

Analysis on Relationship between Skyscrapers and Tourist Cities' Space

Tangbin^{1,a}, Zeng Deheng^{2,b,*}

¹Chongqing University of Science and Technology, Chongqing China, 401331

²Faculty of Construction Management and Real Estate, Chongqing University,
Chongqing China 400030;

^atangbintw@163.com, ^bzengdeheng@cqu.edu.cn

Keywords: skyscraper; tourist city; spatial relationship; mountainous city

Abstract. By reviewing the evolutionary history of skyscrapers in western tourist cities' space, this paper proposes that Chinese skyscrapers need to realize "localization", discusses their role in tourist cities from the three aspects of urban functions, urban landscape and urban environment and finally analyzes the experiences and lessons of Chongqing, a typical mountainous tourist city, in the construction of skyscrapers and points out that the fusion of skyscrapers and cities is a problem requiring joint solutions.

Introduction

Over the past decade, skyscrapers that are introduced into China in the form of western material are rapidly spreading in China and constantly changing the image of Chinese cities. With the ever-rising height, skyscrapers are difficult of measurement with an exact technical index like super tall buildings and more become a symbol of cultural and social psychology. In general, over 500ft/152m tall is a world recognized index. According to statistics, China currently has more than 200 skyscrapers, which is equivalent to the total number of skyscrapers in the US, and China boasts five of the world top 10 tallest buildings. Tall buildings that are springing up make more and more "vertical cities" appear in front of the public. Not only first-tier tourist cities such as Shanghai, Beijing and Shenzhen, even second-tier tourist cities such as Chongqing, Tianjin and Wuhan are also involved. Architect Mr. Zhang Kaiji once heavyheartedly said: "there is no need to build so many tall buildings in Beijing. Super tall buildings undermine the ancient landscape of Beijing and destroy the city's skyline, and the construction costs are also high." Former vice minister of construction Song Chunhua more bluntly spoke that the local pursuit of super tall buildings is "a silly insatiability for height and destroys the original ecology of the cities". The relationship between skyscrapers and tourist cities' space is not only a problem of urban planning and construction, but also a problem of how to develop tourist cities.

Historical Evolutions of Skyscrapers in Western Tourist Cities' Space

Originally, the word "skyscraper" was referring to a tall mast or its main sail on a sailing boat. As an architectural term, it appeared in American Architect and Building News 1883. Two years later, the world's first skyscraper Home Insurance Building (42m high) was completed in the tourist city of Chicago. Although its height is not considered unusual or impressive today, it actually was representing the highest achievements of architectural science and technology at that time: steel frame structure, concrete, safety elevator, glass, telephone and electric arc welding were readily available. In the late 19th century, the service industry rose in the US and specifically provided services to financial, trading and business startups and multinational groups, the tertiary industry dominated the urban centers and to establish corporate image in the best areas in tourist cities' space became an important part of the strategy of a tourism enterprise. This is quite different from the traditional western urban planning in which church and city hall were the commanding heights and

* Corresponding author E-mail address: zengdeheng@cqu.edu.cn (D. Zeng)

urban centers of traditional western cities, for example, Victoria Tower in London, Washington Monument and Philadelphia William Penn City Hall, etc. firmly controlled the height of the cities. But in the emerging cities, there are no shackles of tradition, commercial interests replace politics and religion and skyscrapers construct new skylines for the city centers. Skyscrapers were once considered as the product of the transformation of urban nature and the expression of western modernity. Skyscrapers extending upward represent commercial success and individual wealth and are a symbol of the traditional industrial civilization and the power of capital. Since the date of birth, skyscrapers have been gradually showing various disadvantages while bearing wealth and glory. Diseconomies of construction and use costs, weak anti-disaster ability, heat island effect, canyon effect and light pollution, etc. have been denounced by critics.

