

EVALUATION OF SPATIAL TRANSFORMATIONS IN THE CENTER OF LVIV ON THE EXAMPLE OF SVOBODY AVENUE

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Abstract. Since Lviv is a popular tourist destination, a major IT center, and a temporary residence for refugees from the eastern part of the state during the war, its role attracts people, and an active modern lifestyle can come in conflict with the restrictions of the preservation of the city's historical heritage. Therefore, the modern state of the city's historical core needs to be evaluated and compared to its past state. This research evaluates spatial metamorphosis by analyzing the old to modern city shift. Svobody Avenue, Lviv's main street, was chosen to represent the area of analysis. Evaluation of Svobody Avenue was done by the quality criteria of public space, types of subspaces, and spatial problems of the current state of the avenue. The quality criteria were chosen liveliness, identity, comfort, and functionality, subspaces were based on Carmona's classification, and a systematization of the problems as the outcome of transformation is presented in the end. This work's primary value is considering transformation as a comprehensive process from different angles, which gives a complete picture of the change in the city's main street.

Keywords: spatial transformation, classification of urban spaces, spatial problems, historical city center, public space.

Introduction. From its foundation in the XIIIth century, Lviv has constantly evolved until its current condition, mixing contemporary Ukrainian and international features with the remains of medieval, renaissance, baroque, Polish, Austro-Hungarian, and Soviet architecture. In 1998 Lviv became part of UNESCO Heritage as an outstanding example of the fusion of Eastern European, Italian, and German architectural traditions. Moreover, Lviv's political and commercial role

attracted several ethnic groups with different cultural backgrounds, who established interdependent communities within the city, which defined directions for further transformations.

Among other spaces in the city center, Svobody Avenue occupies a special place as the main city street, one of the most visited spots and the area that once experienced a radical transformation, so its case is chosen for the detailed analysis. Formerly, the Hetman Ramparts (the oldest name of the avenue) was laid in on top of the western section of the historic defensive fortifications that ringed Lviv near the Poltva River, which had been an integral part of the urban landscape of the city and determined the place for its foundation. The walls were pulled down around 1776 and put into public service in the city. In the first half of the XIXth century, the foundation of the future boulevard was planted with rows of poplars, and parallel streets were established on both banks of the Poltva River. In the late 1880s, arched bridges spanned the gap between Maryatska Square (currently Mickiewicz Square) and Golukhovska Square (currently Torhova Square). After 1889, the riverbed was hidden underground in collectors due to pollution problems. During 1888–1890, trees, flower beds, and flower gardens in a style reminiscent of the Baroque period were planted, and in 1901, electric lighting was installed on the boulevard. Over time, tram and trolleybus tracks ran along the avenue, which by the 1970s were decided to close, leaving only automobile roads. The former telegraph attracted business people from Vienna in Austrian times. It was popular among people who lively discussed the political situation in the country in Soviet times, which testifies to the developed social function of the space. Although several monuments on the boulevard as semantic dominants have been changing due to the transformation of political regimes, no radical change in the townscape or spatial hierarchy was made. Some buildings had added upper floors, which changed their heights, but generally, the skyline has been preserved since the XIXth century.

Today, Svobody Avenue is one of Lviv's most beautiful and prestigious streets. According to the authors' social survey [1], the feeling of the place by citizens and tourists is relatively comfortable, and the respondents perceive the boulevard as a highly valuable place in Lviv. In the fall of 2020, Lviv completed a large-scale reconstruction of the square in front of the Opera House and launched a dry fountain, maintaining the landscaping in good condition.

Analysis of the recent research and publications. To understand spatial transformation, it is necessary to understand layers of urban morphology. Urban morphology involves the study of urban settlements, their structure, and their formation and transformation, allowing a researcher to understand the structure and patterns of urban area development. Urban morphology helps to identify individual parts of settlements and their historical origins to explain the nature, diversity and explore the evolution of ideas and diversification of urban forms. A key element of urban morphology is the hierarchy through which levels of complexity and the relationship of parts to the whole are defined. The hierarchy includes streets, precincts, and buildings (Bianca, 2014; Kropf, 2018) [2], [3]. All those elements form urban morphotypes. The spaces play a crucial role in urban morphology. Spatial transformations have been essential in urban science for researchers in recent years. H. Dadashpoor, in 2019, discussed the transformations resulting from urban expansion, particularly in the peripheral areas of metropolises, highlighting three significant typologies [4]. In the same year, typologies of the central urban areas were discussed by A. Krehl and S. Siedentop in the form of a comparative study in economic and residential terms [5]. In 2020, A. I. Zgonić and J. Čakarić analyzed the transformation of typologies in a Bosnian capital, Sarajevo, throughout its existence and concluded that the process of spatial typological transformation is characterized by current social flows and manifested in a new architecture that disrupts the identity of the space and negates the traditional values of the architectural heritage [6].

