

# MORPHOLOGICAL TRANSFORMATIONS OF THE OLD TOWN IN WROCLAW

ROBERT SZMYTKIE , KINGA PAJĄCZEK

Department of Social and Economic Geography, Institute of Geography and Regional Development,  
University of Wrocław, Wrocław, Poland

Manuscript received: November 15, 2022

Revised version: March 17, 2023

SZMYTKIE R., PAJĄCZEK K., 2023. Morphological transformations of the Old Town in Wrocław. *Quaestiones Geographicae* 42(2), Bogucki Wydawnictwo Naukowe, Poznań, pp. 97–113. 13 figs, 1 table.

**ABSTRACT:** The main goal of the article is to present the morphological changes that occurred in the Old Town of Wrocław in the post-war period. Morphological transformation is a natural process that shapes the external and the internal structure of a city. The damage inflicted during World War II interrupted the natural development of the burgage cycle and deeply altered the landscape of the city. Through the analysis of building coverage within street blocks, a classification of street blocks was obtained. On this basis, eight areas that underwent analogous phases of the burgage cycle in particular blocks were distinguished; this made it possible to identify the processes that can affect changes in morphology. The main analysis of the study was conducted using cartographic materials from 1934 to 2019 (through Conzenian methods), which visualised the distribution of buildings within street blocks.

**KEYWORDS:** urban morphology, morphological changes, burgage cycle, Conzenian methods, Wrocław city

*Corresponding author: Robert Szmytkie, Department of Social and Economic Geography, Institute of Geography and Regional Development, University of Wrocław, Plac Uniwersytecki 1, 50-137 Wrocław, Poland; e-mail: robert.szmytkie@uwr.edu.pl*

## Introduction

The Old Town in Wrocław has retained a well-preserved urban layout that was created in the early 13th century; this does not, however, apply to the actual buildings in that part of the city. The Old Town underwent a number of transformations throughout the nine centuries of the existence of this urban agglomeration. Many studies of features, morphology and development have been conducted by the scholars from Poland and abroad. First such endeavours were concerning settlement geography, which over time incorporated increasingly more comprehensive analyses of the spatial structure of cities. The

theoretical basis that facilitates the exploration of urban morphology is thus well-developed. However, Polish research still needs more detail-oriented case studies that would examine the morphological changes of cities and tackle the notion of the fluctuations in spatial development. In this context, Wrocław is quite a peculiar case; the studies of its morphology were conducted by, for instance, Miszewska (1993, 1994). However, the studies only analysed particular street blocks and did not give a comprehensive overview of the morphological development of the Old Town. The studies of the Old Town were also concluded in the 1990s; hence, no 21st-century developments were discussed to date. This study aims to

conduct an in-depth analysis of all the morphological units (street blocks) of the Old Town in Wrocław, thus complementing the research of Miszewska from 1945 to 1990 and reviewing further changes that occurred in the morphology of that part of the city.

The main goal of this study is to identify transformations in the morphological structure of the Old Town of Wrocław in the post-war period; the study also endeavours to create a classification of the street blocks based on the town-plan analysis method proposed by Conzen (1960, 1968). The study also assumes the following secondary objectives: a) discussing the morphological structure of the Old Town in Wrocław, b) enumerating the most important periods of morphological development, c) determining the fluctuations in these changes, and d) identifying their causes and the shifts that occurred in the area. Based on the formulated research problem, the three following hypotheses have been proposed, which constitute the basis for conducting the empirical research:

1. The Old Town area is not homogeneous and comprises morphological units that differ in terms of morphology and the course of the burgrave cycle phases they went through after 1945;
2. Contemporary morphological structure of the Old Town was dictated by the transformations that were induced by a number of processes that occurred at various stages of the area's development;
3. There is a correlation between the building coverage within the street blocks of the Old Town and the degree of the war damage caused.

To verify these hypotheses, two research questions were formulated (the answers thereto are proposed in the Conclusions):

- Which processes caused changes in the morphological structure of the Old Town in the post-war period?
- Can a specific pattern be associated with the morphological changes that took place in the Old Town during the post-war period?

## Theoretical background

The studies on the morphological transformations in city centres make it possible to conduct a

comprehensive analysis of the historical development of the urban structure. This, in turn, allows explaining the origins of the contemporary elements of the spatial layout as well as the relationships that exist between the particular elements of the structure. Three core processes defined the shaping of the spatial structure of Polish cities in the post-war period: a) restoration of the cities that endured damage during the war, b) creation of socialist cities, and c) transformation of cities after 1989 due to the political and socio-economic transition. These processes were not consecutive; in fact, in some cases, not all the gaps precipitated by World War II have been filled to date. However, the legacy of socialism has made a significant impact on the direction of the contemporary spatial and functional transformations in the city centres (Musiaka et al. 2021a). Similar processes also did occur in the large cities of other post-socialist countries in Central and Eastern Europe.

The restoration of the European cities that endured damage during World War II has been discussed thoroughly in other works (e.g. Diefendorf 1989, 1993; Bullock 2002; Clapson, Larkham 2013). The studies that examine these issues have analysed the causes and the extent of damage suffered in different parts of Europe (Diefendorf 1989) or in particular areas, e.g. Germany (Diefendorf 1993), Normandy (Clout 1999) or the United Kingdom (Larkham 2016). The paths chosen towards restoring cities under particular socio-political conditions have also been inspected (Kohlrausch, Hoffmann 2011; Pendlebury et al. 2014), based on the example of the cities in Poland (Dutt, Achmatowicz-Otok 1991; Crowley 1994), England (While 2006; Adams 2011; Larkham 2016; Tiratsoo 2018), Germany (Diefendorf 1993) and Russia (Dale 2015). The impact of war damage on further socio-economic development has also been examined (Brakman et al. 2004). Much has also been said on the topic of retaining the cultural legacy during the reconstruction of the historical cities (Ashworth, Tunbridge 1999; Hagen 2005; While 2006; Stangl 2008; Sørensen, Viejo-Rose 2015).

The directions of restoring war damage of the central areas of the largest Polish cities after WWII were discussed by Musiaka et al. (2021a). Three categories of cities (city centres) were distinguished, given the scope of rebuilding and the

direction of post-war morphological changes: a) cities where the morphological changes were minor (Łódź and Krakow), b) partly reconstructed cities (Wrocław and Poznań), and c) cities that were rebuilt and completely reconstructed (Gdańsk, Szczecin and Warsaw). In the debate on rebuilding the Polish cities, the study of Elbląg, where retroversion was implemented, is particularly interesting (Johnson 2000), as well as the research on reconstructing the city of Warsaw, which was ravaged by the war (Dziewulski, Jankowski 1957; Jankowski 1990; Dutt, Achmatowicz-Otok, 1991; Crowley 1994; Niemczyk 1998; Calame 2005). The issue of war damage in the central districts of Wrocław has been analysed in the context of the burgage cycle phases proposed by Conzen (e.g. Miszewska 1993, 1994; Miszewska, Szymytkie 2015). Miszewska (1994) stated that the phases of the burgage cycle were imposed by the processes that occurred within the street blocks, such as:

- building coverage of a plot whose limits were previously designated;
- restoration of a plot or a block (usually due to the fact that the block was purchased by a single owner, plot borders were removed, or new or modernised buildings were erected);
- restoration of a block damaged by war or fire after it was rebuilt;
- metamorphosis of a block (partial or complete) caused by new and different styles of buildings being introduced;
- metamorphosis, that is change of shape, caused by modification or removal of plot borders, changes made to the street layout or changes made to placement of buildings in the block;
- recession of the buildings due to the deterioration or lowering of building standards, change to the social structure and lack of interest of its hypothetical inhabitants;
- formation of an urban fallow as a borderline case of recession, usually caused by disasters, such as war.

The notion of city development in Central and Eastern Europe during the socialist period has been analysed in many studies (Fisher 1962; French, Hamilton 1979; Bertaud, Renaud 1997; Crowley, Reid 2002; Bertaud 2006). This resulted from the fact that all decisions that influenced the spatial structure of the city in this period had political roots. When the decisions were made

with regard to the placement of buildings, little attention was paid to the spatial order, the more important being supreme political order and its spatial emanations. Thus, in the vicinity of highly urbanised areas, one could find many less-urbanised zones and barren land (Węclawowicz 1992), which led to the deterioration of old quarters of cities. One of the key features of socialist cities was the uniformity of architecture and of urban landscape (Węclawowicz 2016). Architectural contrasts were also common, as well as the lack of competitiveness in ways of using urban areas. Owing to the fact that an urban space had no commercial value, it was possible to locate non-commercial investments in the central parts of the city, including the residential development (Kotus 2006).