In the historical environment of tourist cities, increase in the number of skyscrapers will gradually change the urban texture and increase the urban scale, and large crowded tall building groups will adversely affect the historic districts and adjacent buildings. Therefore, when just emerged in the UK, the skyscraper building boom was subjected to Queen Victoria's restraining order that was not lifted until the early 20th century. To limit the height and construction areas of skyscrapers and improve the supporting facilities became important means of fusion with the cities. In 1915, upon completion of Equitable Building in New York, because too many tall buildings affected the lighting of the adjacent buildings, the property value and rental rate declined, the local taxes reduced and New York promulgated the decree on building height restrictions. In 1916, New York enacted zoning regulations to determine the status of central business district (CBD), restrict industrial and residential development in the area and limit skyscraper construction to a specific region to facilitate the formation of obvious spatial settlements. In the 1970s, the US provided the proportion of building height and occupied land and stipulated that real estate developers must build parks and squares around new tall buildings through the decree limiting the construction of tall buildings. This is the reason why many well-known tall buildings in the US are called "squares". This decree caused that property developers must build parks and squares when building tall buildings and the investment multiplied and thus the blind development of tall buildings was restrained. Sears Tower which is now the highest building in the US was built in 1973 before the promulgation of the decree. After that, the height of skyscrapers in the US does not further increase. The European countries have also introduced decrees on building height restrictions similarly and are equipped with specialized urban management department. For example, the German urban management department has a tall building bureau responsible for limiting building height, evaluating the environment and culture of new tall buildings and grasping the coordination between new buildings and old buildings and old city environment, etc. The spire height (100m) of Frauenkirche in downtown Munich becomes the height limit of the local buildings. In addition, it is noteworthy that, after the 1990s, with the advent of the post-urbanization era, the urban functions of skyscrapers in the US also change. First, the functions of skyscrapers themselves are diversified and transform from single functions such as office and hotel to comprehensive functions such as tourism, entertainment and residence; second, as a product of the post-suburbanization process of the cities in the US, skyscrapers shift to sub-CBD and outlying urban areas such as Rothley, Washington, DC and Irvine Area, Orange County, Los Angeles.

From the development course of skyscrapers in the European and American cities, we may see that the more bound to historical tradition a tourist city is, the more restricted its skyscraper construction is, and the emerging cities are less bound to. In the process of urbanization in western countries, skyscrapers had played a positive role in the formation of urban landscapes and urban function partition and promoting urban economic development. But after the 1970s, worldwide skyscraper construction has shifted from Europe and America to East and Southeast Asian countries and some Middle Eastern countries represented by Hong Kong and Shanghai, which is inseparable from the new understanding of the European and American countries on skyscrapers. In the era of post-industrial civilization, skyscrapers are no longer a sign of urban modernization in Europe and America. After Europe and America complete their process of urbanization, the balanced development of environment and economy is regarded as the true connotation of urban

modernization. Corresponding to that, the emerging Asian countries, under the stimulation of high-speed urbanization and rapid economic development, are still duplicating the practices of the European and American cities.

Roles of Skyscrapers in Chinese Tourist Cities' Space

As a foreign product, the large-scale construction of skyscrapers in China is mainly divided into two phases: the first is the 1920s and 1930s in Shanghai and the second is from the late 1970s to today. The first phase of skyscraper construction is more an expression of the showing off of wealthy individuals in the city and it was introduced into this emerging eastern metropolis as the symbol of "modern" and "novel"[5]; the second phase has been going on for more than 30 years, from the initial diplomatic apartments and hotels to the later office buildings and complexes, gradually spreading from the first-tier cities to the second-tier cities and increasingly showing diverse architectural functions and different role orientation in Chinese cities.

As for the role of skyscrapers in Chinese cities, we must first recognize several basic facts: firstly, the background of skyscraper construction is rapid population aggregation in the process of rapid urbanization in China and the original purpose is to solve the problem of big population and little land in the cities and barter increase in the height of buildings for more usable space, but when the building height exceeds a certain limit (usually 300m), the land-saving role is no longer available; secondly, skyscraper is a product "introduced" rather than "created" by China. It is not a result of the building technology development in China, but only a reproduction process of the western building technologies. China is more concerned about the application and use of technologies and takes it as a means of external manifestation while western countries are more concerned about the possibility of generating new technologies in skyscraper construction and take it as the power of technological invention and development; finally, as a symbol of modernization, skyscrapers are magnified and strengthened by varying degrees in Chinese cities. It seems that if there is no high-rise landmark building, a city cannot be considered as prosperous, powerful or civilized. But in fact, skyscrapers are more considered as a symbol of the traditional industrial civilization and the power of capital and their cultural symbolism has long been obsolete in the post-industrial era.

Therefore, skyscraper cannot be simply regarded as the sustenance of economic success and pride in the development planning of Chinese tourist cities. At this stage, it is extremely difficult to inhibit the enthusiasm of skyscraper construction throughout China, and it is a feasible path to achieve the localization of skyscrapers and fuse them with tourist cities.

Analysis on correlation between skyscrapers and tourist cities' space

Correlation between skyscrapers and urban landscape

First, the influence of skyscrapers on urban landscape lies in city skyline that is the vertical space projection of a city's overall appearance and reflects the overall contour of a city. For a plain city, the city skyline may only be seen far away from the city and the height and density of skyscrapers will directly affect the skyline contour. With good skyscraper complexes such as La Défense, Paris and Pudong, Shanghai, the core area gradually spreads out after aggregation and the skyline stretches and undulates continuously. Skyscrapers scattered in different areas of a city will render the skyline out of abrupt, fragmented and chaotic impression. However, in mountainous cities such as Hong Kong and Chongqing, the trend of mountains itself provides natural skylines. Even within the cities, we may feel the urban form changes from different places and different heights. The influence of skyscrapers on the skyline of mountainous cities may be called destructive reconstruction and shifts natural mountains to a combination of mountains and buildings. Excessive development could result in negative effect to block landscape.

