

Effects of the Modern Railways Construction on the Change of Area and Urban Function in Wuhan

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Abstract

As the capital of the Hubei Province and a megacity in China, Wuhan has always been at the center of attention. Wuhan was one of the first Chinese cities to break the traditional urban structure and move towards modernization. This is typical in the development of modern cities. This paper starts from the topographical environment of Wuhan and analyzes the influence of railways on the change of Wuhan city area and functions. This is done by analyzing the land use, traffic routes, urban fringe belts and nodes before and after railway construction in modern Wuhan. This paper draws out the types and characteristics of the three urban area expansions. As well as the effects of railways on the changes in urban areas, functions and relationships between cities, fundamentally look for the influence of railways on urban development

Keyword: Wuhan, Railways, Urban area, Urban functions, Urban structure

Introduction

The rapid transition of Wuhan from a traditional oriental city toward an open modern city breaks the traditional urban development model in China. The solid industrial foundation, rapid railway construction, and reasonable urban planning make Wuhan a typical example of modern urban development, which makes the research on Wuhan urban development have been effectively explored by many scholars. Jun Li analyzed the laws and morphological characteristics of urban spatial expansion from the aspects of the geographical environment, society, economy, and culture (Li, 2005). Yiguo Wu summarized the morphological evolution of Wuhan and elucidated how the city gradually expands inland driven by waterways and railways (Wang, 2012). Based on the Western typology, Wei Wu sorted out the changes of urban spatial form in Wuchang. (Wu, 2012). Starting with the geographical environment of Wuhan, this paper analyzes the urban expansion process of Wuhan city and the impact of railways on the changes of urban areas and functions in the process of transition from a traditional city to a modern city.

1. Geographical Environment and History of Wuhan

Wuhan is the capital of Hubei Province and also an important inland port of the Yangtze River in China. The earliest Wuchang area was mainly dominated by military functions. Since the Tang Dynasty, it has become the transportation center of north-south land transportation and east-west water transportation, and later,

Hanyang was built. During the Yuan Dynasty, Wuchang was promoted to the local administrative center of Hubei, and the imperial family of the Ming Dynasty was entrusted to expand this city. During the Ming Dynasty (about 1400s), the Han River basin was changed into the Hankou area. Later, the sandbars of Hanyang and Wuchang were flooded, so the trade gradually shifted to Hankou, and the population gradually settled in Hankou to form natural settlements, during which the Hankou government was responsible for the management, forming the basic pattern of the three cities of Wuhan. Since Wuhan's economy is dominated by inland transportation, commercial prosper and decline are closely related to sandbars and there is obvious competition among the three cities of Wuhan (Liu,2017) (Figure 1).