Apart from this, plenty of researchers attempted to classify and evaluate spaces. The classification of urban spaces has been investigated already since 1970, so Krier (1979) classified urban space typologies on basic geometrical shapes (square, circle, and triangle) [7]. Differs from the geometrical approach Lynch (1981) gave urban space several indicators such as vitality, sense, accessibility, control, fitting the behavioral actions and efficiency, simultaneously classified typologies of the urban space based on complex landscapes like squares, plazas, linear parks,

playgrounds wasteland and parks [8]. Researchers of the last decades, for instance, M. Carmona in 2010, distinguished positive, negative, ambiguous, and private urban spaces, and in 2022 A. Alzahrani used his classification to analyze the inner area of Al-Baha city [9], [10]. M. Berghauser-Pont, G. Stavroulaki, E. Bobkova, et al. 2019 identified urban form typologies for three key urban form elements: streets, plots, and buildings in five European cities [12]. Both geometric and configurational measures were used to quantify the elements of urban form, grouped into two separate urban spaces: continuous space of streets, mainly used for traffic, and discontinuous space, consisting of buildings used for long-term living. Equally important was the work by Z. Gong, Q. Ma, C. Kan, and Q. Qi, who 2019 characterized and classified street spaces based on features extracted from street view images with a deep-learning computer vision model [19]. A rule-based clustering method was developed with the fence, openness, and greenery streetscape features to support their empirically generated classification. Al-Hasani, in 2013, based on the investigation of spatial transformation, identified “traditional-survived spaces” and “modern emerged spaces” during different changes such as damage, reconfiguration, and removal, creating new urban typologies with the existing traditional ones. In this process, the self-organized urban form was interrupted by a planned and planted one [11].

Works on public spaces occupy a special place in this article. In 2011 K. Mezentsev and N. Mezentseva characterized modern trends of public spaces transformation, e.g., commercialization, restricting access, sacralization, and increasing of malls' role in the world and Kyiv precisely [13]. R. Feshchur and N. Sosnova specified the main types of urban resources and developed models of public space planning in the case of Uzhhorod in 2020 [14]. Another considerable work is a practical guide by O. Kushnirenko, A. Petrenko-Lysak, and O. Shutjuk, 2020, in which the authors laid the foundations for an initial understanding and stimulation of research into public spaces before their design [15]. In 2018, L. Kozlova and V. Kozlov described ten indicators to check the quality of public space [16]. In 2021, the article by the authors Ł. Musiaka, M. Habrel, M. Habrel, and M. Kosmiy proposed a spatial planning model that takes into account the intangible and hard-to-measure factors that formed the city [17]. J. Duan, W. Lan, and Y. Jiang, in 2022, indicated that assessing the relationship between characteristic resources and human beings is an effective strategy to improve the scientific evaluation of urban spatial identity [18].

The morphology of urban space reveals the structural organization of the environment, on which its various characteristics and ability to develop depend. “Identification of the morphology of space contributes to the discovery of the structure of the timeless model of the city - the “model forever,” in which only the parameters change over time. The structure of such a model includes two components - a semantic core that does not change in time and deviations from it that can occur in time without abolishing the semantic core itself. These very deviations are the elements of order, of surprise, of what is inevitable (and therefore necessary for the city). This is a natural evolutionary development” (Trutnev E.K.) [20]. An environment where metabolic processes occur rapidly is more stable, making it possible to compact further, quickly change, and adapt, i.e., develop flexibly (Repina, 2016) [21].

However, modern research needs a detailed comparative analysis of an urban public space concerning the historical transformation and resulting spatial problems, including specific indicators for measuring the spatial transformation. This article aims to investigate spatial transformations based on the example of Svobody Avenue in Lviv, considering space analysis by historical evolution, geometry, urban morphology, urban form, and socio-economic change.

Materials and Methods. The article's research is based on a mixed methodology, which includes a comparative analysis between the past and the present situation in the analyzed area with the use of such remote methods as an online survey, analysis of documentation, and cartographic analysis. Comparison between the two stages of the site is done in three steps.