In the recent years, more and more studies have been concerned with the notion of transformation of the post-socialist cities (Andrusz et al. 1996; Sailer-Fliege 1999; Tsenkova, Nedovic-Budic 2006; Stanilov 2007; Hirt 2012). This notion has been mainly viewed through the context of suburbanisation processes, which have determined a variety of aspects of urban area development across the entire Central and Eastern Europe (Kubeš 2013). The dynamic development of the suburban zones at the end of the 20th century and in the early 21st century correlated with a decrease in the population of the city centre and with migration to the suburban areas (Sykóra 1999; Lowe, Tsenkova 2003; Hamilton, Andrews 2005; Nuissl, Rink 2005; Schneider-Sliwa 2006; Hirt, Stanilov 2007). Yet, central areas of large cities have undergone significant qualitative transformations; the areas that once were mainly residential are becoming central areas in the context of convergence of urban functions (Bertaud 2006; Hirt 2006; Stanilov 2007; Sykóra 2009). The transformation of the functional and spatial structures in post-socialist cities is shaped by a set of processes and phenomena; these are determined by the market economy (Sailer-Fliege 1999; Diener, Hagen 2013), which is already changing the behaviour of four groups of urban actors: shops and services, industry, house-owners, and private households (Musil 1993).

It does seem, however, that in the studies that tackle the issue of transformation of the central areas of post-socialist cities, very little attention is paid to changes in their urban morphology. The

example of Wrocław, a city largely destroyed by the war, can thus be a spark needed to begin the discussion on shaping the morphology of large cities in Central and Eastern Europe in the changing socio-economic conditions that were present during the post-war period.

## Data and methods

The empirical components of the text are based on cartographic analysis. The study applies the method of town-plan analysis put forward by Conzen (1960, 1968) and introduced into Polish geography by Koter (1974, 1979, 1994) and Miszewska (1993, 1994) (Koter, Kulesza 2007, 2010). However, the core analyses of changes in building coverage were not conducted based on particular plots (as proposed by Conzen), but on street blocks (in line with an approach used by Miszewska and Koter). This is because it was recognised that in view of the changes in ownership that took place in post-war Poland it was the street blocks delineated by the course of the streets, and not the plots, that were the most durable elements of the morphological structure of the city. The obtained results made it possible to gain a deeper understanding of the examined issue and allowed for an in-depth analysis of the phenomena taking place in the studied area.

To conduct the morphological analysis of the city plan, a three-stage research process was used, encompassing three stages: preparation, analysis and consideration, and conclusion drawing.

The first stage relied on collecting relevant source materials. To this end, seven city plans that marked the buildings in the city centre were

collected (Table 1). In the context of the studied issue, the maps from the following years are of particular importance: 1934 (presenting the building development in the pre-war Old Town, with the highest possible density of buildings in the street blocks), 1947 (representing the damage caused by the war, dividing the buildings into undamaged, damaged, burnt down and completely destroyed, which made it possible to assess the degree to which the city was destroyed in comparison with its previous state), and 2019 (representing the current building development in the city centre). The collected resources are only available as paper copies or raster images because rectification and image tracing were required to process them. The cartographic data were analysed using ArcGIS environment and ArcMap software. To have access to the functionalities of ArcGIS, all plans were rectified to the vector background map of Wrocław obtained from Urban Atlas ([www.eea.europa.eu/...](http://www.eea.europa.eu/)) in the ETRS\_1989\_LAEA coordinate system (Lambert's azimuthal equal-area projection). This approach allowed the subsequent analyses to compare maps from different sources and with different projections. The maps were then digitalised, which consisted in re-drawing the data from the map (the development of street blocks) and transforming them into line and surface vector layers. The final step of this stage involved calculating the ratio of the total building coverage to the total surface area of the street blocks; this was performed using the Calculate Geometry tool, available through the table of attributes (calculating the surface area in square meters). The collected data were used to calculate the percentage of building coverage of street blocks and to compare the differences in the percentage values throughout different periods of time.

To facilitate the comprehensive, detailed analysis of the changes in the morphology of the Old Town, some of the street blocks were joined together. This was done to account for the changes in the street networks and to simplify the analysis, the extent of which is visualised in Figure 1.

In the second stage, the proper analysis of the city plan was conducted, examining the changes in the density of building coverage in particular street blocks at the adopted points in time. The changes were analysed based on the chronological order of city plans. The core data were gathered during the first preparation stage and then

Table 1. List of the maps used in the study.

Map name	Year	Scale
Sonderplan der Innenstadt	1934	1:5,000
Plan miasta Wrocławia (City plan of Wrocław)	1947	1:5,000
Plan Wrocławia, cz. Starego Miasta (Plan of Wrocław, part of the Old Town)	1950	-
Topographic map M-33-35-C-a-3, sheet: Wrocław	1965	1:10,000
Topographic map M-33-35-C-a-3, sheet: Wrocław Stare Miasto	1998	1:10,000
Wrocław. Plan Miasta (Wrocław. Plan of the city)	2005	1:20,000
National geoportal ( <a href="http://geoportal.gov.pl">geoportal.gov.pl</a> )	2019	-

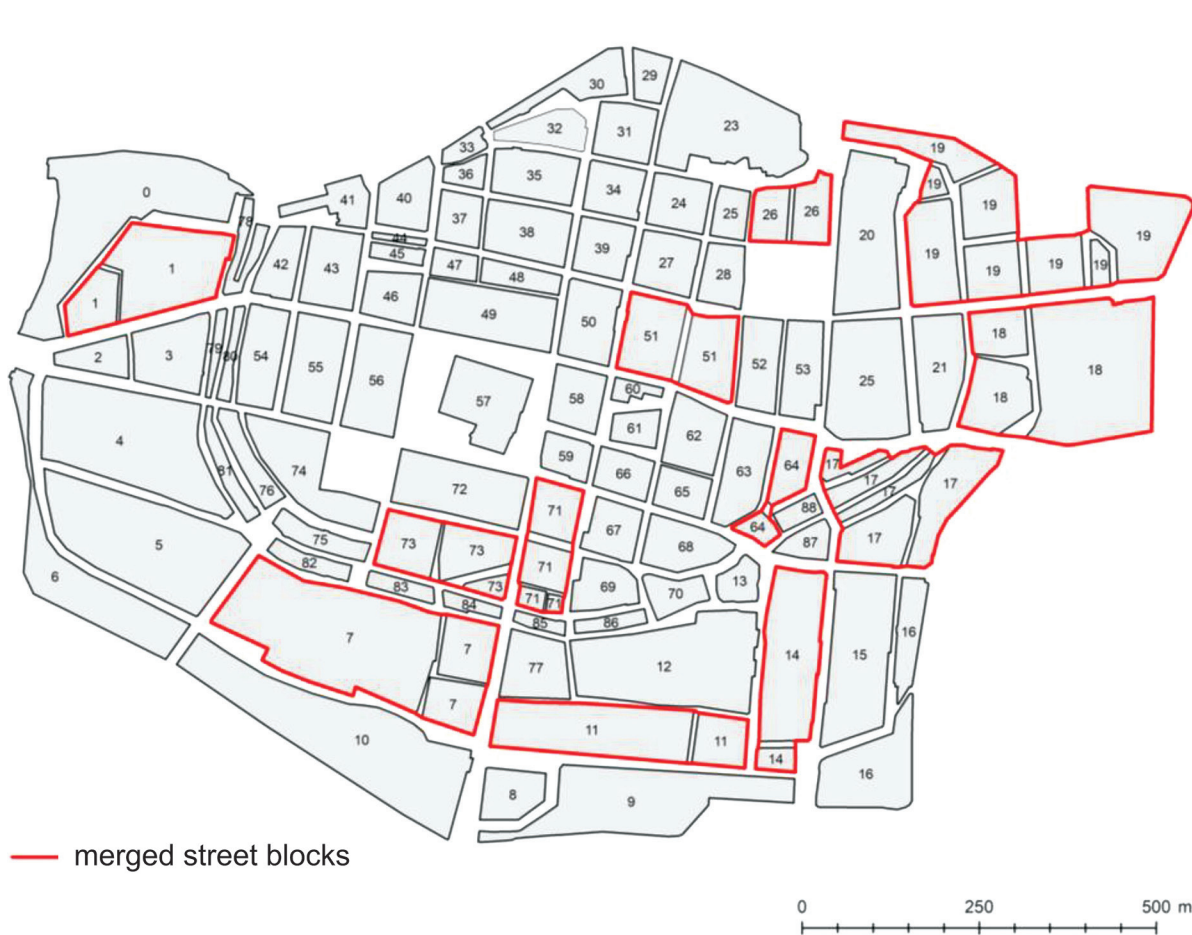


Fig. 1. Street blocks in the Old Town of Wrocław.

Source: own elaboration.

represented as tables, showing the percentage ratio of the existing building areas to the overall surface area of a particular street block (assigned a specific ID number). Based on the data collected, a typology of street blocks was prepared, represented on a map that included the classifications for three time periods (1934, 1947 and 2019). The street blocks were classified based on the surface area occupied by buildings, for each period separately. As a result, an analysis of the phases of the burgage cycle was prepared for the selected areas.

