MODERN MEGASTRUCTURES AND ITS IMPACT ON TRADITIONAL URBAN TEXTURE: A BEIJING EXAMPLE

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ABSTRACT

This paper uses a unique perspective: comparing the large-scale buildings (or so-called Modern Megastructure) in today's city with the idea of Megastructure in the 1970s to evaluate their influence. Through the analysis of the formation process and street texture of its and the surrounding blocks, this paper points out the influence of these large-scale buildings on the current urban structure, and explores how these large-scale buildings affect the development direction of the future city.

INTRODUCTION

In the 1960s and 1970s, with the continuous prominence of urban problems and the continuous advancement of technology, there was a trend in the field of Architecture to solve urban problems with Megastructures, that is, to internalize some urban functions and advocate vertical connections between huge buildings to break the traditional urban structure and resolve the problem of high density and low living standards that have brought counter-urbanization. Due to the theoretical and radical nature of the Megastructure trend, it was hardly reflected in physical buildings and quickly died out after a period. It was written into textbooks as a possible answer to an urban problem. Fifty years later, more and more large-scale buildings have appeared in our cities. The huge volumes of these buildings are easily reminiscent of the concept of Megastructures, but how is the spirit of this new type of modern Megastructures different? Can they solve urban problems like traditional Megastructures, or just bring new problems? Can traditional institutional ideas provide useful references for these contemporary buildings? Based on the perspective of urban morphology, this paper examines the background and development process of two modern Megastructures in Beijing, trying to use this dynamic analysis to investigate the impact of such buildings on urban functions and structures, and make comparative analysis and evaluation with traditional megastructure theory.

BACKGROUND AND METHODOLOGY

The urban morphology scholars of the Conzenian tradition studied the historical process of the formation of the town plan through the method of historical analysis. By extracting the town plan combined with the building fabric and land utilization, and using detailed chronological research based on several cases (the earliest and most representative one is Alnwick), they tried to discover a universal theory and typical process about the formation process of urban town plan.

Scholars of the Conzenian tradition believe that compared with the frequent changes in building fabric and land utilization, the town plan is the most conservative morphological complex: the block layout of a region (especially the street network) is likely to remain in place even after hundreds of years (Conzen, 1960).

In another field, the architects of the 1960s and 1970s were obsessed with the study of Megastructures (Banham, 2020). At that time, many urban problems such as the decline of the city center and suburbanization plagued architects and planning scholars. A trend of technicalism prompted architects to design large structures that could give urban functions to a single building,

including the so-called *plug-in city* ang *walking city*, etc. These Megastructures often have a vast interior space that can be divided into parts, and always ignore the interaction with the street surface like traditional street buildings (because their scale may be much larger than the street itself). Le Corbusier's Algiers plan was considered to be the first Megastructure urban design, although the concept of Megastructure was only proposed by Japanese Metabolist architect Maki Fumiko more than 30 years later. Although this trend disappeared shortly after being too radical, its spiritual core—the tridimensional, centralized urban function—has been retained in some form. Large buildings then compromise with the traditional urban structure. They are scattered or concentrated in some areas of the city, becoming technological monuments, and perhaps also hinting at the future direction of the city.

Therefore, it is not difficult to see the challenges faced in using this ancient theory to explain contemporary large-scale buildings: when the original architects designed mega-buildings, they overthrew the traditional urban form with great confidence. But in fact, independent and large-scale buildings are bound to coexist with the original texture of the city. This is more like a process of a large building invading and destroying the original texture of the city. Before this process is fully completed, what we have to face is a mixed city—new and old, large-scale and small-scale, alienated and closely connected. We are bound to conduct an in-depth investigation of this change in order to analyze the impact of contemporary Megastructures on the city under this new construction background, compare and analyze with the traditional megastructure theory.

Fortunately, Conzen's urban morphology theory provides us with a good way to analyze this process: by studying the development process of the urban texture of the Megastructures and surrounding areas, we can analyze whether the emergence of Megastructures has brought positive influence to the city. This is the basis for our comparative analysis of traditional Megastructures. At the same time, this evolutionary perspective also helps us answer the following questions: Why do Megastructures appear here? Is there a typical development process of urban morphology?

Beijing is undoubtedly a good case for this analysis-the special state-owned land attributes make large-scale construction projects carried out here have more opportunities to obtain land close to the city center (rather than actively distribute surround the city and form the so-called fringe belt), which creates a strong contrast between the two kinds of urban textures. Through the analysis of the project Galaxy SOHO and the National Grand Theater, we were able to answer some of the questions mentioned above.

