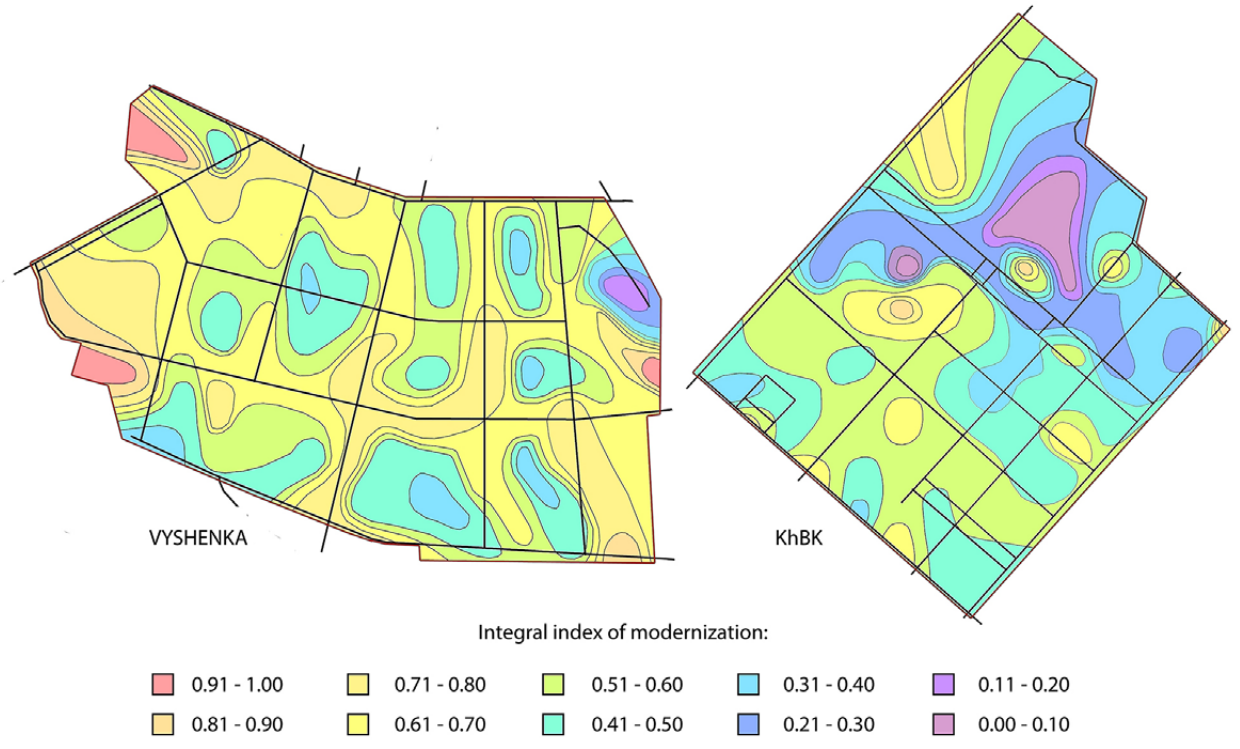

Figure 3. Morphological changes within the tested neighbourhoods

buildings etc.), but rather low on the rest of the territory, especially in places where warehouses and garage cooperatives are concentrated. In general, industrial zone in Vyshenka is characterized by a significantly higher overall level of modernization compared to KhBK due to more successful examples of revitalization and still operating industrial enterprises.

Partial modernization of residential development is practically of a widespread nature and is manifested in the repair of inter-panel joints, partial external insulation, replacement of old wooden glass units with modern metal-plastic or wooden ones, installation of code locks and intercoms. These findings are very similar to those depicted by Soaita (2012) for Romanian large residential estates. A somewhat higher level of improvement is typical for relatively new microrayons. In addition, more intensive improvement is typical for areas around the new residential developments. This is partly due to the efforts of the developer company, which, at its own expense, carries out partial beautification of the adjoining territory. However, the main driving force behind this phenomenon is the initiative of the residents of the houses bordering on the new buildings, having a desire to recreate the modern standards in their own yards. Two mechanisms for the practical implementation of such an initiative have been observed. The first is realized by attracting funds from the city budget within the framework of municipal-private partnership programs. The results of such cooperation are installation of modern playgrounds, building parking facilities for private vehicles, repair of roads and sidewalks. The second mechanism is to make improvement using own resources: creation of flowerbeds, alpine skylights, wooden or wicker fences in the yards, as well as installation of original carved wood figures using also other improvised materials (rubber, plastics, cardboard, plastic bottles, etc.).

