

Received: March 13, 2025; Received in revised form: March 14, 2025; Accepted: October 16, 2025

Citation: Wierzbicka, A.M., Trębacz, P., Duda, M., Heidgerken, T., (2025). Public Space as the Fabric Connected to an Evolving City Structure: Case Study of Powiśle Północne, Warsaw, Poland. Środowisko Mieszkaniowe/ Housing Environment, e2025029. <https://doi.org/10.2478/he-2025-0029>

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Public Space as the Fabric Connected to an Evolving City Structure: Case Study of Powiśle Północne, Warsaw, Poland

Streszczenie

Przestrzenie publiczne są nieodzownymi elementami struktury przestrzennej, które łączą komponenty tkanki miejskiej i odgrywają kluczową rolę w kształtowaniu zrównoważonego środowiska mieszkaniowego. Fragmenty tkanki miejskiej, które nie są powiązane przestrzeniami publicznymi, ulegają stopniowej degradacji. Aby skutecznie przeciwdziałać tej tendencji, zdegradowane miasto wymaga "zszycia" korytarzami przestrzennymi, co bezpośrednio wpływa na jakość środowiska mieszkaniowego. Celem artykułu jest identyfikacja procesu zwiększania atrakcyjności obszaru w wyniku przekształcania węzłów w miejsca oraz formowania między nimi powiązań. Przykładem udowadniającym hipotezę o rozwoju w wyniku udrożnienia i uformowania sieci przestrzeni publicznych są przekształcenia zaniedbanego fragmentu nabrzeża Warszawy – obszaru Powiśla Północnego, ograniczonego mostami: Śląsko-Dąbrowskim i Poniatowskiego, brzegiem Wisły oraz górną krawędzią Skarpy warszawskiej. Niniejszy artykuł prezentuje proces formowania krajobrazu miejskiego w latach 1990-2020. Proces ten obejmuje zaprojektowaną przestrzeń publiczną metodą łączenia w pełni uformowanych węzłów i powiązań w spójną całość.

Abstract

Public spaces are indispensable elements of the urban spatial structure, binding the components of the urban tissue and playing a crucial role in shaping a sustainable housing environment. Fragments of urban tissue that are not connected by public spaces are prone to gradual degradation. A defragmented city must therefore be 'stitched together' by spatial corridors to counteract this tendency effectively, which directly affects the quality of the living environment. The aim of this article is to identify the process of increasing the attractiveness of an area by transforming nodes into places and forming connections between them. An illustrative example of this hypothesis – the development resulting from the creation and consolidation of a public space network – is the transformation of a previously neglected section of the Warsaw waterfront – the Powiśle Północne area, bounded by the Śląsko-Dąbrowski and Poniatowski bridges, the Vistula riverbank, and the upper edge of the Warsaw Escarpment. This article presents the development of urban landscape formation in the years 1990-2020. The process involves designing public spaces by connecting fully formed nodes and linkages into a coherent whole.

Słowa kluczowe: struktura przestrzenna miasta, tkanka miejska, rewitalizacja terenów nadbrzeżnych, placemaking, transformacja miejska, jakość środowiska mieszkaniowego

Keywords: urban spatial structure, urban fabric, waterfront revitalisation, placemaking, urban transformation, quality of the housing environment

INTRODUCTION

Despite several thousand years of experience in city building – and even with state-of-the-art technologies now at our disposal – humanity is still searching for the formula for the ideal city. For centuries, societies have undergone crises that demanded transformation to adapt to changing conditions. These transformations, driven by social, cultural, economic and political challenges, have been reflected in the fabric of the urban environment (Trębacz, 2024a).

In this paper, the authors draw upon the experience of urban structural transformation resulting largely from systemic change: the transition from a centrally controlled socialist economy, based on a hierarchical Modernist model, to a free-market liberal network economy.

By analysing changes in the urban fabric over a longer period (thirty years), some of which have proved irreversible, the authors raise the question of whether permanent elements of spatial structures exist. Regardless of models adopted or cultural

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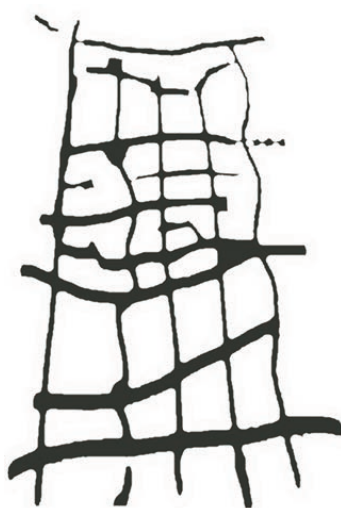
fashions followed, the city can only function through certain enduring principles of spatial design. Among these are 'empty' areas – undeveloped, accessible public spaces – set in contrast to 'full' areas, the built-up quarters with diverse functions and forms of development (Domaradzki, 2013, p. 29). This paper focuses on the first of these components, which form the spatial network that connects different parts of the city (Ill. 1). Such connections provide a means of addressing a recurring problem: the revitalisation of attractively located yet dormant urban areas. This is particularly relevant in relation to post-industrial and waterfront zones reclaimed by the city for the benefit of future residents.

The authors hypothesise that the *sine qua non* condition for reintegrating areas that constitute separate functional 'islands' (Pabich & Wierzbička, 2022) – often originating from Modernist planning – into the city lies not only in the infrastructural and transport systems, but also in the creation of spaces with a clearly defined form and function. Re-stitching this atomised urban structure – characteristic of the Modernist model and inherently time- and energy-intensive – requires establishing connections through a network of public spaces. Urban public space should be understood as that segment of the city's open environment which constitutes a hierarchical network of interconnected, publicly accessible places of an interior urban character, where interpersonal interactions are intensified in line with established cultural codes (Trębacz, 2024b). The concept of the 'urban interior' refers to a fragment of urban space as perceived by the observer, enclosed by boundaries such as buildings, fences or greenery (Wejchert, 1984, p. 25).

Such spaces may be likened to the warp and weft of weaving: a network with visible hierarchical features and significant intersections, or nodes, which emerge as distinctive and recognisable places. Together, these form a legible and memorable system of spatial corridors, characterised by clearly defined edges and integrated public functions.

The present research examines the tendency to link previously disconnected spatial structures, observed over a thirty-year period, through a comparative analysis of their formation in 1990, 2005 and 2020, as inventoried by the authors. It is assumed that a correlation exists between the quantitative features identified and the increasing use of public spaces, particularly at nodes, which provide the basis for qualitative evaluation of spatial performance.

This article forms part of ongoing research into place-making and the creation of meaningful spaces. Its objective is to identify the process through which nodes are transformed into places, and the ways in which pedestrian connections between them are established, thereby enhancing the overall attractiveness of the urban fabric. The case study presented demonstrates the crucial influence of developing a network of connections between significant places on the growth of an area's appeal. It focuses on Warsaw's Powiśle district, delineated by the Śląsko-Dąbrowski and Poniatowski bridges, the banks of the River Vistula, and the upper edge of the Warsaw Escarpment.



Il. 1. Zarys „siec” powiązań przestrzeni publicznej Powiśla Północnego, stan na 2020 r. (opracowanie własne)

Ill. 1. Outline of 'network' of public space linkages of Powiśle Północne, status as of 2020 (authors' compilation)

LITERATURE REVIEW

The changing ideas of design in the public space

The 19th-century Industrial Revolution introduced rapid industrial urbanisation, overturning the previously gradual and relatively harmonious principles of city development (Nowakowski, 2013). "Between 1890 and 1950, Modernist art and culture set out to challenge century-old notions of the individual and the community, culture and politics, morality and freedom, and placed into question the very foundations of Western civilisation" (McBride, McCormick, Zaga, 2007). The modernist ambition to build a contemporary society was rooted in a vision of a perfectly designed living environment. In their manifestos and projects, modernists often promoted an uncompromising *tabula rasa* approach to urban form, even when this required the destruction of historic street patterns. The dictum of Louis Sullivan, *form follows function*, provided one of the guiding principles for new housing developments, neighbourhoods and entire cities. Efforts to create ideal communities found expression in low-cost prefabricated housing and in open green spaces designed to guarantee sunlight and fresh air, symbolising the modern lifestyle (Tasan-Kok, 2015; Lasiewicz-Sych, 2019).