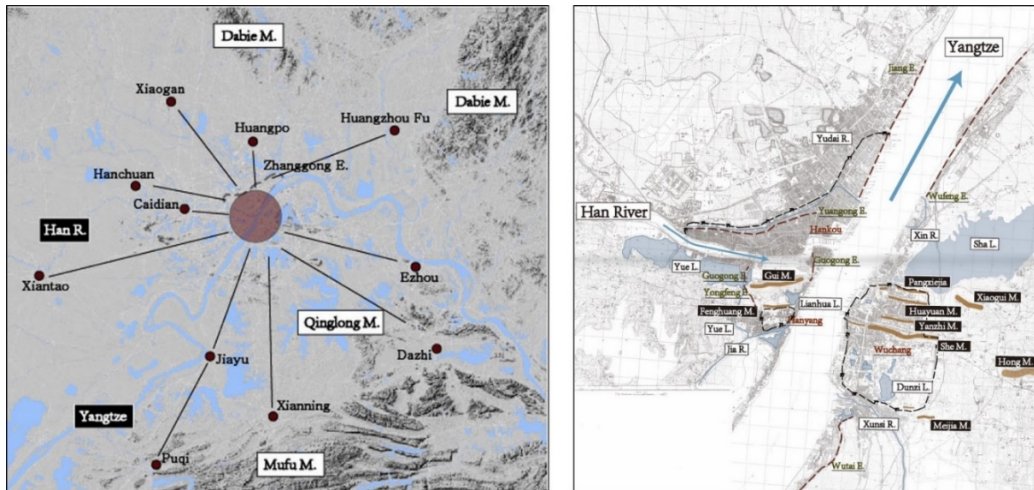


Figure 1. Location of Wuhan and Wuhan's geographical environment map

After the Opium War in 1840, China had to accept modernization. After the defeat of the Second Opium War in 1860, the Treaty of Tientsin was signed, which stipulated that 11 trading ports were opened including Hankou (Pi, 1993). Foreign powers wanted to control the water transportation and trade on the Yangtze River by building a transit station in Wuhan. The construction of a concession in Wuhan by the UK in 1861 started the modernization process of Hankou. Later, the Self-Strengthening Movement (the 1860s-1890s) began, during which Zhang Zhidong introduced Western technology and established a modernized military industry in Wuhan to achieve the goal of rejuvenating the country and strengthening the military. In 1906, the Beijing-Hankou Railway was opened. Then, the Revolution of 1911 broke out and the Qing government was overthrown and Chinese private capitalism began. In 1918, the Guangdong-Wuchang Railway was opened. In 1926, the Nationalist Government moved to Wuchang and unified the administration of the three cities for the first time. The Sino-Japanese War broke out in 1937. Hence, this paper divides the development of modern Wuhan into 4 periods: (1) the entry period of foreign culture in 1890; (2) the expansion period of urban facilities from 1890 to 1911; (3) the reorganizing period of the urban structure from 1911 to 1927; (4) the stable period from 1929 to 1937.

2. The Changing Process of Urban Expansion from the late of Qing Dynasty to 1937

2.1 –1890: Entry Period of Foreign Culture

Hankou: Hankou belonged to Hanyang until 1890. The area along the river connecting Hanyang and Hankou was the most active area for commercial activities. Hankou is a naturally formed city gradually expanding from south to north, which is not a grid block like a traditional oriental city but an elongated strip formed by the maximum use of Han River traffic. In 1861, The UK and France divided concessions along the lower reaches of the Yangtze River in the northern part of the original Chinese area, and the land-use area of the concession was almost the same as that of the large block. This was in sharp contrast to the Chinese area, resulting in sudden changes in the overall urban form of Hankou. However, due to war and other reasons, the concession was unable to carry out large-scale development. In 1864, Hankou built city walls in accordance with the established urban area, forming a new fixation line of Hankou, and the city gate had a corresponding spatial relationship with the wharf.

Hanyang: Hanyang has three levels of fixation lines. The first level is the city wall-Fenghuang Mountain; the second level is Gui Mountain; the third level is surrounded by Han River-Yangtze River-Jia River-Yue Lake. Hanyang mainly depends on administrative and educational functions. The main axis of Hanyang is in a “T” shape, and most administrative facilities of Hanyang are arranged here. The urban development of Hanyang is traffic-oriented, which is mainly divided into three directions: first, heading north towards Hankou; second, using the horizontal axis of the city to extend westward to the outside of the city, leading to western regions such as Hanchuan; third, crossing the Jia River to the west and reaching Yingwu sandbar dominated by bamboo and wood industries. In particular, the Zhongjiacun area in the west of the city is a very prosperous commercial area (Luo, 2017). Although the topography affects the development of Hanyang, the city gate and wharf have a corresponding relationship from a spatial perspective.

Wuchang: The city wall, Sha lake in the east of the Wuchang, and Xunsi river in the south of Wuchang constitute the fixation line of Wuchang. The She Mountain divides the city into two parts: the north is mainly for administrative and educational functions and the south is mainly for commerce. The area outside the south gate was a grain transfer center during the Ming and Qing Dynasties (Wu, 2012). The city has an obvious horizontal axis and vertical axis and gates without a corresponding relationship between the city gates, and there are piers around the gates along the river (Figure 2).

