



# Traffic Sustainability Research of Commercial Complexes in Historic Districts

## —Taking Taikoo Li, Chengdu as an Example

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**Abstract.** In cities, commercial complexes are usually the key nodes of traffic connection and assume certain functions of traffic evacuation and transcontinuation. Commercial complexes can attract a large number of people to produce a high gathering of high-density spatial nodes and guide people to produce activities in public space, which can create great commercial value and thus promote sustainable development of cities. The historical district itself is the root of urban development, the inheritance and continuation of culture, and needs to achieve sustainable development.

This study aims to take Taikoo Li commercial complex in Chengdu as an example, analyze the design of traffic space in Taikoo Li through the overall perspective related to urban design, explore the internal traffic space and contact method of the historic district commercial complex and the influence of the historic district commercial complex on the rational layout and sustainable operation of traffic in urban planning, and summarize the sustainable development strategy of traffic in the historic district commercial complex to provide a basis for the sustainable development of urban traffic.

**Keywords:** historic commercial district · urban transportation · sustainable development · urban design

## 1 Introduction

### 1.1 Introduction to Commercial Complexes in Historic Districts

Neighborhood-style commercial complex is a type of complex architecture, which divides the building volume into pieces to create an external space system similar to the characteristics of urban streets. The historic district commercial complex, on the other hand, has both of these characteristics as well as a unique historical and cultural background, which distinguishes it from other neighborhood commercial complexes.

## 1.2 Transportation Sustainability Design Strategies for General Commercial Complexes

The sustainable development of urban complexes requires an efficient and organic combination of sub-functions, and the mutual promotion and organic organization of sub-functions can improve operational efficiency and save operating costs, which is also a guarantee for long-term development; secondly, the plan layout should be designed in conjunction with the natural environment, using favorable factors in the environment and doing the climate adaptation design of the building; transportation is the lifeblood of urban complexes, and the connection with urban transportation nodes Transportation is the lifeblood of urban complexes, and the connection with urban transportation nodes can stimulate greater vitality of the complexes, and the pedestrian traffic-based approach can reduce the consumption of resources and promote people's interaction. Landscape design is a factor to enhance the sustainable quality of urban complexes, and the combination with ecological environment provides people with quality living space [1].

## 2 Case Study

### 2.1 Taikoo Li General Overview

Taiyang Taikoo Li Chengdu is located in both a historic district and a commercial district, and contains the Daci Temple, which has rich cultural and historical connotations, and the buildings and courtyards have been properly restored; the Chunxi Road area bordering it is the central commercial core of Chengdu, and contains great commercial potential.

### 2.2 Daci Temple Traffic Space Design

The street design of Daci Temple is the result of imitating the construction of lane houses in Shanghai and other places at that time. The square-shaped boundary and the irregular lane and small street inside the square grid reflect each other, forming a regular and changeable road space texture.

The width of the street is 5 to 8 m, and most of the buildings along the street are two-story, with a roof height of about 5 to 7 m and a pleasant spatial scale. In Zhanghuali and Majiaxiang, the width of the street is 3 to 4 m, and the two sides are one-story houses with attics, mostly with tiger windows, and the height is below 4 m. The spatial scale of the lane is friendly, the road is curved and turned, the atmosphere is quiet, and the greenery is good [2].

The courtyard space with two sloping roofs is the main feature of the entire historic preservation district. Most of the well-preserved courtyards are basically triple courtyards with randomly changing patio forms and sizes, some bright and open, some narrow and dark, which are called "crab eyes". The courtyards are oriented according to local conditions, and do not sit neatly in the north facing south. The relationship between the gate and the hall is more casual, reflecting the absorption and integration of northern and southern cultures in Sichuan and Shu culture. The courtyard is green with trees that have grown for many years [3].



**Fig. 1.** (Source: Design text for Taiyang Taikoo Li, Chengdu)

## 2.3 Taikoo Li Traffic Space Design

### 2.3.1 Heritage and Development of Preserved Streets and Alleys

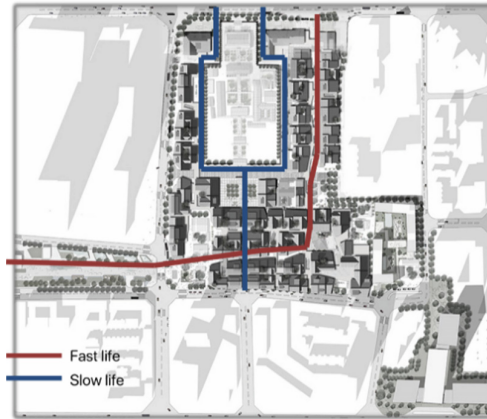
Since ancient times, Daci Temple has been characterized by the form of “temple and city living together”. Today, Taikoo Li’s conservation strategy for the historic district is to inherit the historical elements, i.e., the texture of the historic streets and alleys and the existing historical courtyard form; and to preserve the authentic historical remains.