Modernist urban areas, inspired by the logic of the assembly line, fragmented the urban fabric into segregated, mono-functional 'islands' of development. The resulting changes to patterns of daily use and the compartmentalisation of space reduced both accessibility and attractiveness. Traditional street layouts were supplanted by transport networks stripped of the cultural meaning that had historically accrued to them. Consequently, these unattractive 'islands', connected solely by technical infrastructure, ceased to attract residents, became underused and were ultimately subject to abandonment and degradation.

Public space, understood in its most general sense, may be defined in a variety of ways depending on the analytical perspective adopted. Some definitions emphasise regulatory frameworks and the role of local government control, while others highlight cultural and symbolic dimensions. From the latter perspective, public space is a realm that provides the conditions and stimuli for indirect interaction between individuals and social groups (Chmielewski, 2010, p. 42). Public space is not a homogeneous category: it constitutes a differentiated spatial structure with distinctive characteristics (Trębacz, Duda, 2021, cited in Domaradzki, Lechowski, Trębacz, 2000). These characteristics can be classified into three interrelated domains: social (public accessibility, intensity of interactions, ritualisation of behaviour, significance of place), functional (prevalence of pedestrian movement, presence of key public facilities) and spatial (networked structure, hierarchy of importance, and the urban interior form) (Trębacz, 2024b).

Crucially, people must recognise the role of nodes – as meaningful places – and navigate between them via the street network, conceived as a system of public spaces integrated within the wider urban organism (Law, Traunmueller, 2017; Hillier, Penn, Hanson et al., 1993). Equally important is an awareness of the value of the built environment – its buildings and urban context – since its aesthetic and symbolic appeal strongly influences

patterns of mobility (Miranda, Fan, Duarte et al., 2021). Conversely, the absence of meaningful references to context and symbolism results in spatial autonomy, echoing the Modernist paradox of *no place, but still somewhere*. In the contemporary information society, this notion of *still somewhere* retains a certain resonance. Yet, in practice, lived reality tends to exceed both modernist ideals and more recent digital or global paradigms. As Krzysztof Bieda observes, there remains widespread affection for the traditional European city, with its beautiful streets, distinguished urban interiors, vibrant squares, dense development, iconic buildings and the open landscapes beyond the built-up area – all of which create a striking contrast with urbanised space (Bieda, 2021). However, despite the enduring appeal of such traditional European urban forms, with their coherent public spaces and legible networks of streets and squares, Sieverts raises a provocative question: “does such a city still exist?” (Sieverts, 2003).

The need for a permanent city structure and urban fabric design

Elements of urban space are perceived through the senses. One of the tools employed in urban studies is the creation of a mental map, which does not mirror the actual topography of a city (Lynch, 1960). Rather, it represents a mental network of relationships among individual areas and highlights distinctive landmarks. Constructing a mental map not only facilitates spatial orientation but also generates a symbolic image of the city through the elements that shape it (Trębacz, Jóźwik & Duda, 2025). As critics of modernism have argued, people require a city conceived as a collection of meaningful places, integrated into the wider context of public spaces, designed in the form of interiors imbued with significance (Alexander, 1977; Rossi, 1984). Every spatial element and the system of links within it may thus be interpreted as part of a semantic narrative – albeit one experienced differently by individual users (Węgrzynowicz, 2018; Wierzbicka, 2013).

For a city's image to remain coherent and to foster a sense of security and balance, certain permanent elements are essential (Duda, Trębacz, 2021). The urban fabric that supports such an image must be “malleable – to adapt to the perceptual habits of thousands of residents – flexible in order to accommodate changing functions and meanings, and open to new metaphors, inviting its audience to explore the world” (Lynch, 2011, p. 139). On this basis, urban transformation can yield meaning and enchantment for its inhabitants rather than generating an impression of disorder. Cities are in constant flux, with both virtues and shortcomings. As Joseph Rykwert (2013, pp. 25–26) argued, this ongoing transformation represents the only certainty in the history of cities, underscoring the need to accept their malleability. The authors of this paper, however, contend that even *changing cities* contain fixed elements – specifically, the structural warp and weft embedded in the wider urban context.

In an era of globalisation and digitalisation, if cities are to remain attractive as tangible places rooted in specific geographic locations, they cannot be revitalised or reshaped solely through the creation of fragmented sites of consumption. A city is not merely *The WELL* (Whole Earth 'Electronic Link'), as described by Howard Rheingold (1993). Rather, it should be designed to cultivate a sense of urban community, not to set itself in opposition to the city, a danger against which Richard Sennett (2009) warned. Key components that foster community include high-quality public spaces, accessibility, appealing furnishings, and greenery that sustains ecological balance. Research shows that ‘walkability’ and space quality are the most influential factors associated

with place attachment and satisfaction. Accessibility, combined with a diverse range of services, thoughtful urban composition, greenery, small-scale architecture and convenient pedestrian infrastructure, indirectly supports place-making by enhancing walkability (Miranda, Fan, Duarte et al., 2021; Li, Tao, Lusk et al., 2020). Elizabeth Burton and Lynne Mitchell (2006) likewise emphasise the human-centred qualities of public space, including familiarity, legibility, distinctiveness, accessibility, comfort and safety. Without such fixed elements in the public space network, design principles intended to ensure usability across generations will fail to realise the core ambition of *streets for life*.

Matthew Carmona (2019) also stresses the importance of addressing perceptual and environmental aspects in design. He describes a shift from ‘place-making’ to ‘place-shaping’, which involves not merely creating new places but reshaping existing nodes within a network of interconnected public spaces to deliver a range of public policy objectives: health, social participation, economic competitiveness, social and environmental resilience, safety and more. This perspective resonates with New Urbanist principles of *compact, pedestrian-friendly, mixed-use design* (Talen, 2013) as well as with the approaches of practitioners such as Studio Gang and Gehl, who study behaviour in public spaces to inform design strategies (Sim, 2020).

DATA AND METHODS

General methods

This paper employs source analysis, analytical methodology and a case study of the Powiśle Północne area. To trace and evaluate changes in public space, layouts of the spatial structure of this urban fragment over the past thirty years (1990–2020) were examined.

In addition, a review of the literature was undertaken on the perception of public space as both a carrier of meaning and a durable framework for spatial transformation in the context of post-war Modernism in the Polish capital. Particular attention was given to the issue of waterfront revitalisation and the reorientation of the city towards the river.

Methodology – valorisation of spatial network linkages, nodes, and research tools

The analytical framework adopted in this study assumes that public space is structured as a network of interconnected, publicly accessible places where intense interpersonal interaction occurs. This network encompasses all streets, major pedestrian routes, and combined pedestrian–vehicular routes within the study area. Unlike axial line mapping (Hillier & Hanson, 1984), which treats streets as continuous straight segments, this analysis considers street fragments as the sections between successive intersections.

The evaluation of the urban spatial structure focused on two primary elements (III. 2):

- 1) Linkages, characterised by:
 - a) the degree of development of the urban interior form (shape = formed edges),
 - b) the degree of spatial activation (content = active frontages).
- 2) Nodes, assessed by the degree of formation within the public space network.