Till the beginning of 2010s, the city administration practically did not participate in the modernization of both test neighbourhoods due to the lack of budget funds. At the present stage, the active financial and organizational involvement of the municipality favourably distinguishes Vyshenka from KhBK. Since 2015 the oldest part of Vyshenka, built up by five-story panel houses, is a subject of a complex centralized improvement. Typical reconstruction involves construction of sidewalks and parking lots, restoration of road covering, organization of resting places by installing benches, arbours and playgrounds. Intensive transformations also cover the space around secondary schools. According to the practice, widespread in Vinnytsia, a private developer signs an agreement with the municipality and carries out improvement of the school territory, including, first of all, reconstruction of school sports grounds. Instead, the school transfers part of its territory to an investor for the construction of multi-apartment residential building. Moreover, since 2015, the major development trend of Vyshenka was a large-scale improvement of green public spaces. In particular, the municipality has partially completed a complex reconstruction of the main recreational zone, Prospekt Kosmonavtiv (Avenue of Cosmonauts): the reconstruction involves re-planning of pedestrian paths, creation of bike lanes, renovation of grassland and landscape design, construction of light-and-musical fountains, installation of new ergonomic benches and wireless street lighting system, as well as sockets for gadget recharge. In 2016, the improvement of the central alley and the main square of Lisopark (Forest Park) took place, including a new gravel coating, a bike lane, a playground, and information stands. Also, the municipality announced a large-scale project on the reconstruction of the Druzhby Narodiv Park in the southern edge of the neighbourhood. Furthermore, projects for the complex repair and reconstruction of a number of streets have been implemented, a new tram line has been built, and a reversible tram ring with a maintenance point has been reconstructed. At the same time, in KhBK, where municipality makes practically no investment into urban improvement, the areas of secondary schools and green public spaces (e.g. boulevard on Zalaegerszeg Street, which separates the main housing development from the industrial zone) are in an abandoned and even dreadful condition.

The common feature of Vyshenka and KhBK is the low level of modernization within the university campuses. This is especially true for their peripheral parts, represented by student dormitories, sports complexes, dining halls, motor depots and housekeeping departments. This is caused, firstly, by the lack of university funds for the improvement of the peripheral territory, and, secondly, by the total absence of private business as a modernization factor: private businesses, with rare exceptions, are not allowed to be located within the campuses.

Factors and mechanisms of transformation

It follows from the previous subsections that the rapid development of private entrepreneurship in its various forms and manifestations was the main source of transformation within the test neighbourhood, especially at the initial stage. Thus, the spatial pattern of transformation depends, above all, on the allocation factors of such private enterprises. Two main factors can be traced: possibility of placing a facility (availability of the appropriate premises or possibility of building such premises), and maximal accessibility for consumers.

Accessibility for consumers was particularly critical for small businesses that could be located almost everywhere within residential development zone, e.g. in redesigned residential premises or small architectural forms. Therefore, at an initial stage, these enterprises concentrated in most crowded areas, and stops of public transport were exactly such places. As a rule, public transport stops are located at the intersection of the streets, so in most cases these intersections became the concentration places for new private service facilities. With the lapse of time, small service facilities began to be located also along streets with intensive traffic of transport and pedestrians, intercepting the transit flow of consumers. The concentration of service facilities in these primary loci has been increasing over time as a result of the clustering of the facility services, especially of the similar specialization. At this stage, the concentration of visitors grew even more, as people came here purposefully to meet their certain demands regardless of the transport stops etc. However, configuration of the public transport network was only one among many factors preconditioning high accessibility for consumers. E.g., modernized open public space has great chances to turn into popular leisure place for residents. This is quickly reacted by private business, changing the function and aesthetics of the surrounding area. Areas of urban transformation as a result of the small private entrepreneurship are shaped also in and around areas of new residential development. This is due to the following circumstances: first, new residential buildings are typically designed with ready-made premises for business needs on the ground floor; second, private entrepreneurs are attracted by the aesthetics and status of the location and the availability of profitable wealthy clientele living in newly constructed buildings.