Second, skyscrapers create and destroy urban landscape gallery simultaneously. Landscape gallery is an important manifestation of the urban landscape resources. The formation of a smooth landscape gallery is one of the important principles of urban design. Landscape galleries in different urban patterns have different manifestations: some are fusion of the natural environment and some

are convergence of historical nodes, so the integration of skyscrapers and original landscape galleries produces strong interaction. In the landscape of historic districts, what presides over the surrounding areas are historical buildings of image characteristics and cultural significance, and skyscrapers are just in a subordinate position and their essentials are not to emphasize individuality or stand out volume and integrate into the surrounding landscape humbly. For example, with huge volume and majestically standing turret, ICBC Tower at the end of Central Avenue, Harbin is incompatible with the classical style of the gallery landscape and undermines the continuity and sense of balance of the landscape. But in new urban areas without the shackles of history and culture, it is appropriate to some extent to pursue sharp contrast between the old and the new and give prominence to the cities' modern sense, and skyscraper itself becomes the subject of landscape and strengthens the identifiability of new urban landscapes with a gesture of manifestation of vigor, vitality and prosperity.

Correlation between Skyscrapers and Urban Environment

The correlation between skyscrapers and urban environment involves urban cultural environment and urban physical environment. As for cultural expression that skyscrapers bear, different people will have different evaluation. Whether by expression means of inheritance or subversion, the original characteristics of a building to a city after a long time needs to be taken into account. This is the reason why there is a trend of regionalism in the design of skyscrapers, that is, reconcile the impact of global culture through special local cultural elements. For example, both the dense eaves shape of Shanghai Jin Mao Tower and the bamboo knot shape of Taipei 101 amplify the local architectural elements to form strong links with the local culture.

The existence of any skyscraper cannot be divorced from the physical environment of a city. Its association with the urban physical environment is the material basis to guarantee its functions, and it is related to urban transport, lighting, temperature and wind, etc. Population aggregation brought about by skyscrapers is like the erection of a vertical street in a city. To guarantee the smooth flow of population, provide sufficient environmental space and reduce the negative influence of heat island effect, canyon wind effect, inadequate lighting and curtain wall light pollution are issues to be considered. Therefore, eco-design tendency has also become the focus of interest to architects. This concept regards buildings as an integrated component of the local ecological environment and minimizes their impact on the surrounding environment by active and passive means. Common strategies include adjustment in building appearance and orientation, layout of service core, comprehensive utilization of greening and use of natural lighting and ventilation, etc.

Correlation between Skyscrapers and Urban Functions

The correlation between skyscrapers and urban functions mainly manifests in three aspects, i.e., optimization of urban regional functions, improvement of urban operating efficiency and satisfaction of urban external functions. With the spatial expansion of Chinese cities, urban regional functions experience structural changes, the business & trade and financial functions of urban centers highlight, there is increased demand for services in sub-CBD and satellite urban areas and skyscrapers match up with the changes in regional functions to achieve docking with industrial and population transfer. Therefore, the location of skyscrapers has traction, division, block and displacement effects on the business centers of the whole cities and their location and orientation need to be carefully considered and skyscrapers should be arranged in a centralized manner as far as possible to adapt to the needs of overall development of the cities.

The improvement of urban efficiency is reflected in that skyscrapers improve the operating efficiency of city internal system and change the working and living style of urban residents by relying on the comprehensiveness of various internal functions, the diversification of functional organization pattern and the integration of buildings and transportation. In this regard, it is important to note that, because skyscraper is characterized by spatial immovability and relatively long lifecycle, its construction must be forward-looking, taking the future changes in urban living and working environment and style into account. In the history, the function diversification trend of skyscrapers in the 1970s, the intellectualization trend in the 1990s and the eco-trend in the 21st century all reflect the forward-looking demands of the society and era at that time.

The satisfaction of urban external functions refers to improving city image, promoting city competitiveness, attracting investments and promoting economic development, etc. which are things city managers are most concerned about in reality. For this, different cities require different treatment. This is because the external functions that need to be satisfied in each city are not the same. The requirements of millennium ancient capitals and emerging cities of only a few decades are different. In China today, economic development is a top priority for local governments. The function of skyscraper construction in rapidly stimulating GDP and transforming city image makes it difficult for city managers to carefully ponder what real external functions of their own cities are. Taking the characteristics of their own cities as the starting point to reflect on the correlation between skyscrapers and urban external functions is the key to realize the fusion of skyscrapers and urban functions.