Re. 1. The analysis of the first of the above-listed elements has shown:

- a) Public spaces take the form of an urban interior developed to varying degrees. This form comprises walls of buildings, higher

fences, or dense greenery. Depending on the degree to which the street frontage has evolved, streets were divided into two groups, irrespective of the type of front (buildings or greenery). The first ones are streets or thoroughfares with a high degree of street frontage (at least 50% – marked by a ‘+’ symbol in Ill. 2), whereas the second one includes streets with a low degree of a produced frontage of the urban interior (below 50% – marked by a ‘-’ in Ill. 2).

b) The next significant element for describing the public space, subject to assessment, is the degree of space use. The index adopted here comprises the saturation of the edge of public spaces with generally accessible services. Although, as a general rule, services appear only when the edge is formed, it may happen that in unformed nodes, there is an accumulation of functions in temporary facilities. However, services survive only where people adequately attend the space. Thus, they serve as an essential indicator of the long-lasting use of space. The classification results concerning the saturation of the edges with services allowed for dividing the public spaces into two groups. The first group comprises sections where the boundaries of the edges are significantly saturated with generally accessible services; the degree of saturation stands at least 50% of the length of the street frontage (marked by a ‘+’ sign in Ill. 2). The second group

II. 2. Klasyfikacja węzłów oraz odcinków łączących węzły ze względu na ukształtowanie wnętrza urbanistycznego (forma) oraz aktywizację przestrzeni w wyniku lokalizacji funkcji ogólnodostępnych (treść): istniejące (+), nieistniejące (-) (opracowanie własne)
 III. 2. Division of linkages and nodes on account of the formation of the urban interior (shape) and activation of space (content): existing (+), non-existing (-) (authors' compilation)

WĘZŁ/ NODE	FORMA/ SHAPE	FORMA/ SHAPE	POWIĄZANIE /LINK	FORMA/ SHAPE	FORMA/ SHAPE
	-	+		-	+
TREŚĆ/ CONTENT	nietworzone /non-created	CZĘŚCIOWO UFORMOWANE /FORMED PARTLY	TREŚĆ/ CONTENT	POTENCJALNE /POTENTIAL	CZĘŚCIOWO UFORMOWANE /FORMED PARTLY
-			-		
TREŚĆ/ CONTENT	FUNKcjONALNE NIEUFORMOWANE /FUNCTIONAL UNFORMED	KOMPLETNE/ COMPLETE	TREŚĆ/ CONTENT	FUNKcjONALNE NIEUFORMOWANE /FUNCTIONAL UNFORMED	KOMPLETNE/ COMPLETE
+			+		



includes sections where the saturation is below 50% (marked by a ‘-’ symbol in Ill. 2).

By combining these criteria – edge formation and functional activation – public spaces functioning as **linkages** were categorised into four groups:

- developed form and user activation (formed completely),
- user activation without a developed form (formed partly),
- developed form without user activation (functional, unformed),
- absence of both form and activation (non-created).

Re. 2. The second element subject to the assessment is to determine the degree of formation of the public space network nodes. Based on the classification of the previously described aspects of the spatial structure, it is possible to distinguish – as was the case with links – four degrees of **node** formation:

- the first degree is when no walls form the node (non-created);
- in the second degree, when the walls have been partially formed, but they have no generally accessible services which would testify to the node’s activation (formed partly);
- the third degree is a situation where the form has not developed, but functions that activate the node exist (functional, unformed);
- in the fourth degree, when the node has a complete form and services are enhancing it on the ground floor (formed completely). If the criteria described for the fourth type of node have been strongly formed, and services testifying to its activation are present, it is assumed that the place, not only a node, becomes significant.

Research data

The study of the case study area was based on photographic documentation of links and nodes, surveys, and analyses of data compiled in previous MSc theses¹. For the purposes of this article, a comparative method was employed, drawing upon the data from the two theses. This dataset enabled the tracking of spatial transformations and facilitated comparisons between past and present conditions, which proved crucial for drawing informed conclusions.

Given the extended period over which changes occurred in the Powiśle area, a qualitative assessment method was applied, grounded in the recorded quantitative changes. The analysis is limited to three key periods in which elements of the spatial structure were examined and compared: 1990, 2005, and 2020. These periods correspond to the dates of completion of the MSc theses, which included portions of the area’s functional and spatial analysis conducted by the co-authors. They are also representative of the major economic and political transformations

III. 3. Lokalizacja obszaru opracowania. Przypadek Powiśla Północnego w Warszawie, Polska. Obszar Większej Jednostki Urbanistycznej wyznaczają: brzeg Wisły (od wschodu), Most księcia Józefa Poniatowskiego (od południa), ciąg ulic Krakowskie Przedmieście i Nowy Świat (od zachodu), most Śląsko-Dąbrowski (od północy). Natomiast właściwy obszar badań ograniczono od strony zachodniej do górnej krawędzi Skarpy Warszawskiej, przy pozostawieniu pozostałych granic bez zmian: brzegu Wisły, Mostu Poniatowskiego i Mostu Śląsko-Dąbrowskiego. (źródło: opracowanie własne na podstawie <http://ukosne.um.warszawa.pl/> dostęp 10.06.2021)

III. 3. Localization of the study area. The case study of Powiśle Północne in Warsaw, Poland. The area of the Larger Urban Unit is delineated by the Vistula River bank (to the east), the Prince Józef Poniatowski Bridge (to the south), the alignment of Krakowskie Przedmieście and Nowy Świat streets (to the west), and the Śląsko-Dąbrowski Bridge (to the north). The actual study area is limited on the western side by the upper edge of the Warsaw Escarpment, while the remaining boundaries – the Vistula River bank, the Poniatowski Bridge, and the Śląsko-Dąbrowski Bridge – remain unchanged. (source: own elaboration based on <http://ukosne.um.warszawa.pl/>)



Fot. M. Ostrowski

II. 4. Widok na Powiśle w kierunku północnym. Fot. M. Ostrowski 2004 (pożyczane, październik 2004 z zasobów Biura Przestrzennego Rozwoju Warszawy do pracy dyplomowej Magdaleny Dudy)

III. 4. View to Powiśle in the northern direction. Photo by M. Ostrowski 2004 (received in October 2004 from the resources of the Office of Spatial Development of Warsaw for the diploma thesis of Magdalena Duda)

in Poland and reflect the evolution of spatial management in the study area.

CASE STUDY BACKGROUND – POWIŚLE PÓŁNOCNE

For Powiśle Północne (III. 3, 4), the north-south tracts running parallel to (along) the Vistula River were assumed as 'the warp'. 'The weft' is constituted by east-west routes, perpendicular to (transverse) the river, formed mainly along the traces of former watercourses flowing naturally from the Warsaw Escarpment. Such warp, in conjunction with the weft, has remained in an unchanged layout for years; it has been adapted to different conditions resulting from transformations within the urban quarters (III. 5). The analysis in the case study of the warp is based on a detailed observation of parts of the city over thirty years, beginning with the transformation of 1990 – the first year of the new political system, through 2005 – the first full year of membership in the European Union, ending with 2020 – the year of the thirtieth anniversary of the transformation. In addition, the analysis presents finished projects but also facilities being planned and prepared for implementation.