The final step of the study involved verifying the hypotheses and answering the research questions, analysing and drawing conclusions based on the previously conducted analyses.

## Study area

The oldest settlement in Wrocław was moved from Ostrów to the left bank of the Oder in the

11th century; the new settlement was located in the area that now houses the main university building and the Church of St. Vincent. Locating the settlements on the left bank propelled the city into rapid development at the turn of the 13th century. The mentions of the first chartering of the city come from the 13th century; they are related to the reorganisation of the existing marketplace that took place in 1208 to reflect the European traditions and was instituted by Henry the Bearded (Małachowicz 1985). In 1214, the first market square, *Novum Forum*, was constructed, which was the result of transformation of the previously existing marketplace. As the prestige of the city grew, it was rapidly developing towards the European standards, deliberately aiming to reach a regular city plan. The breakthrough of 1226 made it possible to create the second chartered area and the main Market Square: the Church of St. Adalbert was replaced with the Church of St. Andrew (now the Church of St. Mary Magdalene), which was located far

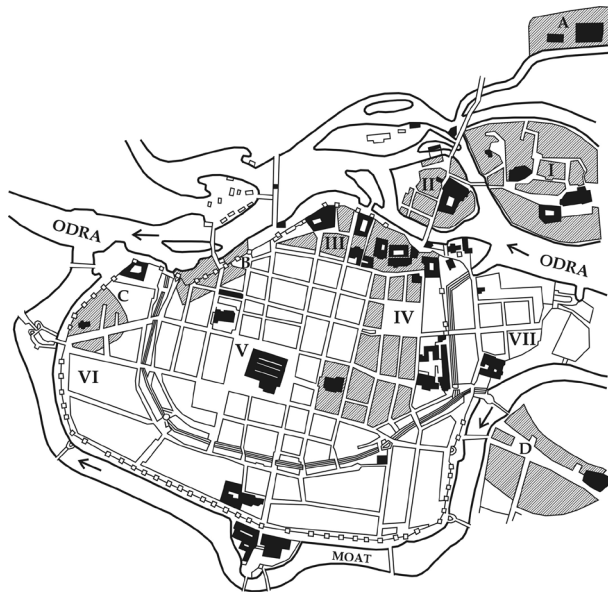


Fig. 2. Wrocław in the Middle Ages according to Malecziński et al. (1956).

I - *Ostrów Tumski*, II - *Wyspa Piasek*, III - princely town, IV - town located in 1226, V - Old Town located in 1241, VI - extension of the city from the end of the 13th century, VII - *Nowe Miasto* (New Town) located in 1263  
Source: own elaboration based on Malecziński et al.

closer to Market Square. In the 1230s, another temple, devoted to St. Lawrence, was constructed (now the Church of St. Elisabeth). These temples determined the spatial layout and the plan of Market Square, which has been retained to this day (Fig. 2).

The construction of Market Square and a secondary smaller square, *Plac Solny* (Salt Square), is related to the second chartering of the city in 1242 (Malecziński et al. 1956). This event was influenced by the Tatar invasion of 1241, which halted the rapid development of the city. The city fortifications were then constructed alongside the smaller oxbow. The document that certifies the exact date of chartering was not preserved; it is assumed that the city was chartered based on Magdeburg Law before the March of 1242 (Malecziński et al. 1956). The city was then chartered for the third time, incorporating the land outside of the city walls (reaching the line of the greater oxbow); by the mid-14th century, the entire newly adjoined area was fortified. In 1263, to the east of *Nowy Targ* (New Market Square), *Nowe Miasto* (New Town) was formed, thus incorporating the areas located a) from north to south, between the Church of St. Adalbert and the Church of Holy Spirit; as well as b) from east

to west, stretching from the Oława river (now the city moat) all the way to the castle on the left bank of the Oder river (Malecziński et al. 1956). *Nowe Miasto* was incorporated into the city in 1327.

In 1241, the area of the chartered town was as large as 60 hectares; in 1261, it expanded, reaching 120 hectares. Once *Nowe Miasto* was incorporated in 1263, and the overall area of the city amounted to the grand total of 160 hectares. In the middle of the 14th century, the city had 16,400 inhabitants (which means that the population density exceeded 10,000 inhabitants per square km). The Old Town in Wrocław reached its peak population density in the mid-18th century (33,700 inhabitants per square kilometre). From that point onwards, the city has been growing area-wise, which has also resulted in a gradual decrease in population density of the Old Town (Szmytkie 2021).

## Results

### Characteristics of morphological changes

In the interwar period, building coverage within the Old Town in Wrocław reached the climax phase, amounting to 79.2% in 1934 (Fig. 3). For 59 blocks (comprising 55.6% of the whole), it exceeded 80%, and for 17 of those (19.1%), it reached 90% of the total area of the block. Moreover, the building coverage of street blocks at the time was quite homogeneous, and only for 8 (or 9%) of the blocks, it did not exceed half of their total area.

The degree of war damage in Wrocław was severe indeed (with 65% buildings being destroyed), and the Old Town was one of the most affected parts of the city (Musiaka et al. 2021a). For the total developed area of the Old Town, only 45% of the buildings remained undamaged, 15.8% were fully destroyed, 28.1% were burnt and 11.1% were partly damaged (Fig. 4). The following parts of the city were affected by the war the most (>80%): *Nowe Miasto*, *Nowy Targ* and *Plac Dominikański* (Dominican Square), as well as the blocks spanning alongside the city moat. Conversely, most of the buildings remained intact in the eastern part of the chartered city and on the areas to the south, which have belonged to Wrocław since the end of the 13th century. The least affected part of the Old Town was the



Fig. 3. Building coverage of the street blocks of the Old Town in Wrocław in 1934.  
Source: own elaboration based on cartographic materials listed in Table 1.

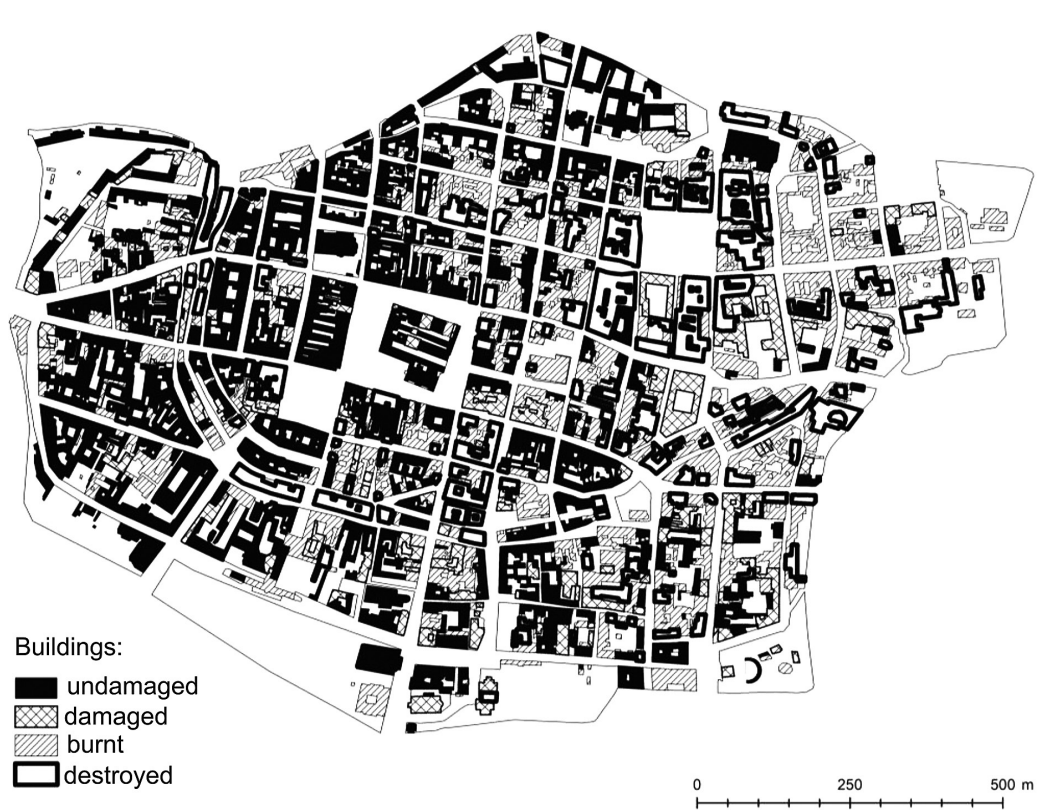


Fig. 4. War damage in the Old Town area of Wrocław in 1947.  
Source: own elaboration based on cartographic materials listed in Table 1.

central part of the chartered city and singular blocks situated in other parts of the studied area.

Partly due to the damage caused by the war, the overall building coverage of the street blocks in the Old Town dropped to 37%. When comparing the condition of the buildings in 1934 to that in 1947, one may conclude that regression of buildings can be observed in essentially all the street blocks in the study area. The war damage meant that the majority of the buildings ceased to exist, and the climax phase transitioned into a recessive phase or even a fallow phase. Only for five street blocks, the development exceeded 80%, while the staggering 13 of all the blocks became urban fallows.