2.2 1890-1911: Expansion Period of Urban Facilities

Hankou: From the French concession in 1890, the German and Japanese concessions were developed and constructed along the lower reaches of the Yangtze River. 1890-1907 was the period of concession expansion. Due to the different planning methods of concession areas in different countries, the urban form showed heterogeneity. From 1899, Hankou no longer belonged to Hanyang and established its own administrative agency. After signing a treaty with Belgium in 1898, the Beijing-Hankou Railway began construction and opened in 1906, becoming a new fixation line in Hankou. The railway, combined with the original waterway

and traditional landway, constituted the modern transportation system of Wuhan. Hankou had 3 railway stations: Yudaimen station serving the Hanyang industrial belt and Chinese area, with logistics as the center (Wang, 2010); Dazhimen station for passenger transportation; Jiangan Station for cargo freight transportation. Simultaneously, The UK, Germany and Japan respectively built special railway lines connecting their concessions.

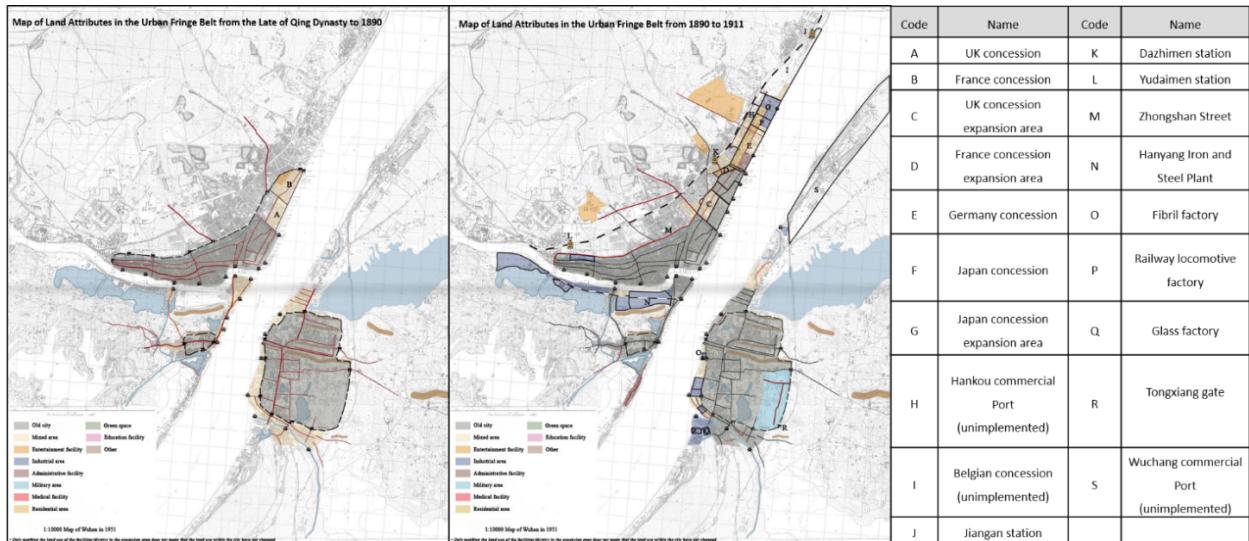


Figure 2. Map of spatial structure in the urban fringe from the late of Qing Dynasty to 1911

The planning area of the Belgian concession was delineated from the Japanese concession to the Jiangan station. However, with the completion of the Beijing-Hankou Railway, Belgium lost the reason to build the concession in China, so it was not completed (HLC, 2002). China had planned to build a commercial port between the concession area and railway, but it failed because of the turmoil. In 1911, almost all areas between the concession area and railway were developed naturally. In 1905, the Zhanggong embankment was built in the suburbs of Hankou, forming the new fixation line of Hankou (Figure 1). In 1906, the Beijing-Hankou Railway was completed and the wall hindered the development of Hankou. Therefore, the city wall was demolished in 1907 and rebuilt into a road, which became the axis of Hankou. Capitalists developed large-scale entertainment facilities on the north side of the railway, and consequently, connecting the entertainment facilities along the railway line became the focus of road construction.