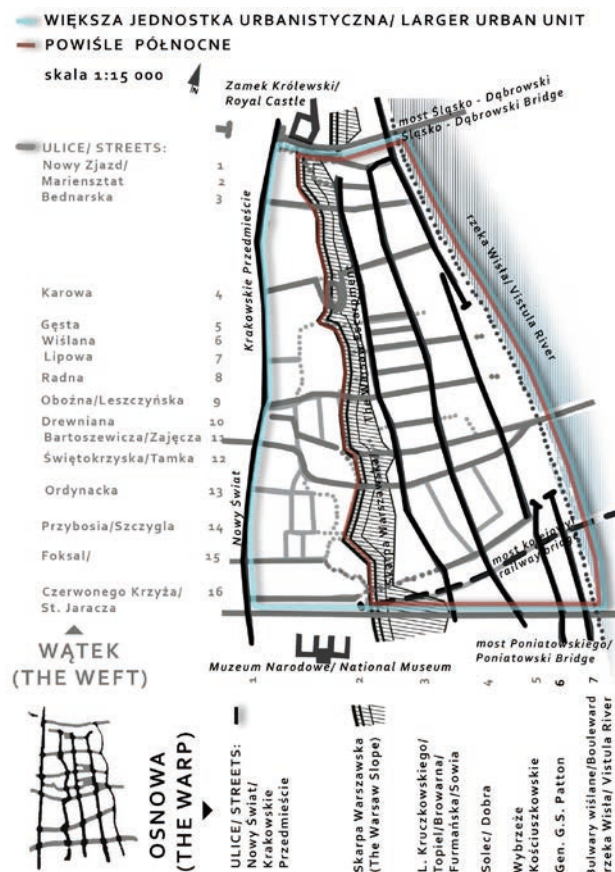
The authors demonstrate how the layout of the city's public space fabric – *warp and weft* – exemplified by a fragment of downtown Warsaw, has endured despite spatial transformations, particularly in terms of maintaining the network despite changes to the built substance of the quarters. The structure of the public space fabric has preserved its historical heritage through linkages, resisted spatial and functional degradation, and contributed to the reconstruction of favourable living conditions for residents. In pursuit of optimal conditions for cultivating urban character, the authors aim to identify the universal values of attractive public spaces and emphasise their significance and role within the urban structure.

Analysis of spatial changes during periods covered by the study, according to the described methodology

Considering that Powiśle underwent significant transformations over the past century, the authors have identified several key points along the temporal axis between 1938 and 1990, culminating in the establishment of the Third Republic of Poland.

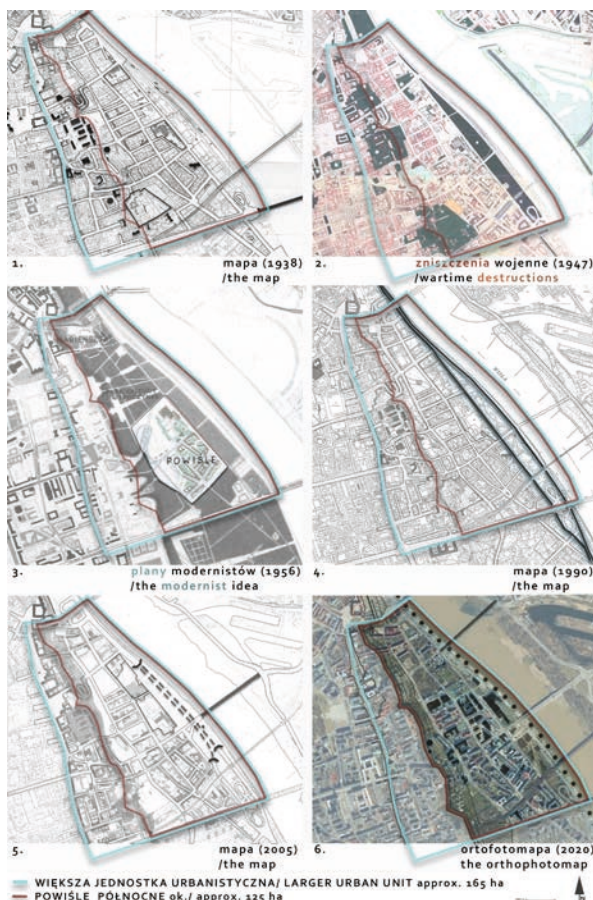
→ II. 6. Zmiany struktury przestrzennej Powiśla Północnego na mapach (opracowanie własne)

→ III. 6. Changes in the spatial structure of Powiśle Północne on maps (authors' compilation)



↑ II. 5. Schemat osnowy i wątku jako typ „siatki” powiązań przestrzeni publicznych Powiśla Północnego, stan na rok 2020 (opracowanie własne)

↑ III. 5. Outline of warps and wefts as a type of “network” of public space links of Powiśle Północne, status as of 2020 (authors' compilation)





II. 7. Układ przestrzeni publicznych w 1990 r. oraz ich syntetyczny zapis (opracowanie własne)

III. 7. Layout of public spaces in 1990 and their synthetic record (authors' compilation)

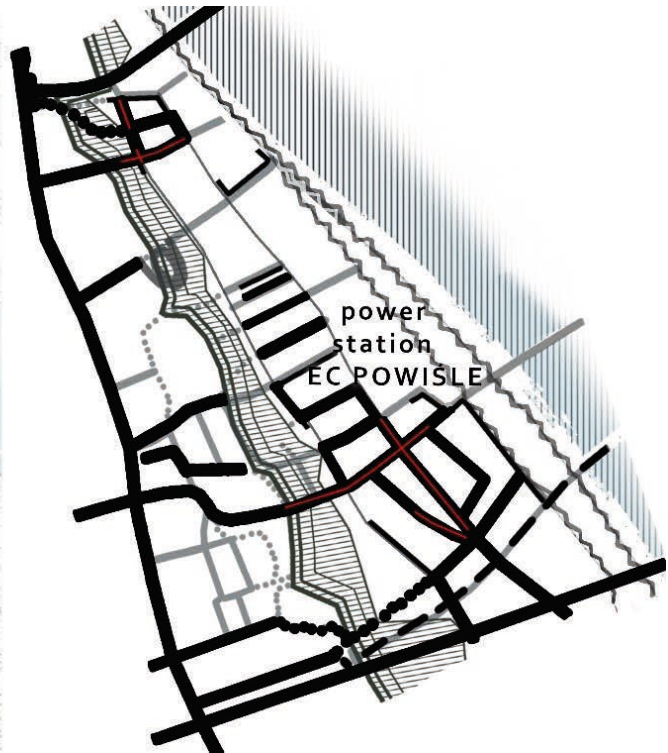
The first four images in III. 6 provide a detailed illustration of this period. The subsequent two maps in Figure 6 depict the main changes that occurred between Poland's accession to the European Union and the present day.

Management status as of the moment of the Third Republic of Poland

Before World War II, Powiśle was a poor but active working-class neighbourhood with an optimistic outlook. New tenement houses were constructed among the factories, a monument to the Warsaw Mermaid was erected on the river, and efforts were made to establish a representative boulevard with modern buildings along the riverbank. However, because of the war, and particularly due to the destruction and burning of houses by the Nazis in the autumn of 1944, approximately 85% of Powiśle was destroyed.

These substantial losses in the urban fabric drew the attention of modernist urban planners. In the post-war 1956 plans, the entire sub-escarpment zone was designated as a corridor of urban greenery, intended for a large cultural and entertainment park with a sports centre on the Vistula River. The two minor housing complexes that survived the war were planned to flank this area. At the beginning of the 1960s, the Modernist Radna housing estate was constructed, incorporating the few remaining pre-war buildings. The University of Warsaw's facilities symmetrically enclosed this layout, while extensive green areas separated Tamka Street from Mariensztat. The strip along Wybrzeże Kościuszkowskie Street remained industrial, occupied by the operating Powiśle C.H.P. plant with its extended transformer station, which effectively cut off access to the river from the city centre. The boulevards comprised a concrete quay, lacked services, and were bisected by a provisional minesweepers' bridge (III. 7, markings as per the legend in III. 8).