The 1950 map (Fig. 5) paints a more detailed picture of the actual condition of the post-war building development; the 1947 plans do not contain any information as to whether the buildings marked as damaged or burnt were restored or simply removed. Hence, the data from 1950 are the basis to determining the most accurate state of the buildings in the Old Town after the war. In 1950, significant morphological changes appeared on the city plan. One can see that only

85 street blocks remained in place (in contrast to 89 blocks present there in 1934). The damage becomes explicitly visible in the eastern part of the studied area, i.e. the street blocks in *Nowe Miasto* and those at *Nowy Targ*, which were almost entirely destroyed. Both the western part of the city and the chartered part of the studied area retained the majority of their buildings.

Considerable changes to the morphology of Wrocław can then be observed on the map from 1965 (Fig. 6). In particular, there was a strong trend to increase the building coverage throughout almost all of the street blocks with lower development; at the same time, in the remaining blocks, the building coverage dropped. This might be partly caused by the extensive works conducted in the studied area at the time. A recession of the existing building coverage was caused by the low technical condition or the 'natural' decay of the buildings. One may also note a metamorphosis of the blocks as the existing building type was replaced by another building type. The ongoing and far-reaching restoration of the street blocks resulted in the removal of obsolete buildings and merging some of the plots.

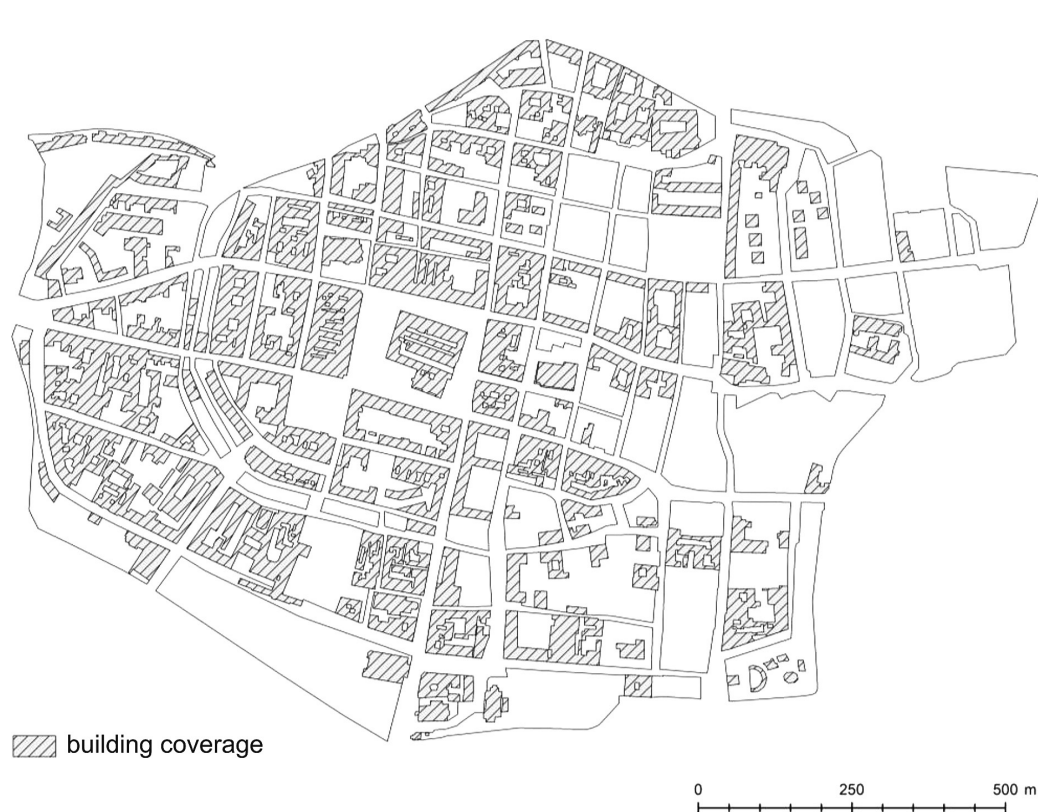


Fig. 5. Building coverage of the street blocks of the Old Town in Wrocław in 1950.  
Source: own elaboration based on cartographic materials listed in Table 1.



As the time passed, the Old Town in Wrocław was developing a more comprehensive building coverage (Fig. 7). The first transformations in its morphology occurred directly after the war, yet the spatial development truly intensified in the later years. Until 1998 (Fig. 8), significant morphological changes continued to take place. The number of the street blocks dropped from 89 to 78, and the majority of them experienced an increase in building coverage (which in some cases exceeded 25 percentage points). Furthermore, for some of the blocks, the building coverage became lower.

The turn of the 21st century brought rapid changes in development. During that period, many new investments also surfaced. The 2005 plan (Fig. 9) shows 77 street blocks, the majority of which display a rise in building coverage. This process continued to develop further as the time passed, with new buildings appearing wherever space was available; as a result of that, the Old Town soon ran out of space. In 2019, the mean building coverage of the street blocks reached 55% (Fig. 10). The building coverage of the blocks in the studied area varies greatly, however (in 15 blocks, it exceeds 80%, while in 14 blocks, it does

not exceed 30%). Building coverage is the highest in the chartered city, especially in its western, northern and central parts. By contrast, given the data of 2019, the lowest building coverage is present in the areas spanning alongside the city moat and the Oder, as well as the areas in *Nowe Miasto*, *Nowy Targ* and specific blocks that belong to the chartered city.

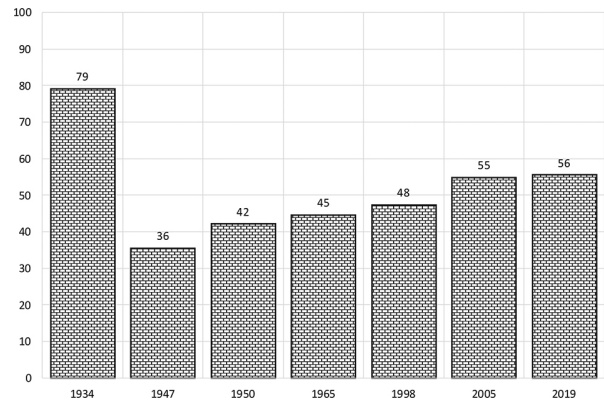


Fig. 7. Changes in the building coverage of the street blocks of the Old Town in Wrocław in the postwar period.

Source: own elaboration based on cartographic materials listed in Table 1.



Fig. 6. Building coverage of the street blocks of the Old Town in Wrocław in 1965.

Source: own elaboration based on cartographic materials listed in Table 1.

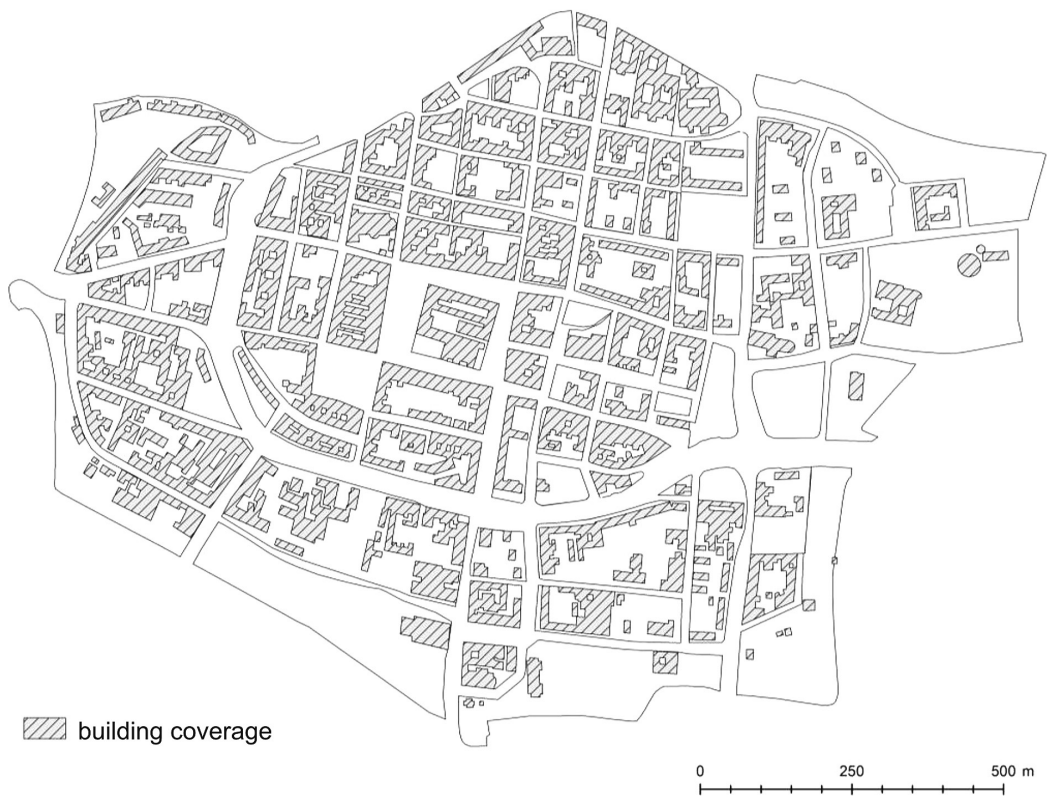


Fig. 8. Building coverage of the street blocks of the Old Town in Wrocław in 1998.  
Source: own elaboration based on cartographic materials listed in Table 1.