Influence of Skyscrapers in Mountainous Cities: A Case Study of Chongqing

As the largest central commercial city in the upper reaches of the Yangtze River, Chongqing is a typical mountainous city encircled by mountains and rivers and with the entire downtown area located at the junction of the Yangtze River and Jialing River.

Chongqing's skyscraper construction started in the 1980s, from the earliest Huixianlou Building (56.5m) in 1982 to Zhongtian Hotel (148m) in 1999 and to Chongqing International Financial Center (470m) under planning. Looked from the time course, skyscrapers built from 1980 to 1990 did not exceed 100m tall, building height was controlled within 150m from 1990 to 2000, and buildings of over 200m tall witnessed a blowout increase[8] after entering the new century and there are more than 200 super tall buildings in the core area of Yuzhong Peninsula alone. In 2011, the number of skyscrapers in Chongqing ranks sixth in China.

As a mountainous city, Chongqing's preference for skyscrapers has natural foundation and public support. Restricted by rivers traditionally, downtown Chongqing is squeezed within 1.5km to the north and south. With big height difference and small area, it can only seek more usable space in the air and thus forms the spatial form of crowded tall buildings. Good geological conditions in Chongqing reduce the construction costs of skyscrapers, plus the Chongqing people's preference for tall buildings, cause that there has been a large market supply of tall buildings.

From the perspective of urban functions, the distribution of skyscrapers in downtown Chongqing gradually shifts from the core area (Yuzhong Peninsula) to the sub-CBD. Because the building density of the region originally taking Jiefangbei as CBD is too large and its density of tall buildings is even larger than that in Hong Kong and Shanghai, according to the requirements of Chongqing urban master planning, sub-CBD are gradually built to transfer urban population and environmental pressures. At present, a large number of landmark skyscraper complexes such as Langgao Kaiyue and Fortune Center emerge in the sub-CBD of Nanping, Jiangbei, Yangjiaping and Shapingba, etc. to effectively make skyscrapers serve urban functions. The new Jiangbeizui CBD completed the construction of 30 tall buildings of 2,000,000m² within a short period of time to form a new skyscraper complex in order to meet the needs of financial, business, cultural and other regional functions. At the same time, new skyscraper complexes scattered in the sub-CBD are usually close to transportation hubs such as highway, light rail and subway transfer centers to realize the short-distance connection between the skyscrapers and the public transport system so as to minimize transfer times and evacuate flow in the shortest possible time. It is noteworthy that, due to market, their own functions and other reasons, the vacancy rate of some office buildings in the early skyscrapers in Chongqing has been high. This is a problem left over by that prospective needs were not taken into account in the early construction.

From the perspective of urban landscape, the three dimensional landscape of architecture and nature fusion unique to a mountainous city makes the viewers feel the charm of the city within it. We have to admit that, due to the lack of effective vertical space management in the early skyscraper construction of Chongqing, the building contours are relatively disorderly and lack sense of clarity and hierarchy on the whole and a lot of "river view buildings" stand along the Yangtze River and Jialing River to block the landscape. It not only destroys the city skyline, but also greatly

wastes the urban public landscape resources, resulting in the loss of the traditional vertical contour features in the mountainous city. Because the sub-CBD where the later built skyscrapers are located are relatively flat, away from the river bank and mostly new urban areas, the skyscrapers form new urban landscape instead.

From the development of skyscraper in the mountainous city of Chongqing, we may see that it objectively promotes the adjustment of urban functions and adapts to the needs of industrial restructuring and regional function optimization in the urbanization process of Chongqing, but restricted by conditions, it has a long-term negative impact on the urban landscape, especially the riverside landscape.

Conclusions

How tourist cities build skyscrapers that suit the Chinese native land is a question worthy of city managers, architectural designers and tourism planners to think together. It might be a feasible path to place buildings in the cities as a part of the urban landscape and look at skyscrapers more from the social, cultural and environmental perspectives.

References

- [1] China Skyscraper City List, Motian City Research Group, " Skyscraper City" Website, Beijing, 2011
- [2] Chen Zhe. Zhang Yuliang, Chairman of Greenland: Understand the Government to Do Real Estate, *The Economic Observer*, Vol.17 (2012), p. 9-11.
- [3] Long Hao.Tang Zhan. Study on Development and Evolution of Chongqing's Urban Morphology, *Interior Design*, Vol.5 (2011), p. 32-33.
- [4] Qiu Qiang. Study on Vertical Contour Features Shaping in Mountainous Cities, *Modern Urban Research*, Vol.4 (2009), p. 46-49.
- [5] Mei Hongyuan.Liang Jing. Research on Interaction between Super High-rise Buildings and Tourist Cities' Space, *Urban Architecture*, Vol.10(2028), p. 22-26
- [6] (Switzerland) Boesiger, et al. *Le Corbusier: Complete Works*, Chapter 3, China Building Industry Press, 2005