In the 1980s, a Long-term General Spatial Development Plan for the Capital City of Warsaw was created, followed by the Local



SYMBOL PLANISTYCZNY PLANNING DESIGNATION	SYMBOL SYNTETYCZNY SYNTHETIC DESIGNATION	OPIS DESCRIPTION
		UFORMOWANE PIERZEJE PRZESTRZENI PUBLICZNYCH FORMED FRONTS OF PUBLIC SPACES
		USŁUGI OGÓLNOODSTĘPNE W PIERZEJACH GENERALLY ACCESSIBLE SERVICES IN FRONTS
		TERENY O ZNAČĄCYCH FUNKCJACH AREAS WITH SIGNIFICANT FUNCTIONS OF PUBLIC SERVICES

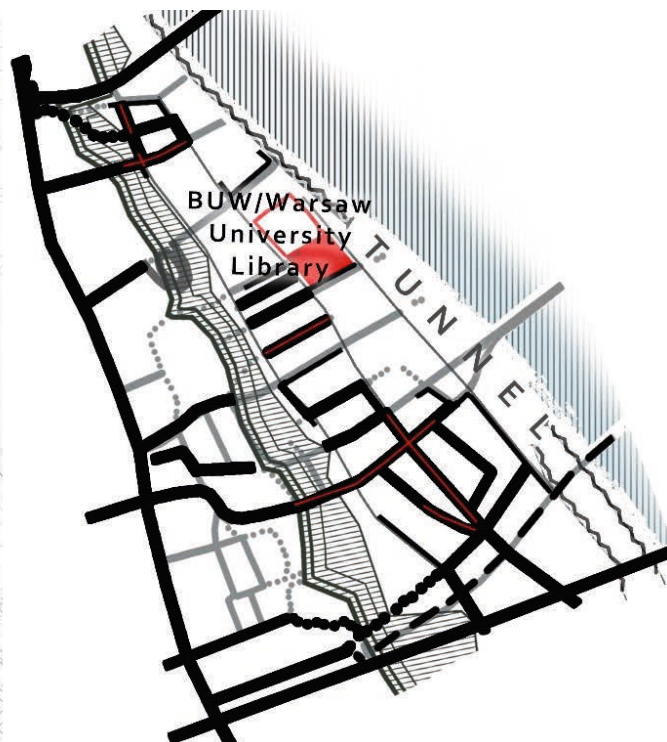
II. 8. Legenda dotycząca il. 7, 9 i 10 – przestrzenie publiczne oraz ich syntetyczny zapis (opracowanie własne)

III. 8. Legend to III. 7, 9, and 10: public spaces and their synthetic record (authors' compilation)

Development Plan for the Capital City of Warsaw, adopted in 1992 in a new functional-zoning format. Based on this, the General Spatial Development Plan for the Warsaw-Śródmieście District was adopted in 1993. These studies, however, largely neglected the issue of shaping public spaces.

Management of Powiśle at the time of admission to the European Union

During this period, key projects were undertaken to improve Warsaw residents' access to the river. Initially, a section of the expressway, known as the Wisłostrada, was covered, and a new local low water crossing, the Syrena Bridge, was constructed. In the post-industrial areas thus released, projects supporting scientific development were implemented, including the Library of the University of Warsaw. The Copernicus Science Centre was established above the transportation tunnel, promoting scientific knowledge in a manner accessible to all generations. These initiatives provided a stimulus for further development of the area. Unfortunately, luxury housing developments gradually occupied post-industrial sites that had been earmarked for more extensive academic and research functions (III. 9, legend as per III. 8). The Act on Spatial Planning and Development of 2003 abolished the provisions of existing development plans. Aside from the Study



II. 9. Układ przestrzeni publicznych w 2005 r. oraz ich syntetyczny zapis (opracowanie własne)

III. 9. Layout of public spaces in 2005 and their synthetic record (authors' compilation)

of Conditions and Directions of Spatial Development of the Capital City of Warsaw, in force since 2007, there were no local detailed plans coordinating development processes until the end of the period under review. Consequently, development decisions were primarily determined by administrative approvals issued by local government offices.

Current management status

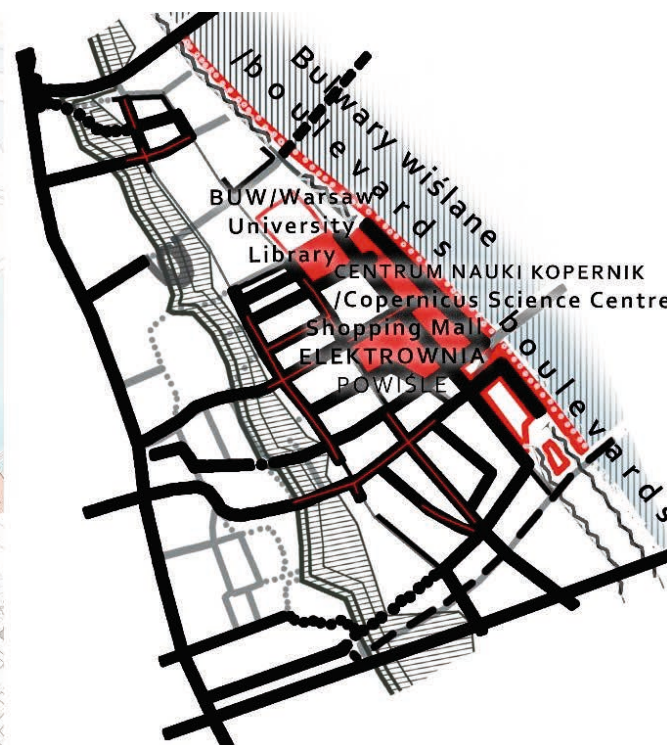
Significant public projects have driven the development of the Powiśle area. Existing spaces were subjected to substantial

intervention, which facilitated the removal of industrial functions and their replacement with residential uses. The power plant was supplanted by luxury residential and service complexes, while academic functions were partially expanded through the construction of new University of Warsaw divisions. Access to the waterfront was markedly improved by the construction of the second metro line and the establishment of the Copernicus Centre station in Powiśle.

The intensification of pedestrian traffic prompted the decision to redevelop the Vistula Boulevards, incorporating numerous

II. 10. Układ przestrzeni publicznych w 2020 r. oraz ich syntetyczny zapis (opracowanie własne)

III. 10. Layout of public spaces in 2020 and their synthetic record (authors' compilation)





II. 11 Widok z dachu Centrum Nauki Kopernik w kierunku południowym na fragment Bulwarów wiślanych. Fot. T. Matwiejczuk, 2021

III. 11. View towards Vistula's Bulvars from the roof of Copernicus Science Centre, in the southern direction. Photo by T. Matwiejczuk, 2021

services and gastronomic facilities along the river. Plans include the construction of a pedestrian and cycling bridge along the route of the pre-war bridge (scheduled to open in 2024) and the development of additional facilities along the boulevards (III. 10, legend as per III. 8).

Summary of development

Over the thirty-year period covered by the study, a notable transformation can be observed: the modernist structure of mono-functional sub-areas – comprising housing estates with stand-alone residential buildings and industrial zones separated by recreational areas – gradually evolved into forms of dense edge development with significantly greater intensity. Despite these substantial changes, the layout of public spaces in Powiśle has remained materially unchanged. Transformations primarily concern the programming of urban quarters, which continue to rely on the urban network delineated in the 18th century.

The placement of key 'generators' of pedestrian traffic has provided a crucial impetus for the area's development. These generators include metro stations, important university facilities (such as the library and humanist faculties), and the Vistula Boulevards. The transformation of the Vistula River Boulevard (IIIs. 11–16) illustrates how the quality of public spaces and the coherence of

II. 13 Widok na Centrum Handlowe ELEKTROWNIA Powiśle z ul. Dobrej, plac na przedłużeniu ul. Lipowej w kierunku wschodnim. Fot. T. Matwiejczuk, 2021

III. 13. View the ELEKTROWNIA Powiśle Commercial Centre from Dobra Street, square, at the extension of Lipowa Street in the eastern direction. Photo by T. Matwiejczuk, 2021



II. 12 Widok z dachu Centrum Nauki Kopernik w kierunku zachodnim na ciąg ulic: Drewnianej i Leszczyńskiej. Fot. T. Matwiejczuk, 2021

III. 12. View towards Drewniana and Leszczyńska streets from the roof of Copernicus Science Centre, in the western direction. Photo by T. Matwiejczuk, 2021

their interconnected network are essential for successfully creating a sustainable urban landscape along the waterfront.

