



# The Development and Transformation of Public Space from the Perspective of Spatial Flow

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**Abstract.** With the modernization of today's cities, the importance of public space is emerging. However, today's public space development is losing its unique character and is presented in a non-functional way, becoming inefficient, without quality and comfort. Therefore, one of the main directions of urban development in modern cities is retraining public space's social, functional and environmental components. In this paper, it will analyze the old and new cities and modern housing through comparative arguments and literature studies and discuss the formation and transformation of public space as an integral element of the urban fabric and life. This paper draws a conclusion that the transformation of public space with the modernization of the city is no longer limited to the development of external spaces and the transformation of scale.

**Keywords:** Public space · Mobility · High-rise buildings · Urban integration

## 1 Introduction

Public spaces are open spaces accessible to residents in their daily and social lives, including urban squares, streets, parks, buildings and other spaces. As cities and societies develop, public space plays an irreplaceable role in the quality of the urban environment, maintaining the vitality of society, hosting residents' lives, and fostering their sense of identity. The first studies of public space began in the 1950s in the direction of social and political philosophy, and in 1960 it was categorised as an urban planning discipline. This direction gradually became the subject of urban development patterns and urban life in the mid-1970s [1]. At the same time, public space has been an essential vehicle for urban development in Western cities. For example, the boundaries of ownership of urban space, the relevance of urban development to public space, and the interchangeability of public space with spatial function. The development of many cities is even planned based on public space. This tradition has led to more Western countries where the shape of urban public space is determined by the basic structure of residential life and architecture. The importance of public space is thus more significant than that of a single building or group of buildings; it also makes for a complete system of urban public space in Western countries.

This paper does this by using comparative analysis and literature research. First, different scales of public space are analysed. Then, through two case studies - the old

city of Nanjing and Zurich - and the development of high-rise buildings in Warsaw, how public space exists in modern urban development is explored. The article also explores how public space can be restored to its original properties by analysing new directions for future public space development. Finally, the article also explores new ways of public space in the city by developing high-rise buildings in Warsaw in response to the space constraints of urban development.

## 2 Spatial Mobility and the Development of Cities

Public space development in small towns is mainly due to its historical context. Therefore, public space development in small towns can give rise to several different development scenarios. Firstly, topographical factors can limit the development of urban space. For example, road planning around squares, building development along major urban roads, building development on the city's outskirts, development where employment comes from, development in the form of satellites, gradual planning of development in surrounding villages and thus integration into the city. At the same time, the historical context has also led to the limitation of space for urban development, such as the mismatch between the original medieval streets and the spatial needs of modern urban development and the lack of space for urban greenery. In some of the larger cities, this original urban structure has been destroyed by modern development and replaced by more precise and more intuitive use of newer, broader and longer urban structures. However, this new development did not occur in the smaller towns, thus allowing these structures to remain largely intact until now.

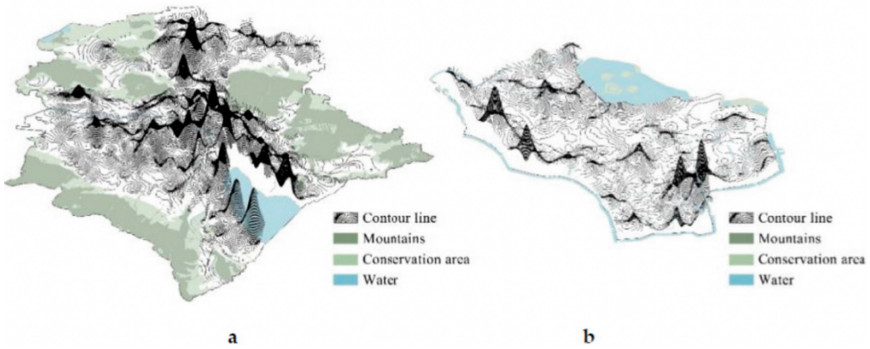
Another limiting factor is the presence of historical buildings or immovable monuments in the history of the small towns. In this context, it also complicates these public spaces' development and full use. Therefore, while conserving objects and archives of historical and architectural value is desirable, there is always a need to find the best solution to the problem.

Other aspects of the current image of the public space in small towns are the lack of financial resources for development and maintenance. For example, there are no conceptual solutions to ad hoc problems. The high number of lay people in the ranks of councillors, urban management and officials and the development of a 'small town approach' in which they solve urban problems [2]. Furthermore, with the concentration of these problems mainly contributing to the chaotic state of urban public space, when cities lose their appeal to residents and visitors, in the vast majority of cases, one must first consider the state of neglect of public space.