First is done by scoring the spaces against the indicators of the comfort or urban environment, such as liveliness, identity, comfort, and functionality. These indicators are bounded by social, culturological, ecological, and urbanistic criteria that are considerable for Svobody Avenue (Feshchur, 2020) [14]. For a more detailed analysis, in the course of the study, the authors divided

the space into three parts: Area I, area II, and Area III. Area I refers to the part of the avenue with the Opera House and the adjacent open territory with landscaping. Area II is an elongated section of the avenue with homogeneous functions of the territory and is perceived as a whole. Area III is Mickiewicz Square as a logical completion of the space of Svobody Avenue, from which it differs visually and functionally.

As a second step, the space is divided into sub-spaces according to the classification of Matthew Carmona, who distinguished positive, negative, ambiguous, and private urban spaces [9]. Positive and negative types of spaces were chosen as the most representative for analyzing the benefits and drawbacks of spatial transformation.

Finally, the modern state of the territory was examined for the presence of problematic aspects, including physical and visual pollution and safety issues. At the same time, the problems were also divided according to their origin. It is essential to understand the background of the changes in urban appearance. The factors causing spatial transformations are divided into three large categories: natural, economic, and social perspectives [22], [23]. The overall impact of these three major groups cannot be isolated as they have close relationships. Besides, natural and social environments directly depend on urban organization. Resources can be lost if the environment is negatively impacted, damaging the city's future. Hence, the aspects that lead to the changes are affected by it in response, so it can be assumed that spatial transformations have a spiral development.

Statement of the problem. This study defines spatial transformations as constantly changing layers or features of urban components. Spaces are formed by a relationship between built and unbuilt areas using small architectural forms and natural elements. Apart from the space itself, buildings and the city's structure are important for spatial analysis because they set the space in certain limits and define its borders. The development of urban fabric is usually uneven as some areas are becoming more resistant to ongoing changes than others, contributing to the overall architectural diversity. The difference between the architectural traditions of the past and the present can create problems for the visual perception of the past and the present environment.

The decision to remove the river into collectors influenced the general appearance of the territory, the way the space was organized, and the direction of the further development of the place, which allows us to call this transformation radical. However, besides the environmental criterion, other essential aspects characterize the avenue both in modern times and in the XIXth century, between which the article's authors draw parallels. The significant time interval since the transformation allows retrospective comparison and evaluation of its results. When planning the avenue, the public role was initially incorporated into the development of the territory. At its creation, the place had already become the second urban center. This work aims to explore the transformation of a public place by comparing one space in two historical moments and understanding what it has led to today. In addition to the historical transformation, this article also touches upon the transformation of the problems and significance of Svobody Avenue.

Main material and results. Svobody Avenue can be considered a public space as it has the following functions: communicative, recreational, political, territorial identification and self-identification, and shopping (Mezentsev, 2011) [13]. Moreover, these features were inherent in the avenue even in the XIXth century after the Austrian influence. Svobody Avenue is also an open space, as most people here are visitors and passers-by (Kushnirenko, 2020) [15]. All the materials for the analysis are based on map data and old photos from the Center of Urban History [24]. Table 1 comprises the results of the assessment.

Liveliness criteria lie in the social aspect of public space, which characterizes the possibilities of social interaction, the attractiveness of the space for users, and their sense of belonging to the space (Feshchur, 2020) [14]. The variety of goods and services is a characteristic of lively streets [25]. For example, "Vienna Coffee House" (area II) is the oldest in the city and one of the few initially built as a coffee shop and remained a favorite place of entertainment for the Lviv public. Other points that provided commercial transactions were hotels "De la Russie" and "De l'Europe" (area III), 2 residential buildings with commercial floors, and "Plasma" trade passage (area II). In

2023, such points on the avenue include 8 shops, 2 banks, 4 cafes, 2 pharmacies, and 2 hotels in area I, the trade center “Opera Passage” 8 shops, 10 cafes, 2 pharmacies, and 6 hotels in area II, 7 shops, 4 banks and 2 hotels in area III.

Additionally, a significant global transformation of public spaces touched Svobody Avenue in such directions as commercialization and access restriction (isolation or separation). Private advertising along the roads, on benches, garbage cans, poles, mailboxes, telephone booths, etc., significantly influences the formation of public spaces' images. Squares, traditionally public spaces, carriers of culture, and places of political speeches, are becoming centers of street trade in a wide variety of goods. (Mezentsev, 2011) [13]. The amount and flow of people depend on the type of their activities, which can be either a durable stay or a transit flow. As Svobody Avenue combines transit and non-transit space, the number of transit routes was counted and put in Table 1.