RESULTS

In accordance with the research methodology outlined above, the dynamics of change in public spaces were analysed, and an assessment of these spaces over a thirty-year period was conducted. The analysis encompassed all network relations – links and nodes – within Powiśle. The study boundaries are indicated by a red line in Figures 17, 18, and 19. The degree of transformation observed is described below, with a detailed focus on the years 1990, 2005, and 2020.

Summary of the state of the urban network in 1990

At the time of the socio-economic transformation in Powiśle, built-up areas existed only in fragments, practically forming isolated 'islands', as illustrated in the first outline (III. 17, legend as per III. 2). This situation is reflected in the public space scheme, where links exhibited partially formed structures and shaped nodes but limited functional programmes, occurring only within these separate areas.

In the Podskarpie area, only a few fully formed street sections between nodes with confirmed active use via publicly accessible

II. 14. Widok na trawnik w pobliżu ELEKTROWNI Powiśle w kierunku ul. Zaječzej. Fot. T. Matwiejczuk, 2021

III. 14. View to the lawn – near the ELEKTROWNIA Powiśle Commercial Centre – towards Zaječza Street. Photo by T. Matwiejczuk, 2021





II. 15 Widok z dachu Centrum Nauki Kopernik na Bulwary wiślane (w kierunku południowym, w oddali na praskim brzegu Wisły widoczny Stadion Narodowy). Fot. T. Matwiejczuk, 2021

III. 15. View from the roof of the Copernicus Science Centre at the boulevards by the Vistula – in the distance, in the southern direction, the National Stadium is visible on the Praga bank of the river. Photo by T. Matwiejczuk, 2021

frontage services existed – nine running along the Vistula River and five perpendicular to it. Only six nodes were fully formed and met the previously established criteria for public places. The river was effectively separated from the urbanised zone by industrial areas and the transport route along its edge. Consequently, the riverbank, unconnected to the city, was largely inaccessible and rarely visited.

Summary of the state of the urban network in 2005

The second outline, depicting the layout of public spaces in Powiśle in 2005 (III. 18, legend as per III. 2), reveals the initial effects of development activities associated with the establishment of the University District and its connection to the waterfront. The coverage of the Wisłostrada was completed, providing access to the Vistula River, and construction of the University Library had commenced. These interventions established a clear connection along Lipowa Street, aligned with the axis of the Kazimierz Palace, which exhibits the characteristics of a fully formed public space. At its terminus, key activating functions emerged within the Vistula Boulevard zone.



II. 16 Widok z dachu Centrum Nauki Kopernik: dwa brzegi Wisły, po lewej stronie rzeki, reprezentacyjne Bulwary wiślane, po prawej, krajobrazowa plaża na praskim brzegu. Fot. T. Matwiejczuk, 2021

III. 16. View from the roof of the Copernicus Science Centre: the two banks of the Vistula River, on the left, the representative boulevards; on the right, the unregulated, beach-like Praga bank. Photo by T. Matwiejczuk, 2021

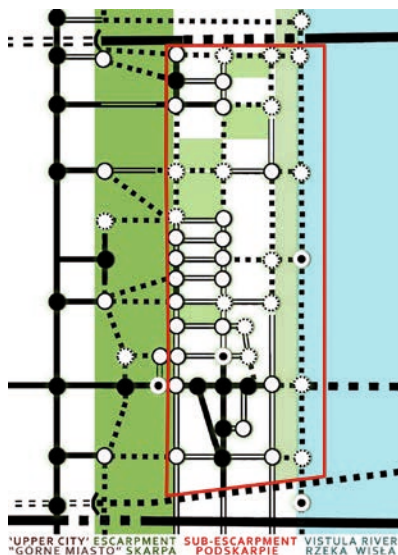
In the Podskarpie area, the number of fully formed street sections between nodes with confirmed active use increased by five, comprising two parallel and three perpendicular to the Vistula River. Additionally, three new fully formed public spaces were created.

Summary of the state of the urban network in 2020

In the third outline, depicting the layout of public spaces in 2020 (III. 19, legend as per III. 2), the 'formed' spatial links perpendicular to the river are highlighted, exhibiting the characteristics of a fully developed urban public space. Thanks to the creation of shaped nodes, the distinctive character of these places, and the development around the metro station, the Boulevard has evolved into a vibrant and frequently visited 'lounge' of Warsaw. In the Podskarpie area, the number of fully formed street sections between nodes with confirmed active use increased to seventeen along the river and nine perpendicular to it. Additionally, seventeen new fully formed public spaces were created across the area, bringing the total number of such places to twenty-six.

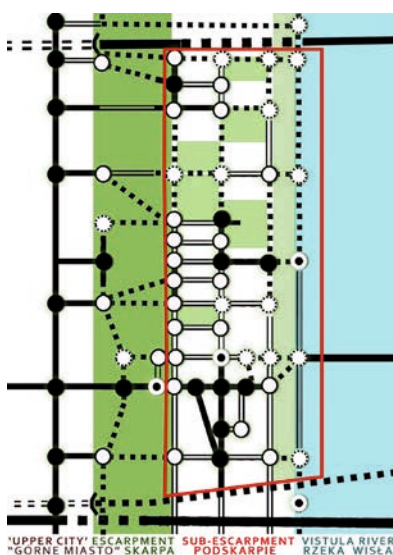
II. 17. Analiza stopnia przekształcenia sieci powiązań przestrzennych (stan 1990) (opracowanie własne)

III. 17. Analysis of the degree of transformation of the network of spatial relations (status in 1990) (authors' compilation)



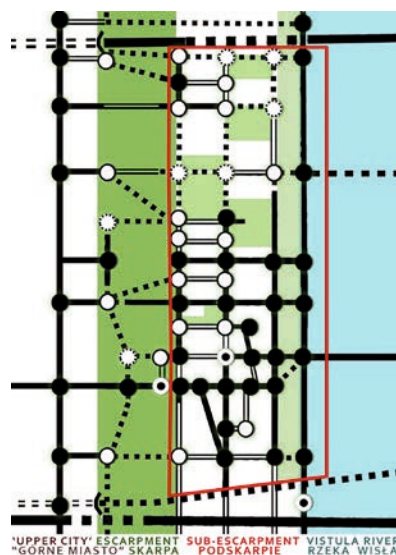
II. 18. Analiza stopnia przekształcenia sieci powiązań przestrzennych (stan 2005) (opracowanie własne)

III. 18. Analysis of the degree of transformation of the network of spatial relations (status in 2005) (authors' compilation)



II. 19. Analiza stopnia przekształcenia sieci powiązań przestrzennych (stan 2020) (opracowanie własne)

III. 19. Analysis of the degree of transformation of the network of spatial relations (status in 2020) (authors' compilation)



Total effects

Public spaces are created based on a network of communication links, predominantly pedestrian. The developed spatial framework consolidates the layout of these links with the public character established in this manner. This framework ensures the possibility of situating permanent service infrastructure and simultaneously reflects the degree of use and intensity of pedestrian flows within the formed corridors.

The observed increase in the number of connections between public spaces with defined edges and functioning ground-floor

services during the study period confirms the gradual activation of these areas. Changes in the grid of linkages in the Podskarpie region between 1990 and 2020 indicate that the number of fully formed, active public space corridors increased more than threefold for both transverse linkages ('weft') and longitudinal linkages running along the Vistula River ('warp'), compared with their initial comparable extents in both groups (Tab. 1a,b).