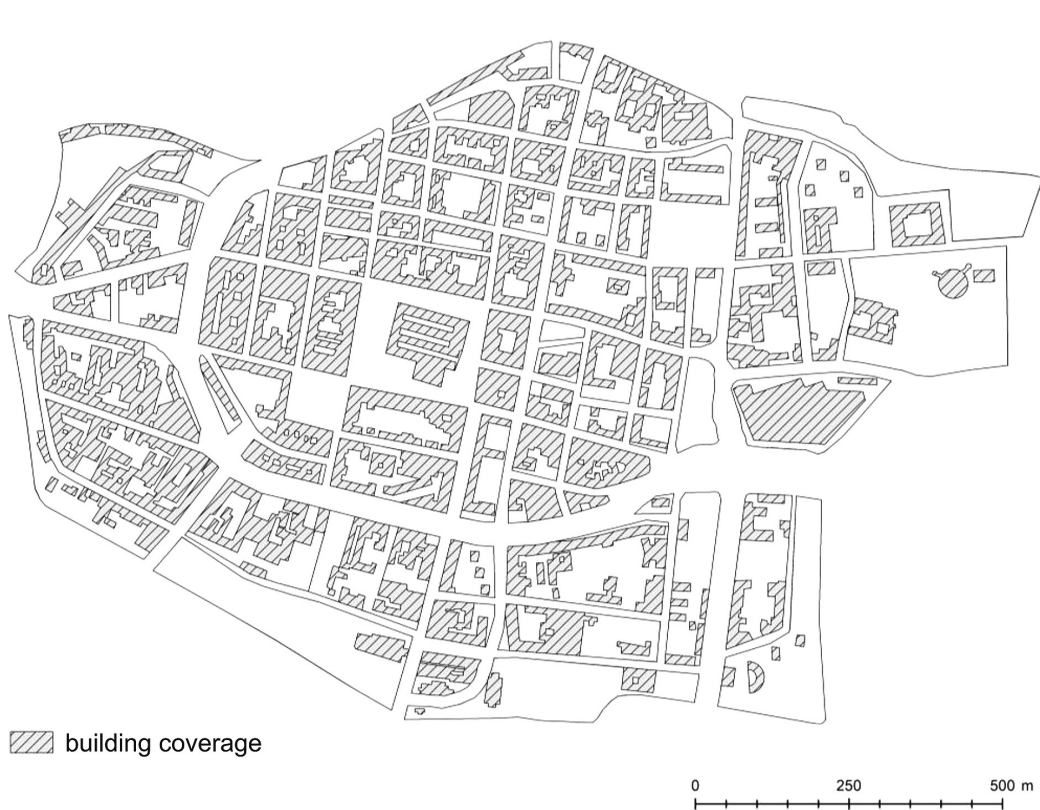


Fig. 9. Building coverage of the street blocks of the Old Town in Wrocław in 2005.  
Source: own elaboration based on cartographic materials listed in Table 1.



Fig. 10. Building coverage of the street blocks of the Old Town in Wrocław in 2019.

Source: own elaboration based on cartographic materials listed in Table 1.

### Classification of the street blocks

The conducted analyses made it possible to create a map that depicts the classification of the street blocks in the Old Town (Fig. 11). The baseline for creating the typology were the building coverages of the street blocks in the following years: 1934 (highest coverage prior to the war), 1947 (degree of war damage) and 2019 (the existing state of development within the blocks). As a result of these divisions, the following areas were distinguished:

1. The areas whose density remained similar throughout the three periods:
  - *Nowe Miasto* (I),
  - the area around *Promenada Staromiejska* (Old Town Promenade) (II),
  - the southern part of the area which then became part of the Old Town at the end of the 13th century (III),
  - *Dzielnica Czterech Świątyń* (Four Temples District) (IV) and
  - the area around the square of *Nowy Targ* (V)
2. The mosaic areas, whose building coverage changed:

- the vicinity of the main building of the University of Wrocław (VI),
- the blocks around Market Square (VII) and
- the western part of the chartered city (VIII).

The standard process of change in the building coverage for street blocks for particular homogeneous areas is shown in Figure 12. In the interwar period, the street blocks in *Nowe Miasto* were under either repletive phase or early climax phase. This part was greatly damaged during the war, which resulted in building coverage of the blocks falling to only a few percent (deep recessive phase) or becoming city fallows. The post-war building coverage in the area was never reconstructed; currently, the buildings are in the repletive phase. The street blocks in the vicinity of *Promenada Staromiejska* have undergone a similar process. In the interwar period, they were characterised by a low building coverage; then, the war damage caused the coverage to recede. The area was only partly rebuilt. The remaining three areas in this group (the southern part of the area which became part of the Old Town at the end of the 13th century, *Dzielnica Czterech Świątyń* and the vicinity of *Nowy Targ*) were in

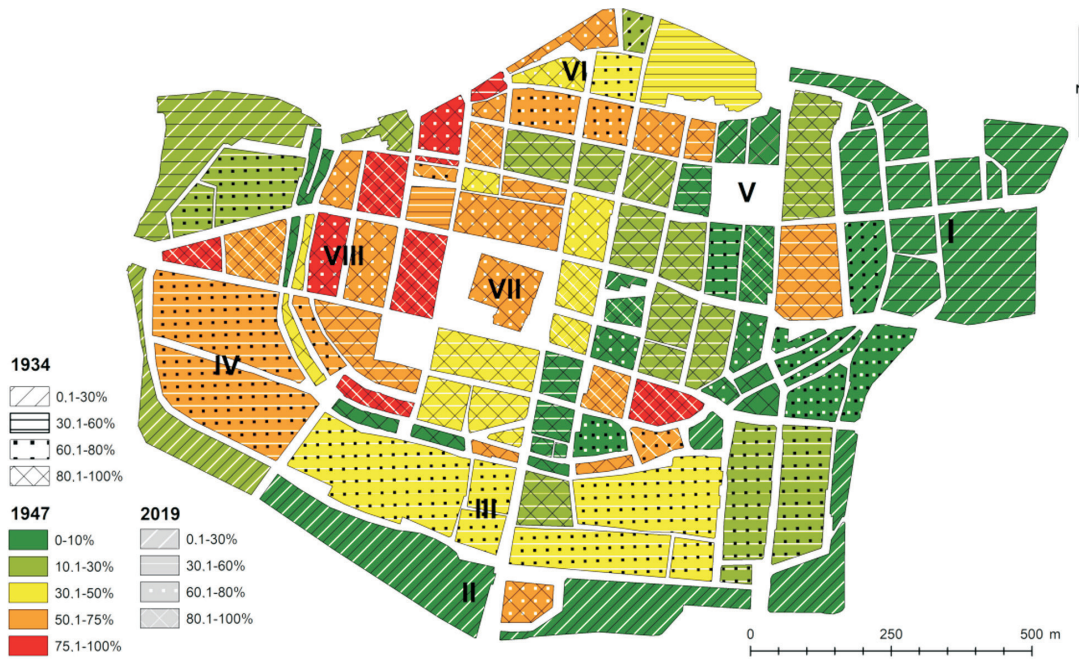


Fig. 11. Typology of the street blocks of the Old Town in Wrocław. *Nowe Miasto* (New Town) (I); the area around *Promenada Staromiejska* (Old Town Promenade) (II); the southern part of the area which then became part of the Old Town at the end of the 13th century (III); *Dzielnica Czterech Świątyń* (Four Temples District) (IV); the area around the square of *Nowy Targ* (New Market Square) (V); the vicinity of the main building of the University of Wrocław (VI); the blocks around Market Square (VII); the western part of the chartered city (VIII)

Source: own elaboration.