Hanyang: In 1890, the traditional cities Hanyang and Wuchang became the main practice places of the Self-Strengthening Movement. During this period, a large number of state-invested industries were established in Wuhan, which became the major driving force of urban development. On the north side of Gui Mountain along the Han River, many heavy industrial factories such as the Hanyang Iron Factory were built, forming an industrial belt along the river. These places underwent a leap-forward urban expansion and relied on these factories to form worker settlements. Simultaneous to the factory construction, a railway was built in conjunction with the factory, which was mainly used to transport cinder and cargo, but it had no significant impact on Hanyang.

Wuchang: During Zhang Zhidong's administration of Wuhan, Wuchang was used as the center of the textile manufacturing industry. Light industrial factories such as Fibril Factory were built along the coastal area outside Wuchang, and Pingxiang Coal Mine Bureau and other factories were built outside the south gate of Wuchang. At the same time, the emergence of private capital investment was stimulated to built private factories along the coast. The southeast area of Wuchang had no gates and was far away from the wharf, which led to its poor development. Zhang Zhidong transformed this area into military schools and barracks, vigorously developed road construction, and increased the density of Wuchang. It had planned to build the Guangdong-Wuchang Railway to serve the army because the Tongxiang gate began to build in 1900. Xujiapeng area was planned to be the terminal of the Guangdong-Wuchang Railway and Wuchang commercial port was originally planned to be established. However, due to the turbulent situation, these plans were not completed and only parts of the roads were built, which provides a potential impetus for future urban expansion (Figure 2).

2.3 1911-1927: Reorganizing Period of the Urban Structure

Hankou: After the Revolution of 1911, the city entered a short period of stability. Hankou's urban expansion was mainly based on the development of the open space between the concession and the railway and gradually continued to spread to the Chinese living area. The northern area of Dazhimen station developed rapidly, with residences and factories as the mainstay. The new industrial area around Yudaimen station eroded the original land of the old town and converted it into industrial land. Scattered facilities such as hospital area on the north side of the railway were developed. During this period, roads connecting the areas on both sides of the railway were mainly constructed and the area on the north side area of the railway was developed. The surrounding area of Jiangan station was developed, but due to its distance from the city center, its development speed is slower than that of the other two stations (Figure 3).

Hanyang: The development of Hanyang was still dominated by the western expansion of the city. Places of worship, hospitals and other facilities appeared between the two mountains, which became the potential driving force for the future expansion of Hanyang. In addition, a railway branch line was constructed near the factory, and the terminal was connected with the wharf.

Wuchang: In 1918, the Wuchang-Changsha section of the Guangdong-Hankou Railway was opened, and the railway construction almost surrounded Wuchang. A total of 4 stations were built: Yujiawan station served the military; Nianyutao station served the factory area; Tongxiangmen station served commuters and military; Xujiapeng station was the terminal. To connect the Beijing-Hankou Railway, special wharves were set up on both sides of the river for the commute. In addition, driven by the national industry, private capital investment was developed rapidly. They developed along the river close to the Xujiapeng station, which promoted the development of the Xujiapeng area.