As for large enterprises (markets, chain trade and catering, shopping malls, cinemas, etc.), availability of placement is at least equivalent but sometimes even more important factor than access for consumers. Therefore, large enterprises typically have the following locations: existing specially equipped premises or structures, inherited from the Soviet large department stores; vacant areas within residential zone or on the periphery of the neighbourhood; industrial sites of closed industrial enterprises. In any case, the emergence of a powerful service facility led to an intensive influx of consumers (coming not only from the neighbourhood but even from the whole city using their own vehicles), which stimulated the further development of private entrepreneurship within adjacent areas and, consequently, their functional and morphological transformation. Particularly powerful transformation effect is observed in the case of a combination of all the favourable factors: the location of a large service facility within a residential zone in a place with good transport accessibility for all categories of consumers.

Transformations are also observed around religious buildings. They are manifested by construction of auxiliary structures around the main temple and beautification of the surrounding area. However, in this case, the transformation is limited exclusively to the site of the religious building and its immediate surroundings.

The processes of transformation inspired by the municipality, in contrast to private business, are not spontaneous, and therefore it is difficult to describe some general patterns and regularities. Therefore, such transformations can be predicted only by knowing the priorities of the municipal policy in each particular city. E.g., in Vyshenka, the oldest residential quarters and the areas around secondary schools are turning recently into the loci of intense transformations due to relevant municipal renovation practice, which is not observed in KhBK.

As for the investments of the residents in the modernization of housing and the improvement of the adjoining areas, they are somewhat higher in the quarters of relatively new development (starting from 1980s) and in areas adjacent to the recent residential development.

Thus, the following areas have the greatest potential for transformation (potential for transformation we define here as a probability of transformation in a certain point of urban space):

1. Areas adjacent to public transport stops, as well as streets, intersections, crossroads, streets and transport interchanges with the largest traffic.
2. Areas adjacent to the existing service facilities (especially those of trade, catering and leisure); the larger is the service facility - the greater is the potential for transformation.
3. Areas adjacent to open public spaces with a high level of improvement.
4. Industrial sites of enterprises that have stopped their operation or are currently optimizing their assets.
5. Other areas, depending on the actual municipal policy.

The map, demonstrating most and least transformed areas (by the sum of functional and morphological changes), with aforementioned factors overlaid, proves the reliability of our conclusions (Figure 4).

In all cases a key underlining condition is the large concentration of people (consumers) that attracts private business. This concentration serves as either the primary factor of transformation (item 1), or arises (or increases) as a result of the already existing changes, reinforcing further transformation (items 2-5).