THE CHARACTERISTICS OF THE ERA OF BEIJING URBAN TEXTURE EVOLUTION

The texture left over from a typical ancient Chinese city has obvious planning features. The urban planning ideas inherited from "Zhou Li" made the square grid the mainstream in the construction of ancient Chinese cities. The urban form of Beijing's Old City was formed by the construction of the Yuan Dynasty and the expansion of the Ming and Qing dynasties on this basis. There are large areas of residential areas and spontaneous roads in the city.

Regarding the formation mechanism of the urban road network in ancient China, some scholars pointed out that while the "Lifang System" divided the city into larger areas, most of the internal roads were naturally formed due to the construction of buildings. In Beijing, the traditional "Siheyuan" style residential courtyards fill almost the entire old city area, and the most inferior roads are called "Hutong", which is also one of the symbols representing the cultural life of old Beijing.

The model of “Hutong” and “Siheyuan” is the most typical urban form of residential area in Beijing's old city. Due to lack of planning, buildings are arranged densely and roads lack systematic planning.

After 1949, due to the establishment of the new communist regime, urban land was gradually nationalized, and huge private house replacement activities were carried out, which provided the property rights basis for the subsequent reconstruction activities in the old city area. In the early days of the founding of the People’s Republic of China, most of the construction activities focused on the demolition of city walls and the construction of large public buildings. The form of residential areas in the old city was not excessively interfered. However, with the increase in population and housing pressure, some units were approved to occupy some historic courtyards, and at the same time, they built their own houses in the original Hutong residential area. Due to the lack of unified approval and planning, these two actions have caused great damage to the original building texture: a large number of newly built houses are randomly interspersed in the empty areas of the old city, further worsening the crowded living environment.

This environment did not change until the renovation of dilapidated houses at the end of the 20th century. Although the two large-scale renovations of dilapidated houses did improve the living environment of residents, they also demolished some traditional blocks with historical value. At this stage, a large number of commercial buildings began to appear in the old city, and this kind of commercial buildings had an even greater impact on the urban texture: from simply affecting the internal texture and function of the building block to affecting the shape of the city, including road levels, roads Net density, accessibility, etc., which further damage the texture of the old city. Fortunately, in the same period, through the delimitation of 25 historical protection blocks in the old city of Beijing, a number of historical blocks of representative value to be protected according to law were stipulated, which made part of the old city texture as a kind of building The legacy was preserved.

After entering the 21st century, this kind of intervention to the original urban texture has become diversified: there are development models of CBD areas, high-rise buildings, and high-density, as well as large-scale buildings interspersed with the old texture. (For example, the National Grand Theater, Galaxy SOHO, etc.). The development of this play has a characteristic: the scale of new buildings is much larger than that of old buildings, which leads to sparse urban blocks-this is also one of the focuses of the case we will analyze later.

CASE STUDY: A CHRONOLOGICAL ATLAS ANALYSIS OF MODERN MEGASTRUCTURES IN BEIJING

We selected two buildings in Beijing as the destination of the analysis: one is Galaxy SOHO in Chaoyang District, and the other is the National Grand Theater in Xicheng District. The selection of the two case sites considered their common and different characteristics. Both are large-scale urban buildings, but Galaxy SOHO has richer urban functions, its internal structure is also richer, and its connection with the outside world is more direct. The National Grand Theater is relatively isolated

from the external environment (Figure 1 and 2).

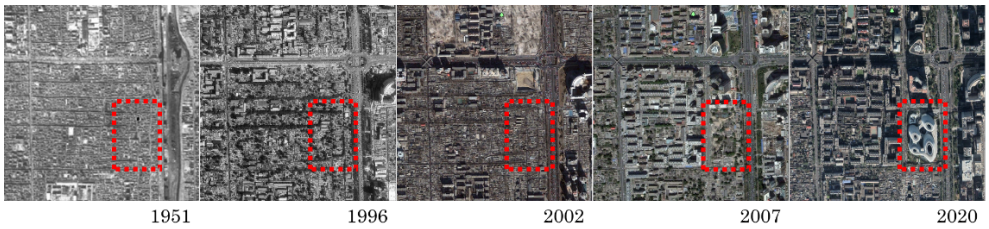

Figure 1. The aerial photos of the Galaxy SOHO.

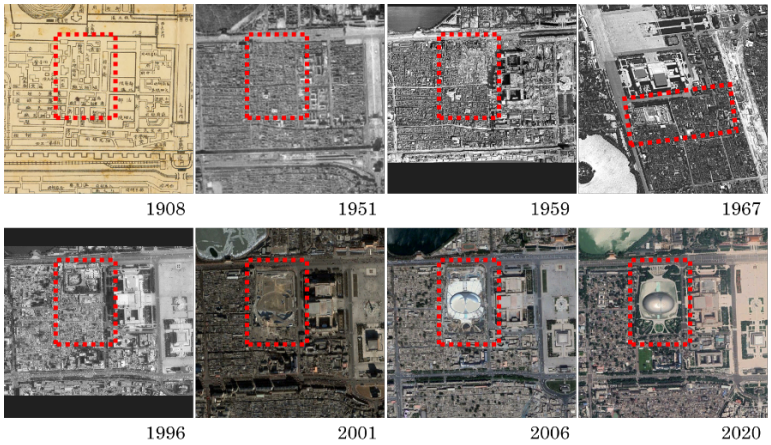

Figure 2. The aerial photos of the National Grand Theater.