However, the identity criteria are the most striking as it serves for the orientation and creates strong associative ties between residents and the place. It includes several unique cultural objects (symbolic memorials and distinctive buildings) and points of attraction (places that gather people around them) that are important semantic dominants of the avenue. Maria Zankovetska Theatre has stood here since 1842 (area I). The Dicasterial Building (area II) since 1844 housed the Imperial-Royal Financial Directorate, archival cadastral maps and plans, and other institutions. The stone statue of Hetman Stanislav Yablonovsky, the first monument on the territory of Ukraine, was installed in 1859 on the Poltva embankment in front of Kastrum Square (area I). The Statue of the Mother of God was installed in 1861, and later, through construction in 1904 the monument to Adam Mickiewicz (area III), which forms the square of the same name, was moved to a new place (area II). Since 1900 the Opera House (area I) has become a not only valuable point of attraction but also an architectural dominant due to its location on the central axis. The Andriy Sheptytsky National Museum since 1905 (area II) and the Faculty of Economics at Ivan Franko National University, founded in 1966 (area II), have become important points of cultural attraction for residents. Monument to Taras Shevchenko, the most famous Ukrainian poet, was opened in the central part of Svobody Avenue in 1992 (area II). To the statue's left stands the memorial stele "Wave of National Revival" with figured bas-reliefs (area II).

On the border of the XIXth and XXth centuries, new governmental and financial institutions were emerging around the Austrian boulevard. Hotels, banks, houses, and various shops were built, including the Opera House in 1900, one of the key buildings in the city. At that time, various mass events and concerts gathered people informally on the boulevard. This territory has always resembled a public space and a place for active trade, parades, and protest demonstrations. Currently, the avenue is dominated by recreational, cultural and shopping attractions.

The comfort of spaces is measured by the amount of green area and pedestrian area. The ecological criteria characterize both the physiological comfort of the user of the space and the compliance of the planning with the balanced development of cities, and the ratio of the area of green spaces to the whole area can serve as an indicator (Feshchur 2020) [14]. The authors of the article identified the percentage ratio of the area of landscaping and the pedestrian zone to the total area of the territory of each zone and recorded the data in Table 1.

In 1863, the main functions of the territory were as follows: promenade (area I, II, III), transport (area I, II), parades (area II); in 2023: promenade (area I, II, III), transport (area II), celebrations (area II), concerts (area II) and recreation (area II). The buildings at one time provided the following public functions: in 1863 — a theater (area I), an archive, a church, a cafe, shops and a bank (area II), a hotel (area III); in 2023 — theaters (area I), institutions, a museum, a church, cafes, shops and a bank (area II), a bank and a hotel (area III).

Table 1 Svobody Avenue, assessment of the spatial transformation, 2023, Besedina A., Kravchenko I., Romanova M.

Criteria	Indicator	Area					
		I		II		III	
		1863	2023	1863	2023	1863	2023
Liveliness	Variety of goods and services	0	18	4	27	2	12
	Number of transit routes	6	6	6	7	5	5
Identity	Number of unique cultural objects	2	2	1	5	1	1
	Number of points of attractions	2	17	8	53	2	19
Comfort	Pedestrian area, %	16	20	9	12	22	19
	Green area, %	2	9	13	40	0	13
Functionality	Variety of functions on the site	2	1	3	4	1	1
	Variety of functions in	1	2	5	7	1	2

According to the conducted analysis and results from table 1, one can see that among the differentiated sections, area II is the most transformed in terms of public space criteria, the next is area I, and area III. However, this statement does not diminish the noticeable transformation of areas I and III. Besides the table itself, understanding the increased worth and meaning of the analyzed territory due to the erection of the Opera House is important. Overall, this, especially the change in the identity of the place, indicates the increased importance of Svobody Avenue and, accordingly, the significance of the spatial transformation that took place in a direction that had begun already in the XIXth century.

Evaluation of the transformation according to Carmona's classification of urban spaces.