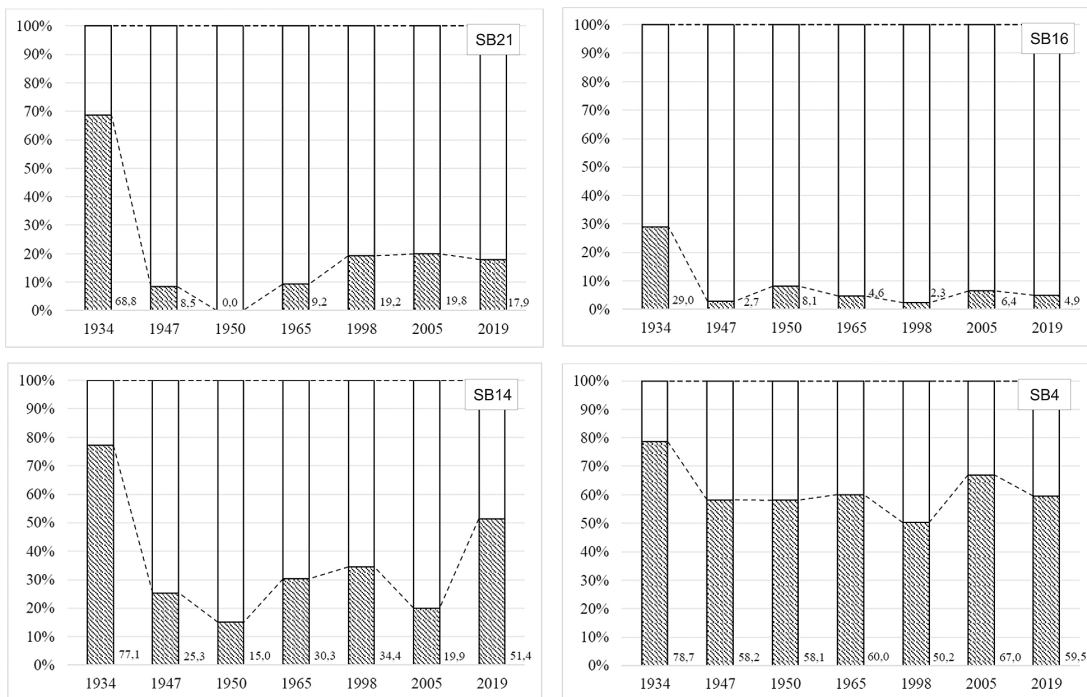


Fig. 12. Examples of post-war burgacy cycles for street blocks in the homogenous areas of Old Town in Wrocław.

SB21 – *Nowe Miasto* (New Town) (I); SB16 – the area around *Promenada Staromiejska* (Old Town Promenade) (II); SB14 – the southern part of the area which then became part of the Old Town at the end of the 13th century (III); SB4 – *Dzielnica Czterech Świątyń* (Four Temples District) (IV)

Source: own elaboration.

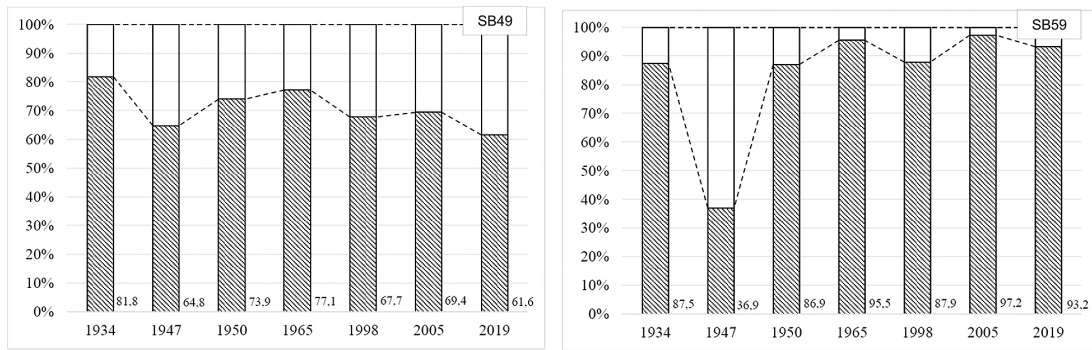


Fig. 13. Post-war burgage cycle for the street blocks around Market Square in Wrocław (example of mosaic areas).

Source: own elaboration.

the climax phase during the interwar period. *Dzielnica Czterech Świątyń* was affected by the war to a small degree, which meant that its building coverage remained stable and high during the post-war period. The southern part of the area that was adjoined to the Old Town in the 13th century was destroyed to a significant degree, with the building coverage in the area decreasing by half; this has barely changed to this day. The buildings within the street blocks in the area around *Nowy Targ* were completely destroyed. After the war, the buildings were gradually rebuilt, with building coverage reaching 50–75%.

The mosaic areas (the main university building, the blocks around Market Square and the western part of the chartered city) did, in turn, undergo a fairly uniform course of street block development (Fig. 13). In the interwar period, the street block building coverage there was particularly high (80–95%). Further changes in these areas were determined by the seriousness of war damage. The buildings in some of the blocks were not destroyed; as a result, these blocks retained high building coverage for the entire post-war period. In the remaining cases, the buildings were destroyed either completely or to a significant degree. Once rebuilt, the building coverage of these street blocks amounted to 50–75% of their total area.

## Discussion

Following the phases of the burgage cycle and creating the classification of street blocks made it possible to distinguish two key, different morphogenetic periods. The first period began

following World War II (1950s and 1960s); it was defined by extreme reduction in the building coverage, unnatural changes occurring in the burgage cycle and considerable transformations in the morphological structure of the Old Town (Musiaka et al. 2021a). The second period encompasses the restoration of the buildings and an increase in the building coverage within the street blocks. This is also confirmed in the study by Miszewska (1994). It is worth noting that this increase (in terms of the growing building coverage) is not consistent across all the blocks. The periodical, markedly visible drops result from the natural processes that govern the urban fabric. Musiaka et al. (2021a) showed that the reconstruction of Old Town areas in large Polish cities destroyed during World War II proceeded with varying intensity, and in some cities, it has not been completed to this day.

In West Germany, it usually took several years to develop reconstruction plans and gain both political and public support, and another five to ten years to implement those plans. During the first post-war years, there was no national government, inflation was very high, financing was lacking and the black-market economy could not overcome the crushing shortage of building materials and equipment. Nevertheless, by the late 1950s, planners stopped talking about reconstruction and instead spoke in terms of normal, on-going planning and building. By that point, the rubble was mostly gone, most public buildings restored, reconstructed or replaced, and the post-war housing shortage solved (Diefendorf 2009). On the other hand, Birmingham was severely bombed, although the damage was scattered. However, no formal 'reconstruction plan'

was developed, and the concept of rebuilding the city centre was dominated by a new ring road and suburban development. The reconstruction process was slow and elicited very mixed public response. The resulting architectural and urban forms were also mixed (Larkham 2016), which is closer to the reconstruction of the Old Town in Wrocław.

Creating a morphological classification of the street blocks in the Old Town made it also possible to confirm the first hypothesis of the study, regarding the nature of classifications that concern the developmental stages of growth of a medieval left-bank city. The basic development units of a city (i.e., in this case, *Nowy Targ*, chartered city, *Dzielnica Czterech Świątyń*, *Nowe Miasto* and the southern part of the area that was incorporated into the Old Town at the end of the 13th century) are strongly reflected in the morphology of contemporary Wrocław. For each of these areas, the burgage cycle has had a different course, with similar developments in its particular stages, comparable damage inflicted during the war and analogous processes that affected the shifts in the morphology of these areas. The transformations that occurred can therefore be described through a specific pattern that is based on the spatial distribution of the street blocks.

It has to be also noted that the contemporary morphological structure of the Old Town has been shaped by the phenomena and processes that are typical of specific periods (i.e. recession in development, formation of fallows, restoration of the block and reconstruction). The morphological structure of the Old Town was formed by over 70 years of influence of multitude factors imposed by the urban fabric (Musiaka et al. 2021a), which, in turn, has been moulded since the Middle Ages (Whitehand 1984). Moreover, the reconstruction of Wrocław, unlike Warsaw (Jankowski 1990; Dutt, Achmatowicz-Otok 1991; Niemczyk 1998) or Elbląg (Johnson 2000), did not follow a single concept. Certain street blocks of the Old Town were reconstructed or restructured, while in others, completely new buildings were built, referring to patterns typical of a socialist (Dutt, Achmatowicz-Otok 1991; Crowley 1994; Węclawowicz 2016) or post-socialist city (Czepczyński 2016; Węclawowicz 2016; Mały et al. 2020). This has contributed to the emergence of different morphological units in different parts

of the Old City in Wrocław and, consequently, to spatial chaos in an area with a once uniform morphogenesis. This problem is also encountered in other Polish cities heavily damaged during World War II (Miszevska, Szmytkie 2010; Musiaka et al. 2021b).

The study also confirms the hypothesis concerning the correlation between the contemporary building coverage of the street blocks and the degree of war damage. The overall trend, charted based on the degree of building coverage in street blocks, indicates that in the blocks that endured most war damage, the buildings never returned to their pre-war condition. On the other hand, the blocks that were affected the least by war damage have retained the level of building coverage that is the same or similar to the one they had in the interwar period. At the same time, there are exceptions to this rule in the Old Town (some of the completely destroyed blocks were fully rebuilt, while some buildings in the blocks that were not damaged by the war were razed); a strong overall trend was observed nonetheless.