Through the comparison of aerial photos, we can find that during the construction of Galaxy SOHO, the surrounding urban environment is also changing. Before and after the construction of the National Grand Theater, except for the Great Hall of the People on the east side, the rest of the urban texture Most of them are preserved (because it is close to the core of the old city, the protection is stricter).

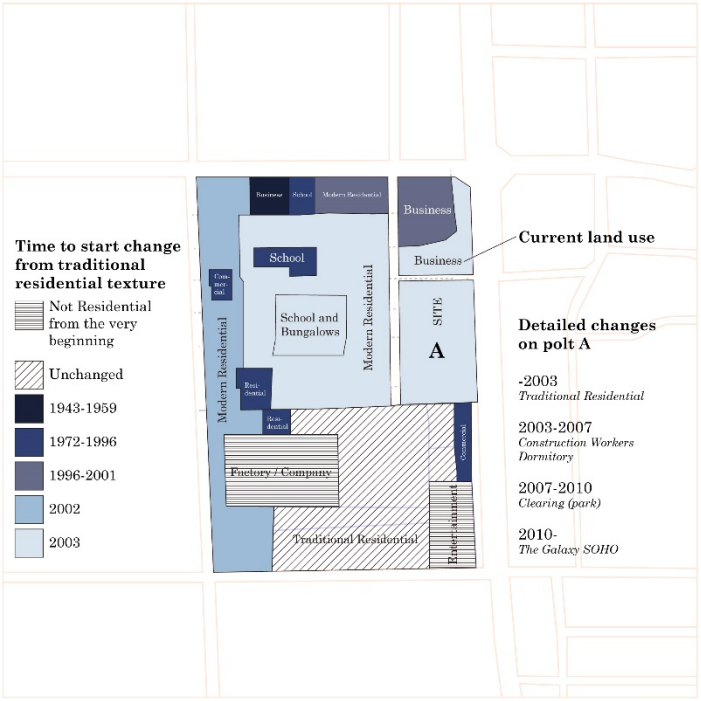

Figure 3. The change of the plan elements (land utilization and building fabric) since 1943.

Through further morphological analysis of the development process of Galaxy SOHO and its surrounding blocks, we can see that long before the construction of Galaxy SOHO, urban renewal behavior has already occurred in its surrounding blocks. From the beginning, scattered commercial or residential buildings were built in the original texture, and some were scattered along the street. After the implementation of the dilapidated house renovation project in Beijing around 2000, the northern and western parts of the project site were demolished in large areas and new-style residential buildings were built, but the composition of residents remained unchanged. Plot A, where Galaxy SOHO will be built in the future, was used as a dormitory for construction workers in this large-scale housing renovation project, and was abandoned after the completion of the project, forming a wasteland (Figure 3).

After analyzing the road network before and after the housing renovation project, we found that even though this project has greatly changed the form of residences and the organization of residents, that is, from the courtyard-style residence along the street to the introverted apartment building, the interior of the block The texture of the street is largely preserved (here, the inherited road refers to the road whose position is preserved and the architectural form along the street is changed, and the unchanged road refers to the road and the buildings along the street have not changed). This shows that even if a certain project can be pushed to the original urban architectural texture in a short time, the street network will still remain part of the street network tenaciously (even retain the original name), which may be related to the residents' habits and suitable block scale. It is related to the stage of construction. In view of this, it is not common to overthrow the original street network.

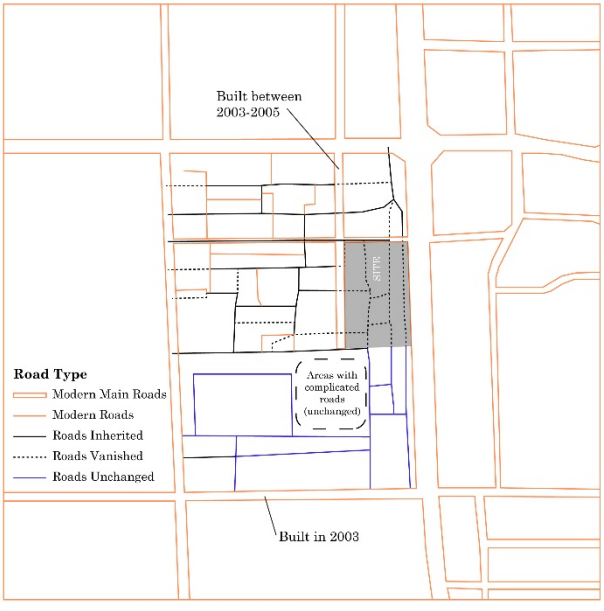

Figure 4. The change of the road system compared with 2003.