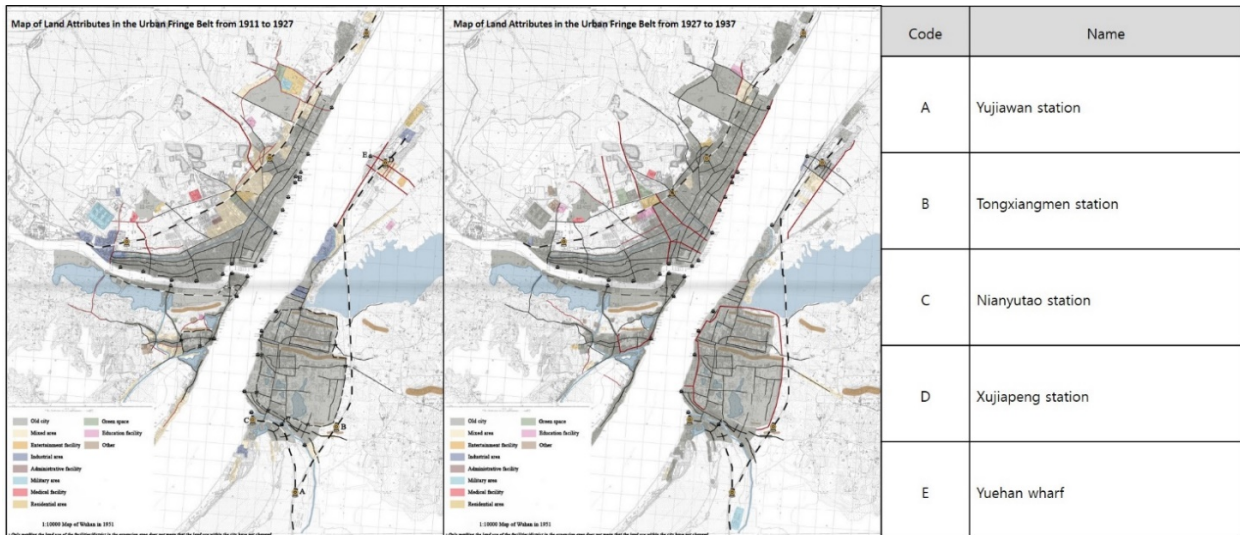


Figure 3. Map of spatial structure in the urban fringe from 1911 to 1937

2.4 1927-1937: Stable Period

Hankou: During this period, Hankou entered a period of reflection on urban development. The traditional roads hindered the development of Hankou, so corresponding regulations were promulgated and roads in non-concession areas were repaired. The area close to the Chinese boundary became the main development area during this period, and Xunlimen station was established in this area. On the north side of the railway, green spaces, hospitals, schools, and other facilities were still arranged in a scattered manner.

Hanyang: From 1925 to 1928, the Hanyang city wall was demolished and built into a road, which was an important symbol of the transformation from a traditional city to a modern city. The direction of urban expansion was still mainly in the western region, with slow development speed.

Wuchang: Similar to Hanyang, Wuhan demolished the city walls and built roads in 1926-1929. Railway construction made people no longer rely solely on water transportation, and the trend of urban expansion to inland areas was also obvious (Figure 3).

3. Changes of Urban Area and Functions in Modern Wuhan

Hankou, a traditional commercial town, has transformed into a comprehensive financial, commercial, and transportation city. Based on natural settlements, the concession construction in Hankou was expanded along the riverbank, with the basic purpose of controlling the water transportation center of the Yangtze River. As the wave of capitalism proceeded, concession development and railway construction were replaced, and the city ushered in a new fixation line and urban fringe belts. The introduction of the international competition mechanism had stimulated the vitality of Wuhan and made Hankou develop rapidly (Luo, 2016). Large-scale entertainment facilities were built on the north side of the railway. Other than the railway, these facilities also became the new driving force for the next expansion of the urban fringe belt. After the Revolution of 1911, urban expansion was mainly manifested as filled. The development

momentum between the concession and the railway station was the strongest, which was closely related to the rapid capitalization. In addition, in the context of rapid modern urbanization, people have reflected on the development of the city, promulgated laws to stipulate road width and road maintenance, and commenced green city exploration.