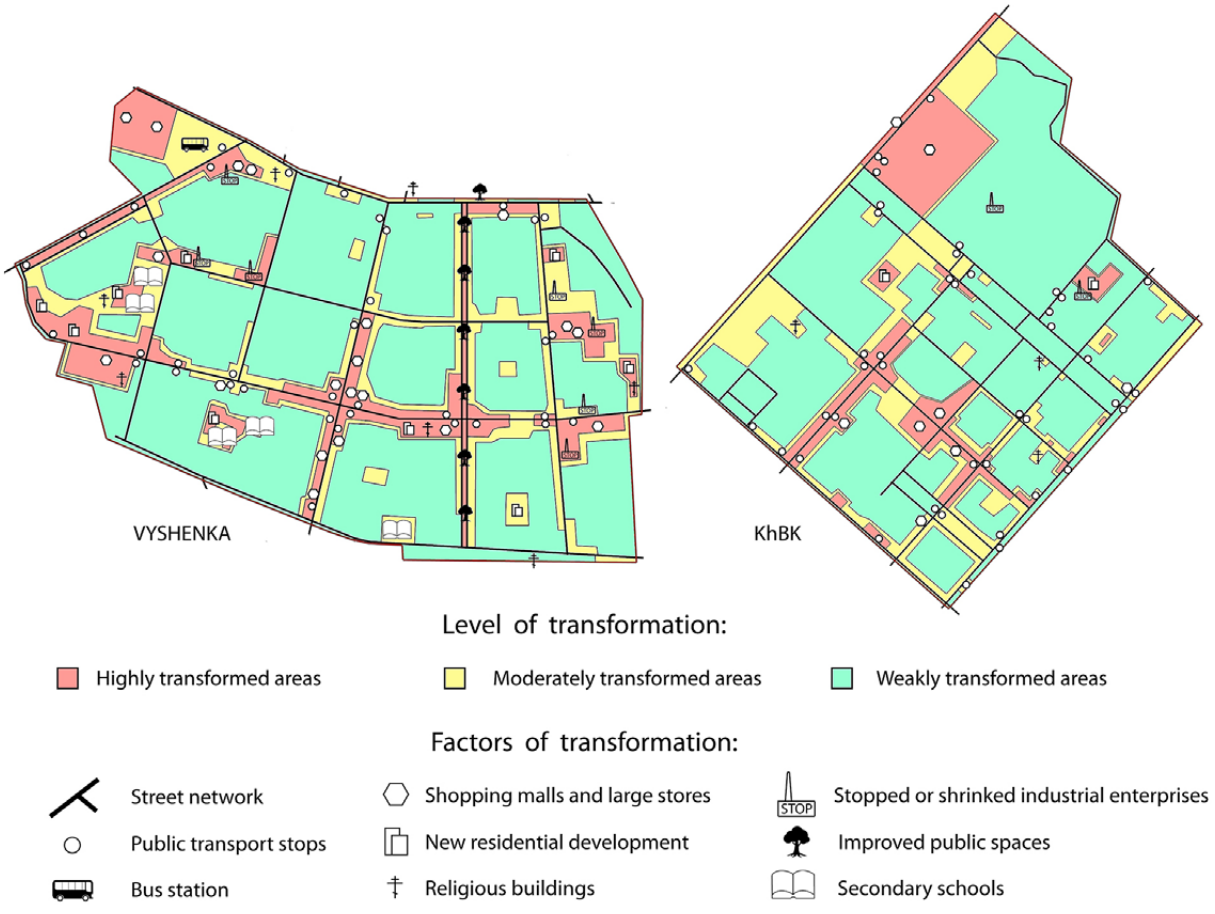

Figure 4. Spatial patterns of transformation and its factors

Based on aforementioned facts and speculations, we may conclude that areas with greater and smaller potential for transformation shape a continuous spatial field of transformation potential. In the early stages, the development of this field is rather spontaneous and can occur in different scenarios, passing through numerous bifurcation points. E.g., large shopping mall may be located with the same probability in different parts of the former industrial zone, or at different neighbouring crossroads; reconstruction of this or that open public space is also a matter of chance. However, having once emerged, such loci of transformation will intensify their influence on the adjoining territory, defining its further changes. Thus, since the probability of further transformations in each point of the territory is determined by the already existing pattern, the already shaped spatial structure has the ability to consolidate in the future, fixing the existing heterogeneities. Given this fact, the initial stages of transformation are especially important for the further development of the neighbourhood, since they are responsible for key spatial patterns and models that are rather difficult or even impossible to change on the subsequent stages.

Models of transformation

The theory and practice show the possibility of different models of post-socialist transformation for post-Soviet residential neighbourhoods. These models differ in the ratio of different transformation factors, their spatial pattern, the set and sequence of stages.