It is necessary to understand the change in spatial hierarchy to evaluate the transformation. Therefore the complex space of Svobody Avenue can be divided into smaller parts: natural, semi-natural, civic, public open space, transit, service, undefined spaces, and built areas [10]. Figure 1 compares the distribution of different spatial types in 1863 and 2023. Public and service spaces are absent in the old map, as these terms are only relevant for modern times. Natural and semi-natural spaces were represented by the Poltva River and the row of poplars in the past and ceased to exist now. Although the main boulevard of the avenue has a significant percentage of greenery, it is considered a part of the public space, not semi-natural. Overall, the area of built and civic spaces barely changed, and the amount of leftover space drastically decreased. The upsetting trend is the reduction of pedestrian public space due to increasing car parking areas.

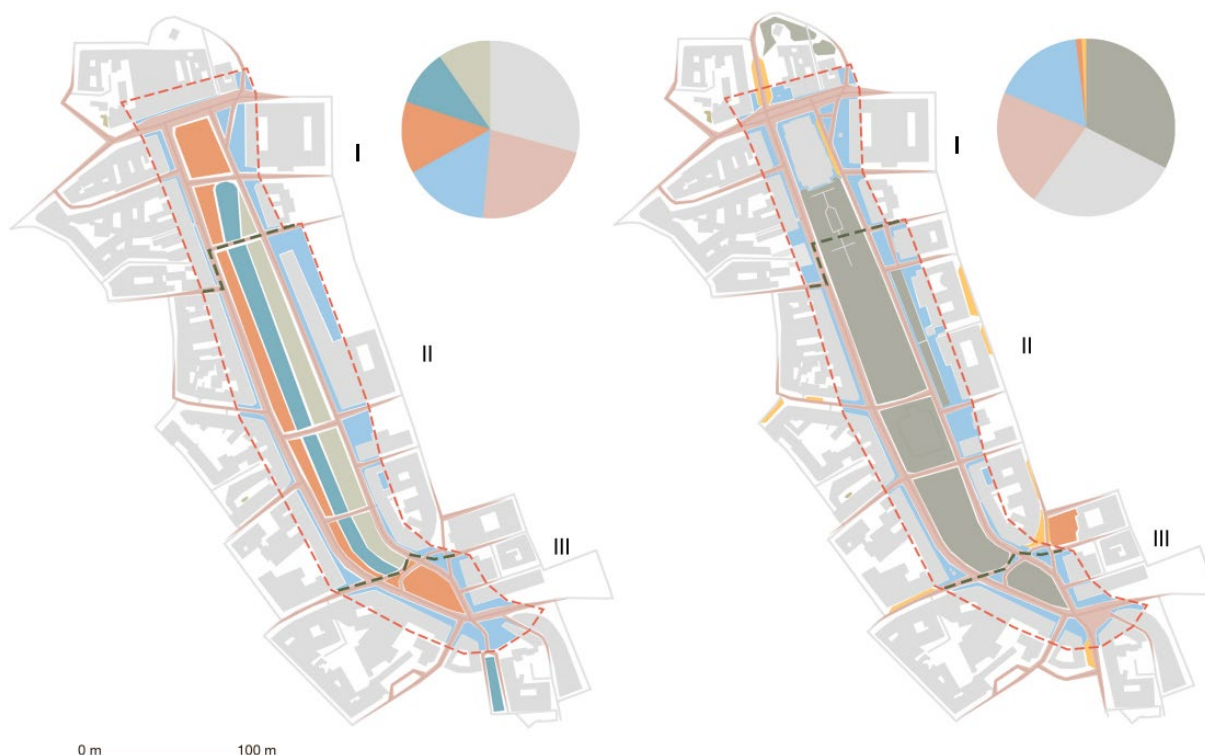


Fig. 1 Svobody Avenue, classification of spaces, 2023, Besedina A., Kravchenko I., Romanova M.

Color	Type of space	Notes	Transformation conclusion
Orange	Leftover and undefined	Abandoned or left after development area	Drastically decreased
Yellow	Service	Area allocated for the maintenance of vehicles, residential or civil spaces	Appeared
Pink	Transit	Area allocated for the use of vehicles	Barely changed
Blue	Natural	Natural landscape	Disappeared
Green	Seminatural	Least human-modified natural components	Disappeared
Grey	Public	Area of pedestrian movement	Appeared
Light Blue		Open, available, multifunctional space with a decent amount of green area	
Light Grey	Built area	Area allocated for buildings	Slightly increased

Table 2 Svobody Avenue, assessment of the spatial transformation, 2023, Besedina A., Kravchenko I., Romanova M.