The old streets and lanes in Taikoo-ri, including Daci Temple Street (about 180 m long, built in the Tang Dynasty), Monk Street (about 170 m long), Beifusi Street (160 m long), Ziku Street, Majia Lane, Zhanghua Lane, Yucheng Street and East-West Lane, are all preserved.

- One of the design constraints of Taikoo Li comes from the old streets and alleys, where every historical street needs to be preserved and set back in planning. Secondly, the organic forms of these streets and alleys are also interspersed with the new streets and alleys to interpenetrate and mix, while weaving them into the walkable urban trail fabric. The designer added the black street in the right image, in fact, to meet the new needs of the current commercial operations, superimposing the two streets together as the main movement line of the project (Fig. 1).

Taikoo-ri does not simply preserve streets and alleys, but actively interacts with the actual project with some adaptability. For example, the commercial atmosphere and axial function of Beifu Market Street are deliberately strengthened; the cultural connotation of Monk Street seeks some connection between traditional religion and modern creativity due to the store type setting. Several new road systems were added to Daci Temple Commercial Street, including a second floor recreation trail, according to the needs of commercial layout, store accessibility, visual identity, pedestrian flow arrangement, and landscape treatment. These new streets and alleys, like the preserved streets, are about curved dynamics and different scales of division.

By superimposing the old and new streets, the texture of the historical roads presents a clear identifiability, and the street and road system within the whole base is in a grid like the old texture in the past. Different floors are connected by escalators to make the road system three-dimensional, which also forms a new texture and a new spatial experience [4].

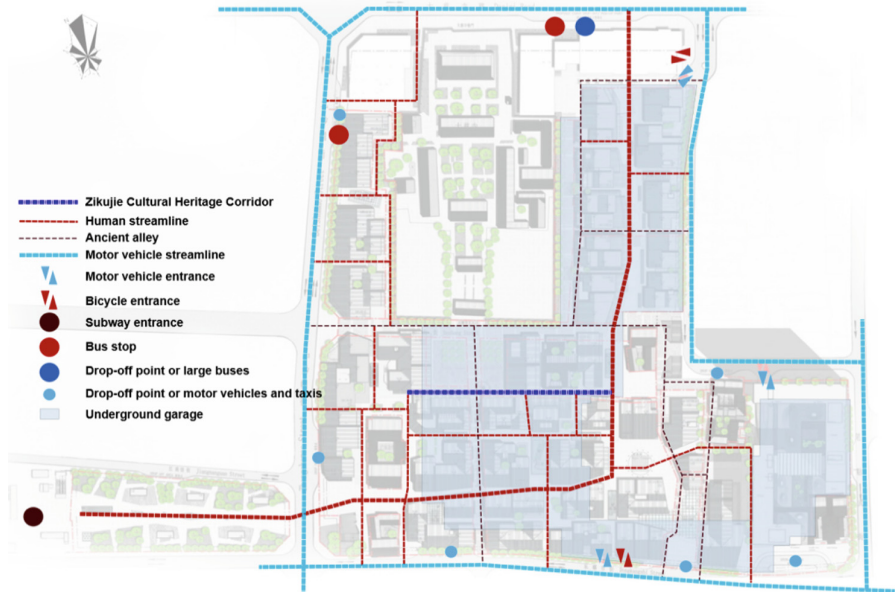


**Fig. 2.** Fast life and slow life (Source: author's own drawing)

### 2.3.2 Pedestrian-Led Transportation

The master plan of Taikoo Li can be defined as “fast and slow”, one is the inner circle, around Daci Temple, a relatively inward-oriented area defined as the slow zone, mostly for exquisite food and creative cultural and lifestyle brands, creating a silent fusion of secular and religious. The more outer circle is the Fast Lane, a sophisticated window display surface that meets the fashion needs of Chengdu people and the core business district location of Taikoo Li. (Fig. 2).

Such a loop-type kinetic path for a one-way loop or back eight-shaped, there is good continuity, consumers along the active line can shop the entire block, and can travel around the block in all directions can be covered, increasing the probability of commercial behavior, maximize the realization of commercial value [5]. The adoption of a purely pedestrian transportation system for the exterior spaces of Taikoo Li Commercial Street in Chengdu is one of the successes of the Taikoo Li commercial district in thinking about urban space in a humanistic latitude. Pedestrian-led transportation effectively improves the efficiency of the city by bringing people together, and in addition pedestrian transportation reduces energy consumption through mechanical means. Pedestrian systems are diverse, while embodying history and culture, permeability, experience, comfort, and connectivity. Pedestrian dominance is a prerequisite for a vibrant, safe, sustainable and healthy urban space. There are various forms of walking in the street space of Taiyang Taikoo Li, Chengdu, such as fast walking with a clear sense of purpose, leisurely strolling, and the joy of children playing and exploring surprises. This series of walking behaviors provides a vibrant atmosphere that was not originally present in Daci Temple, directly interpreting Chengdu's This series of walks provides a vibrant atmosphere that does not exist in Daci Temple, directly interpreting Chengdu's “slow life” quality and providing unlimited possibilities for other activities to take place.