The transformation of the test neighbourhoods, which in the early 1990's were in similar starting conditions, can be divided into several stages: 1. Deindustrialization. 2. Commercialization due to small business. 3. Commercialization due to medium and large businesses. 4. Activation of local governance participation in urban transformations.

The first stage (1990s - early 2000s) was characterized by reduction of industrial activity. In result, large areas of former industrial zones stopped to be used for purpose and fell out of the urban public life, turning into neglected and deserted greyfields and brownfields. The second consequence of deindustrialization was that industry workers were pushed out on the labour exchange. The fall in the living standard has practically brought zero investment of the people to housing modernization. Municipal and state investments in the development and maintenance of infrastructure were also minimized.

The second stage (mid-2000s) was marked by the intensification of private entrepreneurship in the service sector. The prerequisites for this were the revival of the economic situation in the country, the obvious shortage (rooted in the planned economy period) of quality and diverse goods and services, as well as the presence of a significant number of economically active population pushed out from industry. This initial commercialization had two main manifestations with a different effect on the beautification of the territory and the life quality. On the one hand, the emergence of large, semi-chaotic and bad-organized markets (which, however, were a source of survival for a large segment of the population) in place of former open public spaces has led to overload and deterioration of urban infrastructure, numerous inconveniences for neighbouring residents of houses and damage to the aesthetics of urban space. On the other hand, placement of service facilities on the ground floor of residential buildings was accompanied by improvements of the surrounding area, creating in this way something like modernization oases in the grey post-socialist desert. Such transformations were concentrated within the residential zone along the network of streets, primarily in the vicinity of public transport stops and major transport interchanges.

The third stage (end of 2000s - the first half of 2010s) was marked by activation of the medium and large business that began to invest in the restructuring of former Soviet supermarkets, as well as the revitalization of the abandoned objects of industry, education, science, etc. At this stage, availability of premises (or possibility of building such premises) was an important location factor together with good transport accessibility. These stores and especially shopping malls had intense traffic of visitors due to still unimproved open public spaces and growing popularity of new types of entertainment like shopping, visiting a cafe or restaurant, bowling, billiards, skating, etc., thus creating a huge potential for further commercialization (and, consequently, transformation) of the adjoining area. Location of new shopping malls on the former industrial site caused partial revitalization of the industrial zones, as they again became integrated into the urban space.

If earlier the transformation process of both test neighbourhoods occurred without significant differences, at this stage, development scenarios began to differ.

First, Vinnytsia in that period started to demonstrate intensive economic development in comparison with Kherson, and Vyshenka had no competitors among other peripheral residential neighborhoods in terms of population and importance in the urban spatial framework of the city, which cannot be said about KhBK since it is comparable to some other residential neighborhoods in Kherson. Therefore, the first major stores and malls in Vyshenka opened significantly earlier (2007-2011) than in KhBK (2012).

Second, Fabrika and EpiCentr are located nearby each other and on the periphery of KhBK, in the former industrial zone, and are separated from residential zone by a belt of communal enterprises, warehouses and abandoned green spaces, which minimizes their direct impact on the residential zone. Regarding the transformation of the rest of the industrial zone, revitalization of the other two abandoned buildings of the cotton factory requires large investments comparable to the investments into Fabrika, making it difficult to search an investor for such a project.

Third, Fabrika, concentrating various facilities in its premises, in one place on the map, has exhausted the existing demand for a long time, blocking in this way the further construction of large stores and malls in KhBK. Instead, in Vyshenka, such facilities are dispersed across the neighbourhood; therefore their fields of increased potential for transformation more or less evenly cover the whole neighbourhood.

Finally, in Vyshenka, due to the greater investment potential and stronger coverage of the residential zone by transformations, large stores, malls and trade pavilions were constructed on the places of the former markets, existing from 1990s. Thus, a fundamentally different level of improvement of the respective areas was achieved, as opposed to the KhBK, where primitive markets have survived to these days in the heart of the residential zone.