## 3 Analysis of Spatial Mobility in Small Towns

### 3.1 The Old City of Nanjing and Zurich's Urban Public Space Pattern

The Old City of Nanjing is located within the area surrounded by the Ming City Wall, including the Gulou, Xuanwu and Qinhuai districts. The area is approximately 43.04 km<sup>2</sup>. In recent years, the quality of Nanjing's environment has improved considerably. Nanjing ranks among the top cities in China in terms of green space rate, greenery



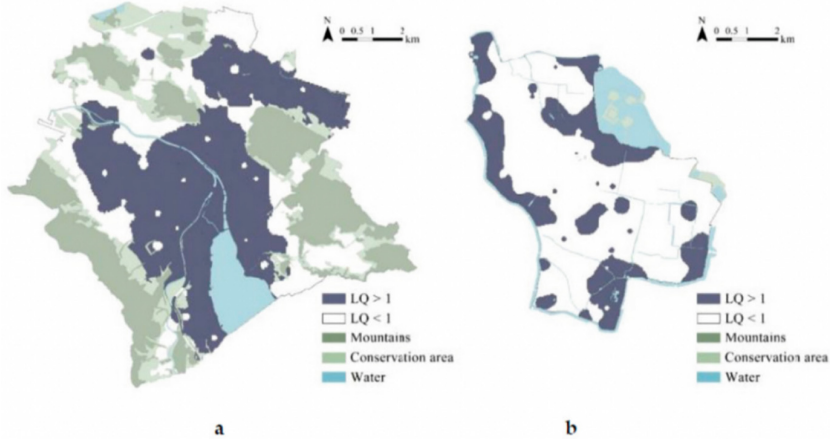
**Fig. 1.** The three-dimensional map of location quotient of public space in Zurich and the old city of Nanjing: (a), Zurich; (b), The old city of Nanjing.

coverage and public space per capita. In addition, Nanjing has been honoured with the titles of “National Sanitary City”, “National Model City for Environmental Protection”, and “National Garden City”. In 2008, Nanjing was honoured with the United Nations Special Award for Habitat for Humanity [3] (Fig. 1).

The construction and development of public space in Zurich account for 63.3% of the total land built for urban development. This shows that the role of public space exceeds the urban average. In contrast, for the old city of Nanjing, the construction of public space only accounts for 30.8% of the total amount of land built in the old city of Nanjing and is scattered around the old city of Nanjing. The role of public space in most of the city’s urban areas is below average. At the same time, Zurich’s public space development is coherent mainly and has a strong sense of continuity. Not only does it better shape the direction of public space development in the city, but it can also simultaneously bring a more unified pattern of public space to the city. In contrast, the discontinuity of public space in Nanjing’s old city, where public space is divided into several different neighbourhoods, urban public space accounts for a relatively low proportion and is not sufficiently consistent (Fig. 2).

Among the regional public spaces in Nanjing’s old city, the waterfront space has the largest area and the largest area of urban green space. In the part of urban soft public space, the green and waterfront space of Nanjing’s old city occupies the leading position. However, the proportion of urban hard public space in Nanjing’s old city, including streets, squares and multifunctional blocks, is only about a third of Zurich. This difference is primarily due to the vast differences in the size of the cities, the area covered by roadways, and the number of streets in the two locations. This linear street space, as an effective form of public space in urban development, has played an essential role in the development and expansion of traditional Chinese towns and cities, but by comparing the results, Chinese cities, represented by Nanjing, are significantly lacking in linear public space.

Zurich’s public space is characterised by its concentration in the inner city and proximity to the city centre. Regarding typology, urban development relies on the street and has a strong continuity, with a unified pattern of urban squares and urban green spaces. In terms of scale, the public space is mainly medium to large. A well-defined



**Fig. 2.** The position of public space in Zurich and the old city of Nanjing: (a), Zurich; (b), The old city of Nanjing.

public space system has begun to replace the traditional sense of centrality and has a deep-rooted cultural identity. In contrast, in Nanjing's old city, public space is generally dispersed and concentrated in the city's peripheral areas. In terms of typology, there is a lack of space in streets and squares and a large gap between linear public spaces in the streets, resulting in a lack of continuity in public space. In terms of scale, public space is mainly distributed into small and extra-large spaces, of which medium-sized public space is rare.