The following two tables (Tab. 2a,b) indicate that, as of 2020, 56.5% of the nodes in the Podskarpie area meet the criteria to be classified as public places. Of these, over 76% were created during the

Tabela 1a. Liczba powiązań na obszarze Podskarpia według ich stopnia uformowania i aktywizacji w latach: 1990, 2005 i 2020
Table 1a. The number of links in the Podskarpie area according to the degree of their formation and activation in the years: 1990, 2005, and 2020

Liczba typów powiązań (stan na dany rok)/ Number of link types per year												
Rok/ year	1990			2005			2020			1990-2020 zmiana/ variation		
typ powiązania:/ link type:	wątek/ wefts	osnowa/ warps	razem/ total	wątek/ wefts	osnowa/ warps	razem/ total	wątek/ wefts	osnowa/ warps	razem/ total	wątek/ wefts	osnowa/ warps	razem/ total
kompletne/ formed completely	5	9	14	8	11	19	17	28	45	+12	+19	+31
częściowo uformowane/ formed partly	15	21	36	14	19	33	10	12	22	-4	-7	-11
funkcjonalne, nieuformowane/ functional, unformed	0	0	0	0	2	2	0	0	0	0	-2	-2
potencjalne/ potential	11	13	24	10	12	22	8	6	14	-2	-6	-8
razem/ total	31	43	74	32	44	76	35	46	81	+3	+10	+17

Tabela 1b. Procentowe zestawienie zmian liczby powiązań na obszarze Podskarpia według ich stopnia uformowania i aktywizacji w latach: 1990, 2005 i 2020
Table 1b. Percentage change in the number of links in the Podskarpie area according to the degree of their formation and activation in the years 1990, 2005, and 2020

Zestawienie wszystkich typów powiązań na dany rok [%]/ Percentage [%] of total links types per year												
Rok/ year	1990			2005			2020			1990-2020 zmiana/ variation		
typ powiązania:/ link type:	wątek/ wefts	osnowa/ warps	razem/ total	wątek/ wefts	osnowa/ warps	razem/ total	wątek/ wefts	osnowa/ warps	razem/ total	wątek/ wefts	osnowa/ warps	razem/ total
kompletne/ formed completely	7	12	19	11	15	26	22	34	56	15	22	37
częściowo uformowane/ formed partly	21	28	49	18	25	43	12	15	27	-9	-13	-22
funkcjonalne, nieuformowane/ functional, unformed	-	-	-	-	2	2	-	-	-	-	-	-
potencjalne/ potential	14	18	32	13	16	29	10	7	17	-4	-13	-15
razem/ total	42	58	100	42	58	100	44	56	100			

study period (1990–2020), and approximately half were developed entirely from scratch, through both formation and functional activation. In 1990, these nodes had been classified as non-created.

DISCUSSION

The tabular presentation of layouts recording changes in the public space system of Powiśle over thirty years illustrates the gradual formation and transformation of links connecting previously separated parts of the city. Despite the relative self-sufficiency of the Vistula boulevard, its saturation with attractive services and access to public transport paradoxically fostered the development of formed public spaces perpendicular to this riverfront area. This shaping process intensifies towards the city centre, suggesting a natural tendency to ‘stitch together’ separated but functionally active parts of the city through a connected network of public spaces.

Osbert Lancaster described modernism as a *nightmare amalgam of various elements from different sources* (Ryan, 2018). The Powiśle district in downtown Warsaw, as examined in this case study, has avoided such an outcome, preserving a coherent and original urban structure thanks to the survival of spatial frames comprising the fabric referenced in the title. The development of the public space system, based on the warp-and-weft pattern, enables multidirectional connectivity between the area and the wider urban structure, representing a critical condition for achieving a coherent urban layout. Over subsequent years, this fabric has been reinforced by both urban forms and programmed functions. By comparing the spatial outlines across decades, a correlation emerges between the gradual formation of public spaces, the enhancement of their formal quality, and increased pedestrian activity, as evidenced by the operation of publicly accessible services on ground floors.

Tabela 2a. Liczba węzłów na obszarze Podskarpia według ich stopnia ich wytworzenia w latach: 1990, 2005 i 2020

Table 2a. The number of nodes in the Podskarpie area according to the degree of the place created in the years: 1990, 2005, and 2020

Liczba typów węzłów (stan na dany rok)/ Number of node types per year						
Typ węzła:/ node type:		1990	2005	2020	1990-2020 zmiana/ variation	
kompletne / formed completely		6	9	26	+20	76,9%
częściowo uformowane / formed partly		21	20	14	-7	
funkcjonalne, nieuformowane/ functional, unformed		2	2	1	-1	
nieutworzone/ non-created		15	13	5	-10	
razem/ total		44	44	46	+2	

Tabela 2b. Procentowe zestawienie zmian w liczbie węzłów na obszarze Podskarpia według stopnia ich wytworzenia w latach: 1990, 2005 i 2020

Table 2b. Percentage change in the number of nodes in the Podskarpie area according to the degree of the place created in the years: 1990, 2005, and 2020

Procentowe zestawienie [%] wszystkich typów węzłów dla łącznej ich liczby na dany rok/ Percentage [%] of node types in the total number of them in a given year:					
Typ węzła:/ node type:		1990	2005	2020	1990 - 2020 zmiana/ variation
kompletne / formed completely		13,6	20,6	56,5	43,0
częściowo uformowane / formed partly		47,8	45,4	30,4	-17,4
funkcjonalne, nieuformowane/ functional, unformed		4,5	4,5	2,2	-2,3
nieutworzone/ non-created		34,1	29,5	10,8	-23,3
razem/ total		100	100	100	



II. 20. Widok nabrzeża w Detroit. Fot. P. Trębacz, 2011

III. 20. View of Detroit's waterfront. Photo by P. Trębacz, 2011

The deliberate formation of public space, through the creation of urban interiors, enhances both aesthetic value and usage. Similarly, Lund (2003) observed in a study of eight neighbourhoods in Portland that the integration of amenities such as services and parks into the street network, within walking distance of residential areas, increases pedestrian travel and encourages higher user flow. However, the reciprocal relationship between spatial frameworks and pedestrian activity – namely, the extent to which spatial frameworks stimulate pedestrian traffic and vice versa – remains an open question.

The hypothesis that shaping spatial linkages and assigning specific content to these forms is a necessary condition for initiating pedestrian movement has not yet been fully confirmed, but it has not been contradicted either. Pedestrian movement maps indicate that attributes of the street network, such as fully formed walls and floors of urban interiors, promote increased usage (Miranda, Fan, Duarte et al., 2021).

Pedestrian traffic fosters the development of network structures and their interrelationships. Although these structures emerge in response to changing economic, social, and functional factors, their genesis is rooted in the recognition and preservation of these links. Pedestrian connections thus constitute a constant, enduring fabric of the urban structure, independent of prevailing architectural trends. Recognising the detailed criteria that determine the attractiveness of network nodes – particularly how they are linked to the surrounding transport network and endowed with site-specific qualities – should be a primary task for urban designers and architects. Identifying legible and measurable criteria for assessing the quality of space – through characteristics such as imagery, enclosure, human scale, clarity, complexity, connectivity, and consistency (Ewing, Handy, 2009) – remains a significant challenge. To date, studies of pedestrian accessibility based on quantitative measures (e.g., walkability) have been unable to fully capture the complex perceptual experiences of space users. Consequently, the evaluation method presented in this paper – a straightforward approach assessing the existence of developed form and activity within links and nodes of public space – may prove more effective for general assessments of spatial condition.