At the fourth stage, started in the middle 2010s in Vyshenka, private investment were joined by those of municipalities, which generated additional transformation factors: public spaces and secondary schools.

Thus, although Fabrika can undoubtedly be considered a successful revitalization project for the city of Kherson, its opening had limited and even negative consequences for KhBK neighbourhood. The multinuclear model, which involves creation of many transformation loci of different types, evenly distributed throughout the area, including within the residential zone, has proved to be more effective.

The aforementioned stages and their sequence could be different in the case of different social, economic and political transition of the country. E.g., municipal investments and policies of integrated urban development at the initial stages of transformation would have a positive effect. However, even under the actual conditions of the post-socialist transition in Ukraine, we see the possibility of more and less successful development models. In particular, the case of Vyshenka could be an alternative scenario for KhBK, which, unfortunately, was not implemented.

Could the case of Vyshenka be an alternative scenario for KhBK? Obviously, absolute analogy is unattainable due to differences in the general urban dynamics of the respective cities. However, different localization of the initial transformation loci could lead to the fundamentally other final results. If Fabrika did not open in 2012, other investors would have an incentive to invest in the construction of shopping malls and hypermarkets in the central part of the residential zone, e.g. in the place of Dniprovskyi market. In this case, we would receive a powerful transformation nucleus for the entire residential zone. Visitors from the other parts of the city could meet their needs not only in such shopping malls, but also in nearby small facility services, which is impossible in the present situation, since Fabrika is located in isolation on the periphery of the neighbourhood. In addition, if the abandoned green area on Zalaegerszeg Street, which is currently serving as a barrier between the residential and former industrial zones, was well-maintained, this would not only stimulate the transformation of the adjoining area, but would also create a comfortable pedestrian corridor between residential zone and Fabrika.

Moreover, the existing model of KhBK transformation has some comparative advantages for future development. Since large stores and shopping malls are located outside the residential zone, there are fewer seizures and damages to public spaces for the needs of private sector. If the municipality of Kherson will strictly ensure compliance with construction norms while transforming existing markets, the construction of such facilities in the residential zone may be less aggressive in relation to the urban environment and to the residents comparing to Vyshenka.

Based on knowledge of the identified transformation factors and the spatial structure of the test neighbourhoods, we proposed some spatial models for their further transformation (Figure 5). The meaning of such proposals is the creation of the minimum sufficient number of transformation nuclei (based on existing conditions and possibilities) that would allow the most comprehensive coverage and maximize the level of modernization of the entire neighbourhood.