With the classification of Matthew Carmona, it is possible to estimate the spatial value of Svobody Avenue. Positive spaces are natural, semi-natural, and public open spaces; negative are transit, service, and undefined spaces (Carmona, 2010) [9]. In the past, the Poltava River was referred to as a negative space as the pollution at that time was enormous, and it was the main factor of disturbance on Svobody Avenue. Also, according to the old pictures, there was no division between pavement and road which made the area between facades and greenery a dangerous one. The diagram of the ratio between positive and negative spaces in Figure 2 shows that in 2023 the area of positive spaces increased compared with those in 1863. The results of the comparison are put in Table 3.



Fig. 2 Svobody Avenue, positive and negative spaces, 2014, Besedina A., Kravchenko I., Romanova M.

Color	Type of space	Area, %		Transformation conclusion
		186 3	202 3	
Orange	Negative	57	25	Significantly decreased to about a quarter of the analyzed area
Green	Positive	43	75	Significantly increased to about three-quarters of the analyzed area

Table 3 Svobody Avenue, classification of spatial problems, 2023, Besedina A., Kravchenko I., Romanova M.

Therefore, based on the previous, the conclusions about the change in sections of the avenue concerning the types of subspaces can be drawn. In general, due to the emergence of open public space on the territory of Svoboda Avenue and despite the disappearance of natural space (the Poltva River), and given the resulting small area of undefined space, most of the territory can be considered "positive."

Moreover, the "negativity" in this analysis relies instead on problems in space than the mere definition of Carmona. In any way, these results justify the spatial transformation that occurred in the past, for it led to a better situation and condition in the present, which proves its value and meaning for the whole of Lviv.

The modern state of the space and its problematic aspects

Lviv's central core has a long development history. It can now struggle with the negative impact of entirely different economic and social conditions nowadays, which makes these two categories of influencing factors more valuable in terms of their importance. Svobody Avenue, with the adjacent Mickiewicz Square, is included in the UNESCO World Heritage List. The façade of the avenue is an architectural ensemble with a mixture of different styles. The architectural ensemble surrounding the greenway combines elements of late classicism (as in the former Skarbek Theatre) and historicism (the former Galician Savings Bank and Museum of Industry).

According to the theory of landscapes, urban scenes include vertical planes (also known as “walls”), horizontal planes (or “floor,” “ceiling,” and “roof”), and elements distributed freely throughout them, similarly to the interior [17]. The “walls” of an urban space are the facades. Although historical facades reflect the city's rich cultural heritage, they are threatened. Understanding the problems regarding the preservation of the urban appearance of Lviv is the first step towards their solutions that will ensure the safety of the cultural heritage for future generations. In the case of Svobody Avenue, outdoor advertising creates visual noise and conflicts with the style of the facade. The poor condition of the facade itself, such as faded paint, plaster, or whole parts of the building falling off, also contributes to the degradation of the city's architectural heritage. Andriy Salyuk, head of the Lviv Regional Organization of the Ukrainian Association for the Protection of Historical and Cultural Monuments, notes that during the reconstruction of historical buildings, the color of the facade is often decided not based on research but with an approximate selection of a suitable shade. Also, builders neglect the method of painting facades, using modern methods that differ from those used in the early centuries [26]. In addition, graffiti on the facades of historical buildings is another sign of disrespect for the cultural heritage of Lviv. Generally, all these problems can be divided into three groups according to their economic or social origin. The economic factor results in limited funding for conservation projects, while restoration and maintenance require significant investments, which makes it difficult to carry out the necessary repair and restoration work and further exacerbates the problems of preserving the appearance of old architecture. The social factor lies in the irresponsible attitude towards monuments of architecture and authenticity of the place, lack of awareness and education of the population about the importance of preserving the cultural heritage. Many people may not realize downtown buildings' historical and cultural significance, resulting in neglect and damage. Business interests seriously threaten architectural monuments in Lviv, and it is often more profitable for investors to demolish old monuments and build new buildings than to restore them. This is especially true when obtaining permits to construct offices, hotels, and other institutions in the city center, which also concerns the corruption problem and legislation system. The desire to modernize the city and attract tourists often outweigh the need to preserve the heritage. Furthermore, even increased air pollution, dust, and car exhaust lead to the aging of materials and damage to decorative elements of Lviv's monuments, resulting in a high level of dilapidation. The question of exclusion of the city from the UNESCO list was repeatedly raised. Altogether, mentioned problems pose a danger of losing the heritage and the spirit of the place.