However, in the plot of Galaxy SOHO, the original street network has completely disappeared: this is one of the most obvious characteristics that distinguish it from the renewal of surrounding residential areas. Large buildings eliminate the possibility of retaining the original street network, and therefore have a greater impact on the urban form (Figure 4).

Figure 5. The contemporary road system around the two sites.

Therefore, a complete investigation of the street network surrounding the project may be the key to studying the influence of modern Megastructures. By extracting and visualizing map data from online map providers, we can see that the street networks of Galaxy SOHO and the National Grand Theater show different characteristics: Although Galaxy SOHO has broken the original connection structure, it tries to integrate The internal creation of a pedestrian system with as close to the original scale as possible is an effort to integrate into the original urban fabric. The street network around the National Grand Theater is sparse and isolated, and the entire building is isolated from the original urban fabric (Figure 5).

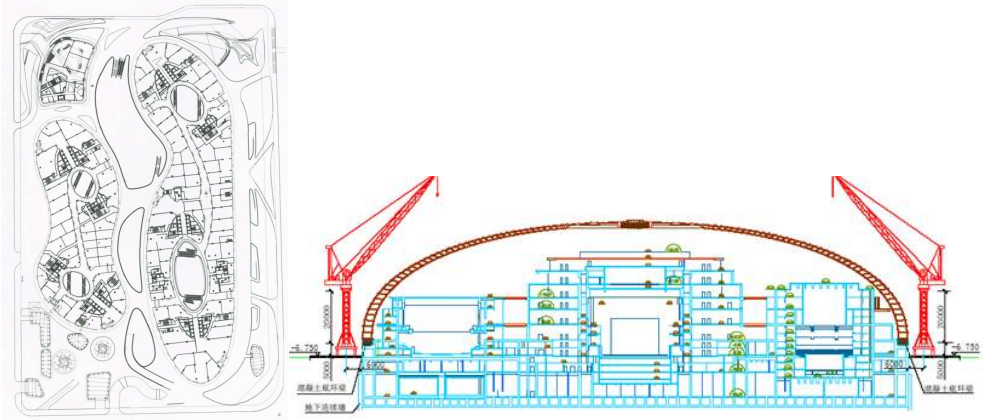

Figure 6. The inner structure of Galaxy SOHO (L) and the National Grand Theatre (R).

This difference may come from the different architectural design concepts. At the beginning of the design, Galaxy SOHO was positioned as a neighborhood where young people live and work. This requires that it must have an internal scale that is easy to walk and communicate under its megastructure exterior, so it appears as several small buildings in form. Fusion. The National

Centre for the Performing Arts, as a public venue, considers its functionality and monumentality more, so it is designed as a structure that is isolated from the outside world by a dome.

CONCLUSIONS

Through a brief analysis of Galaxy SOHO and the National Grand Theater, we can get a glimpse of the primary characteristics of modern Megastructures. In this part, we will compare it with the original mega-ideas, and point out its problems and development directions.

Undoubtedly, compared with the wild ideas of old Megastructures, contemporary Megastructures show more compromises to existing cities, such as smaller scale, more dispersed distribution, and efforts to integrate into the old urban texture. This goes against the idea of extensive interconnection and tridimensional development in the original Megastructure to produce a new urban form. Therefore, it is difficult for us to see that modern Megastructures can solve the problems of high density and low living conditions in urban centers like the mega-ideas. However, contemporary Megastructures do inherit the characteristics of old Megastructures in some respects, such as internalized urban functions, vertical structure to a certain extent, and, even if some projects try to conceal, rebellion against the original city streets.

These inherited characteristics do not necessarily all have a good effect: we see that the appearance of Megastructures completely disappears the original urban fabric. This is not a gradual process, but a direct change. Therefore, if there is no good spatial organization inside the Megastructure, the original pedestrian-friendly block scale will disappear completely, and the expansion of the block scale will increase the difficulty of urban life. In other words, the original megastructure replaced the original urban streets with internalized interconnected blocks to promote the connectivity of the city and facilitate people's lives. However, if modern Megastructures can only destroy the old streets, they cannot Form a new internal texture, and this change will have a negative impact on the ease of use of the city.

Therefore, this comparison helps us reveal some of the problems existing in modern Megastructures and points out some possible solutions: increase internal and external connectivity and try our best without completely subverting the existing urban texture. Get into it. Perhaps with the development of the city, we will see a three-dimensional city with huge buildings intricately connected to each other. But before that day, these behemoths must try to hide themselves in the streets of the city.

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