However, some European cities, such as Zurich, have a strong tradition of public space and public life, so the civic tradition has given birth to the critical role that public space plays in the development of urban society. The city has also developed a more rational pattern of public space as the various phases of urban planning have contributed to more sustainable public space development. The pattern in Nanjing's old city was formed because the cost of building at the edge of the old city was relatively small, so a large amount of public space was concentrated around the city. At the same time, the lack of public space on the streets is also evident in the increase in motorised traffic and motor vehicles on the city's roads, which has led to the maximum compression of pedestrian space. However, because new public space sites are unlikely to be developed, Nanjing has generally adopted the "all available space" model, increasing the number of tiny public space sites.

### 3.2 Skyscrapers and Public Space

The issue of the appropriate size of buildings in the surrounding public space has been ignored concerning the positioning of tall buildings in Warsaw. While most high-rise buildings are used for high-density office functions and the number of people as a basis for extending the scale expansion of buildings, this has resulted in many buildings being investigated. This high-density concentration of people also leads to overcrowding in public spaces during the morning and afternoon peak traffic periods. This situation is

inconvenient for both the inhabitants of the building and the users of the city. In the vast majority of cases where this interaction between building and public space occurs as a result of use, the multifunctional spaces also act as a link between the site and the building and provide a range of public space functions organised in the form of arcades or clusters of businesses and services.

The planning in a public space of such a functional facility that generates significant pedestrian and cycle traffic is detrimental to its operation.

In terms of the perception of objects in public space, most buildings have separate podiums and towers. This feature is frequently found in building projects from 1999 to 2013. In contrast, the latest buildings in 2020 to 2022 lose this feature of podiums and towers. Regardless of whether or not a podium is installed, most towers are located at the junction of public spaces or street boundaries and have direct contact with the ground. On the other hand, Western European cities have a much longer history of building taller buildings than Warsaw. The European experience of building such buildings relies on considerations of the location of clusters and individual skyscrapers. Hence, tall building zoning or the declustering of tall buildings outside city centres, for example, Canary Wharf in London, La Défense in Paris, Donau City in Vienna, and Zuidas in Amsterdam.

The location of skyscrapers in the historic fabric of cities has often been the subject of long-standing European discussion and analysis. Planning agencies have conducted various studies and analyses of views and panoramas to find places for skyscrapers. For example, in London, where many skyscrapers were built, one criterion for determining their location was that they did not collide with designated view corridors.

There is also a clear trend in Western Europe to consciously plan high-rise buildings as elements of the city skyline and as elements that form part of public space [5].

From the point of view of urban development, the completed Warsaw skyscrapers are not elements that reinforce the city's public space network and concretise its spatial arrangement. Although they are an essential part of the construction of the city skyline, their location is insufficient for the system of adjacent public spaces. The way that high-rise buildings are sited in Warsaw is that the developers propose the construction plans and initiate the relevant streamlined procedures. However, the process of issuing this decision is mainly automatic. Moreover, the view of the buildings on the city skyline on the east side of the Vistula River becomes the only criterion for assessing these buildings. Although this is to preserve the landscape of Warsaw's Old Town to a certain extent, the city's architectural complex has been inscribed on the UNESCO World Heritage List [6, 7]. But it is a process for assessing the impact of the building's view threshold on the skyline rather than its relationship to public space. Because of the need to meet such view threshold criteria, most of Warsaw's skyscrapers are located adjacent to each other in the city's central area. This plan certainly contributes to a certain extent to the view of the Warsaw skyline, but it is also a factor that leads to an over-concentration of buildings at one point in the metropolis. The siting of these buildings has not considered the impact and relationship of the buildings to the public space of streets, squares and nodes. Thus, the buildings do not fit in with the public space and do not conflict with it.

However, the city's image results from globalisation in terms of the siting of high-rise buildings. Therefore, tall buildings also became a sign of revitalised space and

development in this period. Here it can be reflected that Warsaw is a city transforming, the mechanisms of which are primarily regulated by market development and the economy. As a result, most of the Warsaw skyscrapers were built like the American skyscrapers, which are expressions of the city, economy, market, and technology, rather than strict urban planning in the modern European sense.

In the case of the Warsaw development, the location of the skyscraper coincides with the planned centre, which allows its central part to create a city skyline that is visible from a distance. On a local scale, however, the buildings do not form a coherent, separable policy from the public space. The public spaces adjacent to the buildings are not of a size and scale commensurate with the grade and scale of the tall buildings in which they are located.