Visual perception is the primary human recognition of space. Images people see can become obstructed by visual pollution, which can be classified into media surfaces and various advertising (billboards, banners, signatures, commercial sculptures, flags), vehicles (congestions, parking), crowds (business, education, tourism), soft temporary architecture (retail, entertainment, politics, religious, event-oriented), visual buffers (property fencing, transportation architecture, brownfields) [27]. Based on existing graphic materials and historical descriptions of Svobody Avenue with river Poltva, the main problems in the XIXth century can be considered river pollution and the abundance of undeveloped free space. Social negligence resulted in the loss of the historically valuable body of water that is still irreparable.

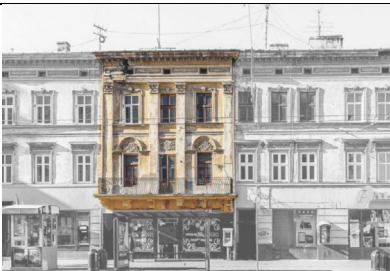
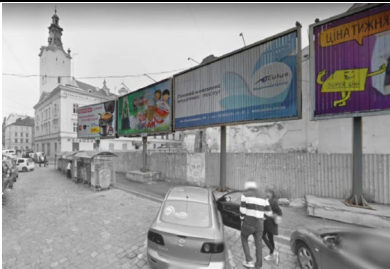
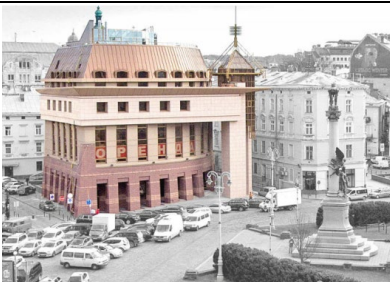
Nowadays, several problems create visual conflicts within historical development: incoherent shape, style, and several stories; extensions of the buildings; advertising billboards and signs that cut off the view; undeveloped or abandoned spaces. The most noticeable visual conflict in urban appearance is between old and new-build structures: created at different times, and the incoherent buildings may disharmonize the environment. The insertion of new buildings and outbuildings without careful consideration of their impact on the visual perception causes dissonance in the integrity of the cityscape. It poses a historically valuable appearance in danger. The most representative problematic building within the analyzed area is the building of Ukrasotsbank on Mickiewicz Square, 10. It was erected in 2005 instead of the former Kamienica of 1830, which was burned down in 1991. The appearance of the new building is completely detached from the historical environment and feels irrelevant.

Many streets and squares in the city are clogged with parked cars, resulting in the loss of green and public spaces that contribute to the liveability and aesthetics of the city. Svobody Avenue combines transit and non-transit space. The neighboring streets of Rynok Square are fully pedestrian and prohibit car traffic. Hence, the drivers, who want to reach the Old Town, tend to leave their vehicles on Svobody Avenue, contributing to the overall visual and environmental pollution.

Unregulated outdoor advertising is crucial for the business but can also create visual chaos and degrade the overall quality of the urban environment. Billboards can obscure sights of historic landmarks and endanger the visual integrity of a city. Finally, contemporary undeveloped space is perceived as a blank space in the urban fabric, and often, they are the remnants of modernist ideas, leftover or abandoned space, for example, the blank space left after a lost building.

Based on the conducted analysis, table 4 shows the classification of spatial transformations depending on their origin and location in the vertical and horizontal planes as part of space.

Table 4 Svobody Avenue, general conclusion about spatial transformations' problems, 2023, Besedina A., Kravchenko I., Romanova M.

Location	Origin	Problem	Number of an area with a prevalent problem	Evidence
Vertical plane	Economic	Poor condition of facades	II, I	
		View-blocking advertisement	III, II, I	
	Social	Graffiti as an unrecognized historical value	II, I, III	
		Irrelevant style of building	III, II, I	

Horizontal plane	Economic	Poor condition of roads and pavement	II		
		Unsafe combination of transit and non-transit space	I, II, III		
	Social	Reduction of public space due to increased parking	III, II		
		Loss of the river due to pollution	II, I		

Based on table 4, one can notice that area II is more diverse in terms of spatial problems than the others, while area I is the least problematic. However, in this analysis, there is no differentiation and prioritization between types of problems, while in practice, some are more or less impactful. Nevertheless, this systematization can be useful for further research development in evaluating Svobody Avenue and finding solutions to these problems for a better future.