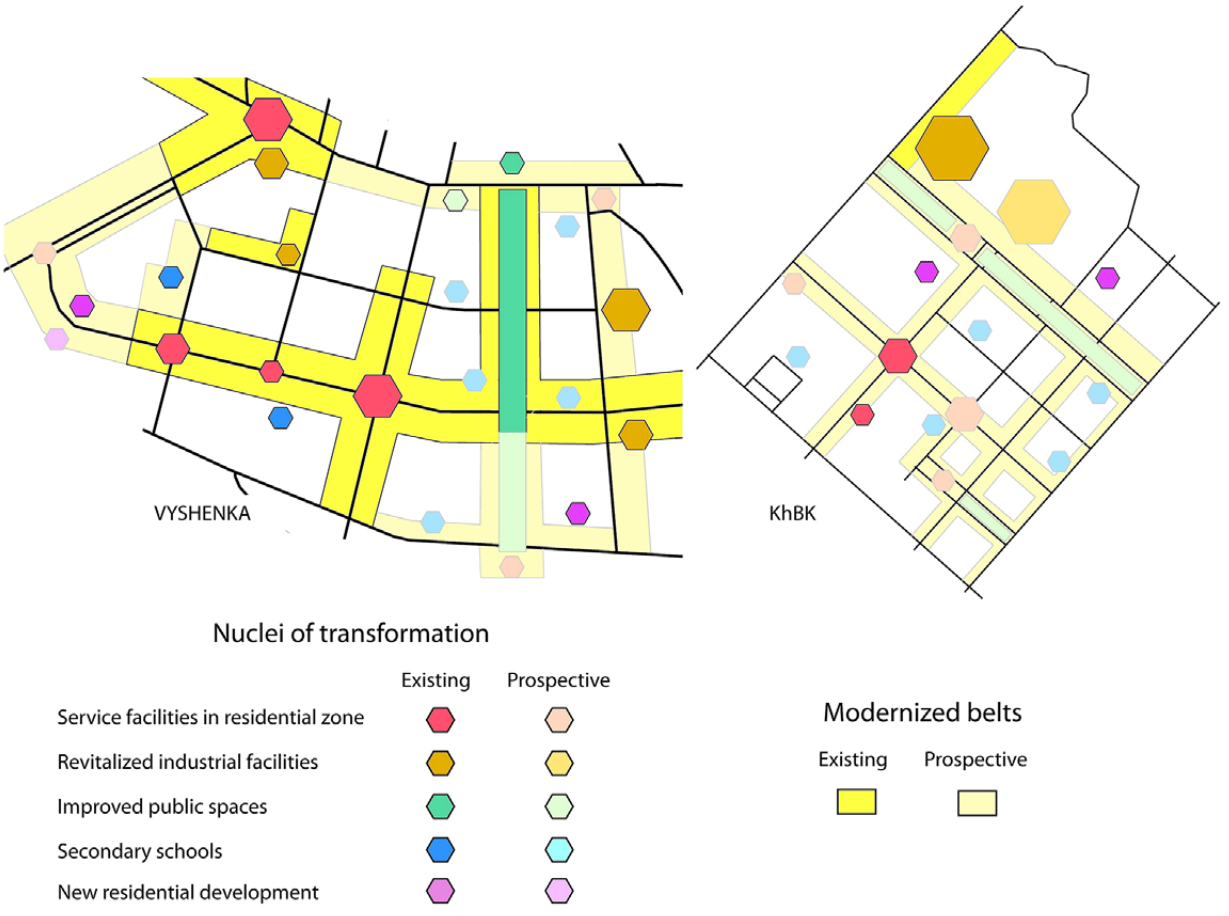

Figure 5. Proposed transformation models for test neighbourhoods

Conclusions

Post-Soviet neighbourhoods have undergone a significant transformation expressed both in functional and morphological changes. Functional diversification, including combination of several functions within a single territory, is a typical pattern of the modern period of development compared with the Soviet period, when the functional zoning of the territory was quite rigid. This contributes to the revitalization and internal integration of the neighbourhoods. However, processes of modernization are spatially fragmented, incomplete, and often contradictory: due to the lack of a consolidated municipal and / or state policy, uncontrolled private investments constitute the main source of transformation; therefore, existing transformation models reflect, first and foremost, the interests of private business, but not the interests of residents. Slightly paraphrasing Marcińczak's wording about gentrification in post-socialist city (2007), we may state that modernization takes the form of oases, while the total restoration remains a song of tomorrow. Post-Soviet capitalism widely remains the capitalism of ground floors and street facades. Nevertheless, we have not found any radical decline, including housing deterioration, as well as deep socioeconomic polarization. Test neighbourhoods continue to play an important role in the spatial functional structure of their cities.

Although we have generally identified the same factors, mechanisms, and stages of transformation in both test neighbourhoods, apparently different result of this process is explained by the differences in the urban spatial structure (network), spatial and sectorial structure of industrial zones, position (importance) of the neighbourhood in the whole city, as well as the economic dynamics of the city. The early stages of modernization often have crucial importance as once emerging spatial patterns tend to enhance in future. Interestingly, large investment projects, which are clearly beneficial for the city as a whole, may have a negative impact on the development of the neighbourhood in which they are located.

Considering the scale of the Soviet mass housing construction, post-Soviet neighbourhoods will soon compel attention of urban specialists trying to inspire them with new life. The knowledge of the factors, mechanisms and basic models of transformation will permit to better understand the instruments and measures needed to push the transformation toward more successful scenarios.

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