The study encountered a rather large challenge during its empirical phase due to the limited availability of the city centre plans as well as their cartographic accuracy and level of detail. The issue was mainly caused by the accuracy in the depiction of the buildings within each block on particular plans. The access to the plans from the 1970s and 1980s is limited. The 20th century most likely did not have much influence on the results of this analysis, yet this period was marked by significant morphological shifts in the area; hence, the availability of maps from these years would have certainly enriched the study. Nevertheless, the study confirmed the validity of applying burgage cycle analysis to urban blocks, as was proposed by Koter (1979) and Miszevska (1994).

The processes that influence changes in the morphology were identified based on the analysis of the distribution of buildings on the city plan and on the results of similar studies (Koter, Wiktorowska 1976; Miszevska 1993, 1994; Miszevska, Szmytkie 2009); hence, some of the indications could potentially be inaccurate or not precise enough. Pointing out the exact morphological processes that influenced the morphology of the Old Town in Wrocław is restricted if one does not have sufficient data on the

functional-spatial structure of the area and land use. This study could constitute a starting point to functional analyses. That would make it possible to establish a number of facts related to the complex structure of the city centre and to create a series of maps that would demonstrate morphological changes as well as the changes occurring in the function of the buildings and land use. This approach is in line with Conzenian tradition in urban morphology (Conzen 1960; Whitehand 2001; Koter, Kulesza 2010).

## Conclusion

The conducted analyses and their results have led to many important conclusions. The damage caused by the war affected not only the morphological structure of the city but also its visual features. Moreover, the damage inflicted during the war period contributed to the distortion of the (until then) natural burgage cycle, which, in turn, led to the changes in the phases of the burgage cycle. The area of the Old Town in Wrocław, while certainly homogeneous in its morphology in the interwar period, did undergo a diverse transformation and became a morphological mosaic composed of blocks with varying building coverage. Across all the periods examined, the highest building coverage was found in the chartered part of the Old Town and *Dzielnica Czterech Świątyn*, while the lowest coverage was present in the areas of *Nowe Miasto*, the neighbourhood of *Nowy Targ* and the street blocks spanning alongside the city moat. The most significant changes of the post-war period occurred in the area of *Nowy Targ* and *Nowe Miasto*, while the least significant changes took place in the western part of the chartered city and the street blocks located in the area that was adjoined to the Old Town in the 13th century. The area of *Nowy Targ* underwent significant transformations, but owing to the existing state of the street block, no further changes are possible without far-reaching alterations made to the nearby buildings.

One could claim that the most radical transformation of blocks occurred in those destroyed by the war. The reduction of building coverage often led to complete replacement of the buildings themselves, often changing the borders of the street blocks as well (which resulted in the

changes made to the network of streets and the layout of other blocks) and shifting of the layout of buildings within the block. Less significant changes did occur through restoration and modernisation. As a result of restoration, the owners of plots could change, or the borders of plots could be removed (which would lead to the buildings being replaced). Modernisation, on the other hand, could lead to some of the buildings being removed and new buildings being constructed in their stead. One cannot directly specify the influence of the restoration of the blocks (due to purchasing them by a single owner) and the influence of other processes on the changes in morphology since the analysis of the transformations of the buildings is ambiguous. Hence, more accurate functional-structural analyses are required. Any future changes to the morphology of the Old Town will be strictly dictated by the ongoing spatial changes and the processes that lead to them. Moreover, one may expect a gradually increasing building coverage in street blocks (filling the urban fallows or constructing infills) and a secondary recession of the buildings, leading to a complete metamorphosis of the existing development.

## Acknowledgments

The authors would like to thank the reviewers for all their detailed comments and suggestions for changes.

## Author's contribution

RS: conceptualisation, formal analysis, investigation, methodology, project administration, supervision, visualisation, roles/writing – original draft, writing – review and editing; KP: data curation, formal analysis, investigation, methodology, resources, visualisation, roles/writing – original draft, writing – review and editing.

## References

- Adams D., 2011. Everyday experiences of the modern city: Remembering the post-war reconstruction of Birmingham. *Planning Perspectives* 26(2): 237–260.
- Andrusz G., Harloe M., Szelenyi I. (eds), 1996. *Cities after socialism: Urban and regional change and conflict in post-socialist societies*. Wiley-Blackwell, Oxford.

- Ashworth G., Tunbridge J., 1999. Old cities, new pasts: Heritage planning in selected cities of Central Europe. *GeoJournal* 49(1): 105–116.
- Bertaud A., 2006. The spatial structures of Central and Eastern European cities. In: Tsenkova S., Nedovic-Budic Z. (eds), *The urban mosaic of post-socialist Europe*. Physica-Verlag HD, New York: 91–110.
- Bertaud A., Renaud B., 1997. Socialist cities without land markets. *Journal of Urban Economics* 41(1): 137–151.
- Brakman S., Garretsen H., Schramm M., 2004. The strategic bombing of German cities during World War II and its impact on city growth. *Journal of Economic Geography* 4(2): 201–218.
- Bullock N., 2002. *Building the post-war world: Modern architecture and reconstruction in Britain*. Routledge, London.
- Calame J., 2005. Post-war reconstruction: Concerns, models and approaches. *Macro Center Working Papers* 20.
- Clapson M., Larkham P.J., (eds). 2013. *The blitz and its legacy: Wartime destruction to post-war reconstruction*. Ashgate Publishing, Farnham.
- Clout H., 1999. The reconstruction of Upper Normandy: A tale of two cities. *Planning Perspectives* 14(2): 183–207.
- Conzen M.R.G., 1960. Alnwick, Northumberland: A study in town-plan analysis. *Transactions and Papers* (Institute of British Geographers), 27: 1–122.
- Conzen M.R.G., 1968. The use of town plan analysis in the study of urban history. In: Dyos H.J. (ed.), *The study of urban history*. Leicester University Press, Leicester: 113–130.
- Crowley D., 1994. Building the world anew: Design in Stalinist and post-Stalinist Poland. *Journal of Design History* 7(3): 187–203.
- Crowley D., Reid S., 2002. *Socialist spaces: Sites of everyday life in the Eastern Bloc*. Berg, Oxford.
- Czepczyński M., 2016. *Cultural landscapes of post-socialist cities: Representation of powers and needs*. Routledge, London and New York.
- Dale R., 2015. Divided we stand: Cities, social unity and post-war reconstruction in Soviet Russia, 1945–1953. *Contemporary European History* 24(4): 493–516.
- Diefendorf J., 2009. Wartime destruction and the postwar cityscape. In: Closmann C. (ed.), *War and the environment: Contexts and consequences of military destruction in the modern age*. Texas A&M University Press, College Station, TX: 171–192.
- Diefendorf J.M., 1989. Urban reconstruction in Europe after World War II. *Urban Studies* 26(1): 128–143.
- Diefendorf J.M., 1993. *In the wake of war: The reconstruction of German cities after World War II*. Oxford University Press, Oxford.
- Diener A.C., Hagen J., 2013. From socialist to post-socialist cities: Narrating the nation through urban space. *Nationalities Papers* 41(4): 487–514.
- Dutt A.K., Achmatowicz-Otok S., 1991. Residential preferences in the city of Warsaw, Poland. *GeoJournal* 24(3): 285–292.
- Dziewulski S., Jankowski S., 1957. The reconstruction of Warsaw. *Town Planning Review* 28(3): 209–221.
- Fisher J., 1962. Planning the city of socialist man. *Journal of the American Institute of Planners* 28(4): 251–265.
- French R., Hamilton F., 1979. *The socialist city, spatial structure and urban policy*. John Wiley, Chichester, New York, Brisbane, Toronto.
- Hagen J., 2005. Rebuilding the middle ages after the Second World War: The cultural politics of reconstruction in Rothenburg ob der Tauber, Germany. *Journal of Historical Geography* 31(1): 94–112.
- Hamilton F.I., Andrews K.D., 2005. *Transformation of cities in Central and Eastern Europe: Towards globalization*. United Nations University Press, Tokyo and New York.
- Hirt S., 2006. Post-socialist urban forms: Notes from Sofia. *Urban Geography* 27(5): 464–488.
- Hirt S., 2012. *Iron curtains: Gates, suburbs and privatization of space in the post-socialist city*, Vol. 27. Wiley-Blackwell, Oxford.
- Hirt S., Stanilov K., 2007. The perils of post-socialist transformation: Residential development in Sofia. In: Stanilov K. (ed.), *The post-socialist city: Urban form and space transformations in Central and Eastern Europe after socialism*. Springer, Dordrecht: 215–244.
- Jankowski S., 1990. Warsaw: Destruction, secret town planning, 1939–44, and postwar reconstruction. In: Diefendorf J.M. (ed.), *Rebuilding Europe's bombed cities*. Macmillan Press Lt., London: 77–93.
- Johnson J., 2000. Rebuilding of a historic Polish town: 'Retroversion' in action. *Journal of Architectural Conservation* 6(2): 63–71.
- Kohlrausch M., Hoffmann S.L., 2011. Introduction: Post-catastrophic cities. *Journal of Modern European History* 9(3): 308–313.
- Koter M., 1974. Fizjonomia, morfologia i morfogeneza miasta. Przegląd rozwoju oraz próba uściślenia pojęć (Physiognomy, morphology and morphogenesis of the city. A review of development and an attempt to clarify concepts). *Zeszyty Naukowe UŁ, Nauki Matematyczno-Przyrodnicze* 2(55): 3–16.
- Koter M., 1979. Struktura morfogenetyczna wielkiego miasta na przykładzie Łodzi (Morphogenetic structure of a large city on the example of Łódź). *Acta Universitatis Lodzianensis, Nauki Matematyczno-Przyrodnicze* 2(21): 25–52.
- Koter M., 1994. Od fizjonomii do morfogenezy i morfologii porównawczej. Podstawowe zagadnienia teoretyczne morfologii miast (From physiognomy to morphogenesis and comparative morphology. Basic theoretical issues of urban morphology). In: Koter M., Tkocz J. (eds), *Zagadnienia geografii historycznej osadnictwa w Polsce* (Issues of historical geography of settlement in Poland). Nicolaus Copernicus University in Toruń, University of Lodz: 23–32.
- Koter M., Kulesza M., 2007. Morfologia miast-stan i tendencje rozwoju (Morphology of cities-state and development trends). In: Jądzewska I. (ed.), *Polska geografia osadnictwa. Dotychczasowy dorobek* (Settlement geography in Poland. The achievements to date). *XX Konwersatorium Wiedzy o Mieście*. Łódź: 303–314.
- Koter M., Kulesza M., 2010. The study of urban form in Poland. *Urban Morphology* 14(2): 111–120.
- Koter M., Wiktorowska D., 1976. Proces przemian morfologicznych śródmieścia Łodzi (w granicach byłej kolonii tkackiej) pod wpływem kształtowania się ogólnomiejskiego centrum usługowego (Morphological changes in the Łódź city centre (within the former weaving colony) under the influence of city-wide service centre development). *Acta Universitatis Lodzianensis, Nauki Matematyczno-Przyrodnicze* 2(7): 41–88.
- Kotus M., 2006. Changes in the spatial structure of a large Polish city - The case of Poznań. *Cities* 23(5): 364–381.
- Kozaczewski T., 1959. Początki i rozwój Wrocławia do roku 1263 (Origins and development of Wrocław up to 1263). *Kwartalnik Architektury i Urbanistyki* 4(3–4): 171–184.