Conclusions. The transformation of society led to spatial transformations that may differ in their radicality or persistence. The center of Lviv was gradually formed mainly under the influence of Central European countries, such as Poland and Austria, with Ukrainian traditions and identity, creating the smooth urban fabric in the city's core. The importance of this work lies in evaluating the historical development of Svobody Avenue. Semantic dominants, with their functions, influenced the development and transformation of areas into their current form, although initially, the avenue was completely homogeneous. The interconnection between the various domains of spatial transformation made it possible to carry out a multidimensional assessment in three steps. The change in public space was assessed by referring to such main criteria as liveliness, identity, comfort, and functionality. Regarding spatial typology, the boulevard was divided into smaller sub-spaces distinguished as "positive" and "negative." Even though the area of the latter decreased, problematic spots in the area are still present. Their assessment was summarized regarding the origin and location of spatial problems resulting from transformations. The problems that were figured out in the process of research are poor condition of facades, view-blocking advertisements, graffiti as an unrecognized historical value, irrelevant style of building, poor condition of roads and

pavement, unsafe combination of transit and non-transit space, reduction of public space due to increased parking, loss of the river due to pollution. The city's historical center, recognized as a UNESCO World Heritage site, showcases a harmonious coexistence of different architectural periods.

Exploring the spatial transformations at different levels, the authors concluded that the territory has radically transformed in visual, semantic, and functional terms. At the intersection of different analytical approaches, the degree of transformation of individual sections of Svobody Avenue was revealed, of which area II has changed the most. Assessing the transformation results, it can be characterized as generally positive. However, the difference between past and present architectural traditions created problems in the city's visual appearance. The historical center needs a proper, respectful attitude toward the legislation protecting the historic environment. There is a delicate balance between respecting its rich history and embracing contemporary urban development. Preserving Lviv's architectural heritage, revitalization efforts, and adaptive reuse projects will contribute to creating a dynamic and engaging urban environment. Lviv's spatial transformation is a testament to the city's ability to adapt, evolve, and harmoniously blend its past and present, captivating residents and visitors with its unique charm and character.

Prospects for future research may be a detailed assessment of the prospect's current state by conducting an extensive survey among various population groups, considering non-material indicators, and an estimated comparison of the states of the avenue in recent years to identify trends in urban spatial transformations. It can also be possible to evaluate the spatial affiliation of the avenue as part of the city's historical center by assessing the visual identities.

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ОЦІНКА ПРОСТОРОВИХ ТРАНСФОРМАЦІЙ У ЦЕНТРІ ЛЬВОВА НА ПРИКЛАДІ ПРОСПЕКТУ СВОБОДИ

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Анотація. Трансформація суспільства від середньовіччя до сьогодення тягне за собою зміну містобудівного каркасу та тканини. Оскільки Львів є популярним туристичним напрямком, великим ІТ-центром і тимчасовим місцем проживання для біженців зі східної частини держави під час війни, його роль приваблює людей, і активний сучасний стиль життя може вступити в суперечність з обмеженнями, накладеними історичною спадщиною. Тому сучасний стан історичного ядра міста необхідно оцінити та порівняти з минулим станом.

Мета цього дослідження полягає в оцінці просторових метаморфоз шляхом аналізу переходу від старого до сучасного міста. Простори утворюються шляхом взаємозв'язку між забудованими та незабудованими територіями з використанням малих архітектурних форм і природних елементів. Різниця між архітектурними традиціями минулого і сьогодення може створювати проблеми для візуального сприйняття середовища.

Зоною аналізу обрано Галицький район, до якого входять майже всі об'єкти всесвітньої спадщини ЮНЕСКО, та проспект Свободи як його головну вулицю. У вступній частині обґрунтовується важливість дослідження саме цієї частини району. Основна частина зосереджена на порівняльному аналізі минулого та сучасного стану центру Львова. Оцінка проспекту Свободи проводилася за критеріями якості публічного простору, типів підпросторів та просторових проблем сучасного стану проспекту. Критеріями якості було обрано жвавість, ідентичність, комфорт та функціональність, підпростори - за класифікацією Кармони, а наприкінці представлено систематизацію проблем як результат трансформації. Головною цінністю цієї роботи є розгляд трансформації як комплексного процесу з різних точок зору, що дає повну картину змін на головній вулиці міста.

Ключові слова: просторова трансформація, класифікація міських просторів, просторові проблеми, історичний центр міста, публічний простір.