**Fig. 3.** External Traffic Access Entrances and Routes (Source: Design Text for Taiyang Taikoo Li, Chengdu)

### 2.3.3 Transportation Nodes that Connect the City

Taikoo Li is connected to the urban transportation network mainly in the near-ground space. Taikoo-ri has an underground garage with three entrances for motor vehicles and two entrances for bicycles. To the north, there is a bus stop and an entrance for large buses, to the west there are two motor vehicle drop-off points and a bus stop, and to the south there are three motor vehicle drop-off points. In the southwest, there is a metro gateway area with one metro station. (Fig. 3).

The west side of Taikoo Li is adjacent to its International Finance Center. The southwest corner of Taikoo Li is the West Plaza, which is connected to the C entrance of Chunxi Road Station of Metro Line by an underground commercial passage. The passageway is approximately 162 m long and 6m wide, with the above-ground portion being the subway plaza. Although there are a few retail stores along the passage, the overall retail stores are mainly catering and creative lifestyle businesses. The project introduces Cat's Sky City, Starbucks, Gloria Jean's coffee and other coffee houses, turning the traditional underground passage into a characteristic underground coffee street, so that customers can experience the leisure atmosphere as soon as they leave the subway station.

The implementation of transportation integration strategies such as these can facilitate the rapid and orderly clustering of the building with the surrounding urban traffic, achieving a positive exchange between the architectural space and the urban environment. The integration of transportation hubs and stations, the optimization of barge space and parking space makes Taikoo Li a reasonable three-dimensional space, acting



**Fig. 4.** Fire Protection Road Network Setup (Source: Taikoo Li Chengdu Schematic Design Text)

as a spatial gathering point for urban transportation and providing a comfortable space for transportation interchange [6]. Together with the urban transportation function, the integration of the area's use function constitutes the core public space of the area, which allows human travel, activities and consumption behavior to form a gathering attraction on the ground, and then leads the flow of people to the three-dimensional evacuation space, providing more transit and detention space for the city [7].

### 2.3.4 Meeting the Fire Protection Needs of Historic Districts

Taikoo Li makes the best use of city roads and internal roads of the reserve to form a fire road network with a circular pass to reach each building unit, and all fire roads meet the fire protection requirements of  $4 \times 4$  m, with a road slope of less than 5%. The size of the block of the street is controlled within a fire protection subdivision. The fire protection channel is mainly formed by relying on the street (about 10 m) and the mile (about 7 m), and the entrances and exits of the fire protection channel are concentrated in the area with more buildings in the southwest, and there is a fire protection water connection in the south (Fig. 4).

Such a setup can form a good protection barrier for the historical remains inside and ensure the safety of the historical remains.

### 2.3.5 Ecological, Low-Carbon Design

The ecological design of Taikoo Li's transportation system is combined with landscape design to make Taikoo Li's access environment more intimate and encourage people's

willingness to interact through the arrangement of pleasant greenery and well-designed vignettes.

Taikoo Ri achieves energy-saving goals by reducing energy consumption through the use of mechanical transportation. It also controls the changing mix of travel modes by adjusting public space nodes, slowing the public transportation component rate, reducing motor vehicle trips, encouraging walking trips, and reducing motor vehicle carbon emissions. These measures expand the spatial scope of urban activities while counteracting the effects of weather and other natural factors, improving the urban travel environment, making Taikoo Li itself a spatial gathering point for urban transportation, and promoting a mutually supportive and catalytic role with urban transportation [8].

### 3 Conclusion

Based on the above analysis, the transportation sustainability strategies for commercial complexes in historic districts are summarized as follows.

#### 3.1 Traditional and Modern Fusion

Modern commerce as a strong existence needs to affirm the existence of historical tradition and actively make acceptance. The original texture becomes the substrate for the growth of new buildings, the original buildings become part of the new environment, the original inner nature is subordinated to the transformation of commercial consumption, the inward space becomes outward space, and new boundaries and streets are grown and integrated.

#### 3.2 Integration of Heritage and Development

The development of commercial complexes in historic districts promotes the great promotion of urban transportation system, underground space development, urban compactness and pedestrianization, promotes the integration of architectural and urban transportation development, reproduces the relationship between transportation system and urban spatial function and architectural spatial function, and responds to the current environmental protection and historical preservation.

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