However, comparing Warsaw's experience of building tall buildings with European countries, landmarks must be connected to critical public spaces to give buildings a central functional attribute while gathering large numbers of users.

Of course, for the city, it is also an essential part of the public space and functions well, with multifunctional spaces accessible from the public space, visible intrusions and exhibitions in the cityscape, which will consist of medium or large public spaces being implemented next to it.

### 3.3 Tokyo, Japan - Urban Mixing in a Networked Metropolis

The fluidity of linear space is constantly integrated with the surrounding space in the city's development, thus overcoming the fractured nature of the original urban development by reducing spatial boundaries, for example, traffic, functions or the separation of public and private. This mobility is also considered to be the unique charm and attraction of the city.

Caballero and Tsukamoto (2009) analyse the complex relationship between public space, transport and commercial uses in their analysis of Tokyo's transport urban centres.

(1) Centrality is the intersection of flows, with transport hubs located at the centre of radially expanding commercial districts.

(2) Complex spaces with open access allow multiple possibilities for pedestrian movement.

(3) Blurred boundaries between different typologies of the urban landscape and land use.

(4) Hidden public spaces with a decisive edge [8].

The vast majority of cities in Japan lack highly symbolic urban public spaces like those found in cities in other countries. The change in Japanese urbanism is reflected in the civic awareness and mobilisation of concern for the urban environment. Tokyo is often described as a city of chaos, disorder and confusion. Moreover, this development has made Japan a mosaic of cities or a patchwork. An example is the architectural configuration of the 'main' gates facing the 'public' streets. Most of the former streets retain their alley character, except for those that were widened during the development of the first half of the twentieth century.

Furthermore, while these streets are separated from the main road, they lack any trace of access to any building line. People live in what amounts to a secluded space, away

from the hustle and bustle of the urban space. The spaces and alleys between through gaps and thresholds produce an ambiguous overlap of public and private spheres.

Moreover, these boundary divisions are feasible between buildings and open spaces about each other. This mosaic of spatial textures is more complex than the simple division of public and private elements, more common in Western culture [8]. At the same time, programmatic additions and the almost infinite possibilities for recombination have produced urban and architectural developments. Vertical stratification is often rearranged with many commercial activities located above and below ground. These commercial activities are often visible and accessible from the street and are in multi-storey buildings with lifts. This fluid stratification can also be seen in Tokyo's urban spaces, crossing the city's dense built fabric via multi-storey expressway viaducts or drilling through elevated train stations and department stores on trains. Aerial and below-ground tenures are intensively used to generate income by combining metropolitan junctions with local public spaces.

The project's layout linking the Shuto motorway to the central ring road required a move from underground to a viaduct. It, therefore, surrounds an inner courtyard with sports fields and local public services. At the top of the structure, a public garden provides access to the open-air hall. On either side, two residential blocks are constructed, but the lower floors are reserved for commercial and office space, city offices, community services and a public library. Tandem links have been provided at the middle level to make it easier to connect these facilities with the roof garden at the junction. Combining these different activities into one complex building structure is an example of the possibility of reducing this heavy network for the benefit of the local community [8].

As an enduring layout pattern and traditional building type, small-scale urban space is typical of both the suburbs and the centre of Tokyo. On the one hand, the central areas are surrounded by the intensity and vitality of low-rise buildings; on the other. These built spaces provide 'gaps' that can be seen as opportunities for less formal, porous and dispersed activities, in contrast to the rather synchronised urban and social rhythms. These residual spaces can also be found in gaps in infrastructure and roads, with the potential to become compatible public spaces.

## 4 Conclusion

This article discusses the formation and transformation of public space as an integral part of the urban fabric and life, finding that as cities modernise, the transformation of public space is no longer limited to the development of external spaces and the requirement for site dimensions. In contrast, vertical space, the development of linear space and the reliance on natural space are the main directions for transforming public space. However, three-dimensional architectural spaces and fragmented public spaces will be integral to future urban development. One of the main directions in this transformation process will be to improve the circulation and integration of future spaces. That is, how fragmented spaces can be purposefully integrated, for example, by reorganising the fragmented functions of teams to form new clusters of public spaces and how public spaces can be better integrated into urban architecture in terms of vertical circulation. In addition, the integration and development of public space in different building types, such as residential buildings, should continue to be explored.



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