In a similar way to Warsaw's example, Detroit's riverfront has changed from unused industrial land into a lively public space. The idea for connected riverfront parks began with Mayor Coleman Young in the 1970s and 1980s following the creation of Hart Plaza (1979) and the Renaissance Center, and gained strength when General Motors moved its headquarters to the Renaissance Center in 1996. The creation of the Detroit Riverfront Conservancy (DRFC) in 2003, helped by Mayor Kwame Kilpatrick, was a key step forward, establishing an organisation responsible for creating a coherent plan within which many investors, developers, and stakeholders could work. Important events followed: Riverside Plaza was completed in 2004, GM donated land to the DRFC, and the city signed a 90-year agreement with the DRFC in 2005, which led to the Smith Group completing the first phase in 2007.

Before the cohesive Detroit Riverfront development existed, the area consisted of fragmented, underutilized urban spaces, including industrial brownfield sites, parks, and deteriorating waterfront infrastructure like slips and harbours. Prior to 2003, there were several unconnected efforts to reclaim sections of the waterfront, resulting in spaces such as Hart Plaza (1975), Gabriel Richard Park (1985), Aretha Franklin Amphitheater (formerly Chene Park, 1985), Milliken State Park/Wetlands/Harbor (formerly St. Aubin), Robert C. Valdez Park, Stroh's Riverplace (1990s), and Robert's Riverwalk Hotel (1993). A diverse collection of public and private entities owned and maintained these spaces, creating a patchwork of development without a unified vision. The Detroit Riverfront Conservancy (DRFC), established in 2003, implemented a plan to connect these spaces through a network of pathways and parks: Cullen Plaza (2007), Dequindre Cut (2009), Mt. Elliott Park (2014), Dennis Archer Greenway (2021), East Riverfront (2023), The Southwest Greenway (2023), and Ralph C. Wilson, Jr. Centennial Park (expected 2025). This development catalysed significant private housing projects from developers like The Platform, Roxbury Group, and McCormack Baron Salazar along the corridor. According to annual reports from the Detroit Riverfront Conservancy, the riverfront attracts approximately 3.5 million visitors annually (Detroit Riverfront Conservancy, 2023). This figure represents a substantial

increase from the estimated 1 million annual visitors in 2007 when the first phase was completed (III.20). The riverfront has become one of Detroit's most popular public spaces, with usage patterns showing consistent growth even during economic downturns, underscoring its importance as a civic amenity (Smith, Johnson, 2022).

The concept of 'public space as fabric', as referenced in the title of this paper, represents both an urban form and a cultural factor, closely tied to the history and identity of a given area. It may also function as a psychological factor, fostering a sense of belonging to a broader community. These dimensions are among the most important determinants of contemporary urban development, as noted by Castells and Himanen (2009). Consequently, the design of such a city structure warrants careful study and description.

The network of relationships within this structure enhances the experience of public space as attractive, as it comprises continuous and consistent sequences of links. These links serve multiple purposes: they provide orientation, connect one place to another, and promote everyday activity – such as walking – rather than merely facilitating consumption. This network appears to be more significant than the precise location of programmed functions, particularly in the present context, where the physical relationship between people and well-formed urban public spaces is increasingly diminished.

A related issue concerns the creation of open areas with functional and spatial structures integrated into the city's natural systems,

a consideration made more urgent by the growing climate crisis. Identifying factors that influence residents' comfort and environmental conditions in the urban context is therefore essential (Zinowiec-Cieplik, 2020). The role of public space networks as vital corridors that maintain natural connections – biological, hydrological, and climatic – is increasingly recognised (Ghale, Gupta, Roy, 2025). The form and layout of urban streets and squares play a significant role in enhancing a settlement's resilience to threats posed by extreme weather, temperature fluctuations, and pandemics. Maintaining the continuity of natural systems, and thereby preserving a networked public space structure, depends directly on the deliberate creation and upkeep of such networks within sustainably developing cities. At the interface between the city and water bodies – the waterfronts – the extension of urban tissue edges acquires heightened significance, further reinforcing the importance of these linked public spaces (III. 21).

CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

Public space constitutes the fabric – the warp and the weft – upon which the city is 'woven'. While buildings, as the urban tissue filling districts, may be transformed, the public space preserves the spatial form of the city. Research confirms that public space is often the most durable element of urban spatial structure (Trębacz, 2009, 2014, 2024b). Spatial form provides the framework for locating various activities, and only the

II. 21. Widok z dachu Centrum Nauki Kopernik na bulwary nad Wisłą (w kierunku północnym). Fot. T. Matwiejczuk, 2021

III. 21. View from the roof of the Copernicus Science Centre at the boulevards by the Vistula (towards the north). Photo by T. Matwiejczuk, 2021



combination of spatial form and function enables the creation of a coherent relationship with the character of a place.

Using Warsaw's Powiśle as a case study, it has been demonstrated that user 'flows' along the network are a prerequisite for transforming separated or insufficiently connected nodes into a coherent public space. The complex and often debated relationship between form and function is, however, not the primary challenge for the city's survival. Instead, it is the city's structure in an indirect sense – particularly the fabric of public spaces – that persists and is continuously co-created by the actions of its inhabitants.

Although any project has a defined commencement date, integrating a new facility into a functioning network is an evolutionary process. The study of Powiśle's transformation has certain limitations, including periods influenced by political censorship, which do not necessarily align with socio-economic events. Moreover, the analysis focuses on a specific fragment of Warsaw, and the method used to determine qualitative changes through generalised quantitative data necessarily involves some simplifications.

Nonetheless, the investigation of Powiśle's urban fabric reveals that a well-formed and attractive public space network possesses distinct developmental characteristics that bind the city's aesthetically valuable areas. The role of the public space network as 'warp' and 'weft' within the city's structure is thus confirmed. Establishing links can accelerate and initiate revitalisation processes in specific urban areas, supporting sustainable development. In evaluating riverside areas, the study demonstrates that the use of a place is closely linked to its accessibility, which depends on consistent spatial connections within a broader, contextually valuable urban framework. Revitalising the boulevard naturally encourages resident engagement; however, this activation was only

possible by animating the previously dormant public space along the river. Warsaw's example is not unique; it reflects a wider trend of 'the city's return to the river', transforming waterfronts into vibrant 'urban lounges'. Similar approaches can be observed in other Polish cities, including Wrocław, Poznań, Kraków, and Gdańsk (Wierzbicka & Pabich, 2023). Notably, in Powiśle's transformation, spatial planning regulations had limited influence, whereas administrative decisions played a far more significant role.

Comparisons between Detroit's and Poland's riverfront revitalisations highlight the influence of differing economic systems: Detroit's market-driven approach necessitated public-private partnerships due to municipal fiscal constraints, whereas Poland relied on municipal, governmental, and EU funding. A distinguishing feature of Detroit's riverfront development was its emphasis on public engagement and community input, reflecting the need to combine limited public resources with innovative private development while maintaining accessibility.

This paper also engages with the conceptual framework of a sustainable city. Examining the evolution of a selected district fragment provides a synthetic criterion for designing modern, dense urban areas, in line with the perspectives of David Sim and Jan Gehl. Furthermore, the study reinforces the view of urban planning as a proto-science, as proposed by Kim Dovey and Elek Pafka (2016), intersecting with the sciences of probability, adaptation, and complexity (Boeing, 2018). Empirical research in this field may rely primarily on detailed observation of urban processes, and agent-based models (ABM) can be applied for this purpose (Yang, Dane, Arentze, 2025). In this context, future empirical studies should aim for more precise identification of links and indices connecting formal and physical elements of urban public space with patterns of use, as exemplified by Powiśle Północne in Warsaw.

PRZYPISY KOŃCOWE/ ENDNOTES

¹ Two unpublished MSc theses prepared at the Faculty of Architecture at the Warsaw University of Technology in the Studio of Applied Urban Design under the supervision of Krzysztof Domaradzki by Paweł Trębacz, entitled 'Powiśle

Warszawskie. The study for the spatial development plan' (1994), and by Magdalena Duda entitled 'THE LOWER CITY TO GO UP! The study on the spatial development possibilities of Powiśle Północne' (2005) were used.

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