- Kubeš J., 2013. European post-socialist cities and their near hinterland in intra-urban geography literature. *Bulletin of Geography. Socio-economic Series* 19(19): 19–43.
- Larkham P.J., 2016. Replanning post-war Birmingham. *Architecture* 46(1): 2–26.
- Lowe S., Tsenkova S., 2003. *Housing change in central and Eastern Europe: Integration or Fragmentation?* Ashgate, Aldershot.
- Małachowicz E., 1985. *Stare Miasto we Wrocławiu. Rozwój urbanistyczno-architektoniczny, zniszczenia wojenne i odbudowa* (Old Town in Wrocław. Urban and architectural development, wartime damage and reconstruction). PWN, Warsaw–Wrocław.
- Małczyński K., Morelowski M., Ptaszycka A., 1956. *Wrocław. Rozwój urbanistyczny* (Wrocław. Urban development). Wydawnictwo Budownictwo i Architektura, Warsaw.
- Mały J., Dvořák P., Šuška P., 2020. Multiple transformations of post-socialist cities: Multiple outcomes? *Cities* 107: 102901.
- Miszewska B., 1993. Procesy morfologiczne w blokach urbanistycznych Starego Miasta we Wrocławiu (Morphological processes in urban blocks of the Old Town in Wrocław). *Rocznik Wrocławski* 1: 225–239.
- Miszewska B., 1994. Bloki urbanistyczne Wrocławia w różnych fazach cyklu miejskiego (Urban blocks in Wrocław in different phases of the urban cycle). In: Koter M., Tkocz J. (eds), *Zagadnienia geografii historycznej osadnictwa w Polsce* (Issues of historical geography of settlement in Poland). Nicolaus Copernicus University in Toruń, University of Łódź: 111–129.
- Miszewska B., Szmytkie R., 2009. Mikro-i makroprzestrzenne zmiany fizjonomiczne i funkcjonalne miast polskich w okresie gospodarki rynkowej (Micro- and macro-spatial physiognomic and functional changes in Polish cities during a market economy). In: Jażdżewska I. (ed.), *Duże i średnie miasta polskie w okresie transformacji* (Large and medium-sized Polish cities during the transformation). *XXII Konwersatorium wiedzy o mieście*. Wydawnictwo Uniwersytetu Łódzkiego, Łódź: 23–34.
- Miszewska B., Szmytkie R., 2010. Staromiejskie blokowiska w strukturze przestrzennej miast Dolnego Śląska (Old tower block project in the spatial structure of Lower Silesia cities). In: Jażdżewska I. (ed.), *Osiedla blokowe w strukturze przestrzennej miast* (City block estates in the urban spatial structure). *XXIII Konwersatorium wiedzy o mieście*. Wydawnictwo Uniwersytetu Łódzkiego. Łódź: 27–35.
- Miszewska B., Szmytkie R., 2015. Morphological processes in the spatial structure of the Southern District of Wrocław city. *Bulletin of Geography. Socio-Economic Series* 27(27): 133–151.
- Musiaka Ł., Figlus T., Szmytkie R., 2021a. Models of morphological transformations of centres of the largest Polish cities after World War II. *European Planning Studies* 29(3): 511–535.
- Musiaka Ł., Sudra P., Spórna T., 2021b. Spatial chaos as a result of war damage and post-war transformations. Example of the small town of Węgorzewo. *Land* 10(5): 541.
- Musil J., 1993. Changing urban systems in post-communist societies in Central Europe: Analysis and prediction. *Urban Studies* 30(6): 899–905.
- Niemczyk M., 1998. City profile – Warsaw (Warszawa). *Cities* 15(4): 301–311.
- Nuissl H., Rink D., 2005. The ‘production’ of urban sprawl in eastern Germany as a phenomenon of post-socialist transformation. *Cities* 22(2): 123–134.
- Pendlebury J., Erten E., Larkham P., 2014. *Alternative visions of post-war reconstruction: Creating the modern townscape*. Routledge, London.
- Sailer-Fliege U., 1999. Characteristics of post-socialist urban transformation in East Central Europe. *GeoJournal* 49(1): 7–16.
- Schneider-Sliwa R., 2006. *Cities in transition: Globalization, political change and urban development*, Vol. 83. Springer Science & Business Media, Berlin and New York.
- Sørensen M., Viejo-Rose D., 2015. *War and cultural heritage*. Cambridge University Press, Cambridge.
- Stangl P., 2008. The vernacular and the monumental: Memory and landscape in post-war Berlin. *GeoJournal* 73(3): 245–253.
- Stanilov K., 2007. Taking stock of post-socialist urban development: A recapitulation. In: Stanilov K. (ed.), *The post-socialist city: Urban form and space transformations in Central and Eastern Europe after socialism*. Springer, Dordrecht: 3–17.
- Sýkora L., 1999. Changes in the internal spatial structure of post-communist Prague. *GeoJournal* 49(1): 79–89.
- Sýkora L., 2009. New socio-spatial formations: Places of residential segregation and separation in Czechia. *Tijdschrift voor economische en sociale geografie* 100(4): 417–435.
- Szmytkie R., 2021. The cyclical nature of the territorial development of large cities: A case study of Wrocław (Poland). *Journal of Urban History* 47(4): 771–793.
- Tiratsoo N., 2018. *Reconstruction, affluence and labour politics: Coventry, 1945–1960*. London: Routledge.
- Tsenkova S., Nedovic-Budic Z., 2006. *The urban mosaic of post-socialist Europe: Space, institutions and policy*. Physica-Verlag, Heidelberg.
- Węclawowicz G., 1992. The socio-spatial structure of the socialist cities in East-Central Europe: The case of Poland, Czechoslovakia and Hungary. In: Lando F. (ed.), *Urban and rural geography*. Cafoscarina, Venezia: 129–140.
- Węclawowicz G., 2016. Urban development in Poland. From the socialist city to the post-socialist and neoliberal city. In: Szirmai V. (ed.), *“Artificial towns” in the 21st century. Social polarisation in the new town regions of East-Central Europe*. Centre for Social Sciences Hungarian Academy of Sciences, Budapest: 1–82.
- While A., 2006. Modernism vs urban renaissance: Negotiating post-war heritage in English city centres. *Urban Studies* 43(13): 2399–2419.
- Whitehand J., 1984. *Rebuilding town centres: Developers, architects and styles*. Occasional Publication, 19. University of Birmingham, Birmingham.
- Whitehand J.W., 2001. British urban morphology: The Conzenion tradition. *Urban Morphology* 5(2): 103–109.