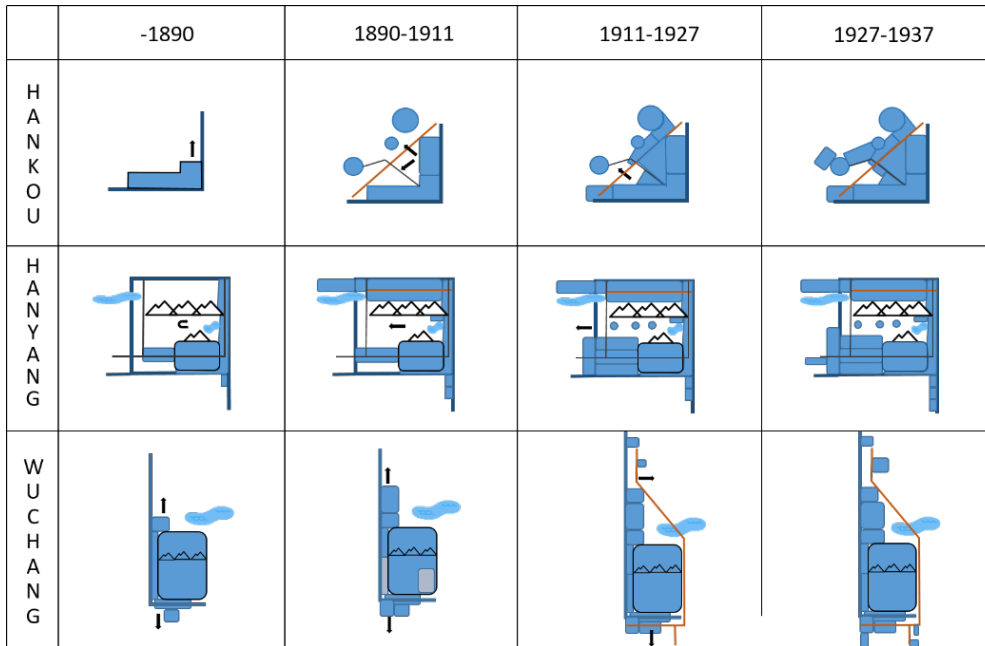


Figure 4. The pattern of urban expansion from the late of Qing Dynasty to 1937

Hanyang has transformed from a traditional administrative center to an industrial city centered on heavy industry. Hanyang has always been regarded as the local administrative center, but the topography greatly limits its development. The expansion of Hanyang is traffic-oriented, mainly focusing on river and road construction. The construction of the riverbank industrial belt in 1890 enabled the city to complete a rapid expansion, but it did not exert much impact on Hanyang. Later, the city wall was demolished and facilities appeared in the urban fringe belt between the two mountains. Although this provided a potential impetus for future urban expansion, the progress was slow.

Wuchang has transformed from a traditional administrative and educational center to a central city for light industry, military, administration, and education. Because of the imperial family in feudal society, this large-scale city was the administrative and educational center of Hubei in the Ming and Qing Dynasties. In 1890, with the convenience of waterway transportation, a textile industrial belt was arranged along the river, which pushed private capital investment and factory construction to a climax. The demolition of city walls and the railway construction created a fixation line and new private-invested factories were the driving force of Wuchang (Figure 4).

4. Conclusion

This paper studies the influence of railways on the change of modern Wuhan urban areas, and conclusions are summarized into the following five aspects. (1) The expansion of the three cities of Wuhan has its own characteristics. Hankou shows an inland expansion; Hanyang shows frog leaping and internal filling expansion due to topographical factors; Wuchang shows a linear expansion along the riverbank and inland expansion. (2) The driving force for the change of Wuhan urban areas is generally the transformation from waterway transportation to railway transportation, and the expansion direction is also from riverbank expansion to inland expansion. The facilities can also be seen as part of the dominant urban development. Furthermore, the railways built along the riverbank are integrated with the wharf, and expansion is generally carried out along a line or within a block. However, when the two ends of the railway and port are separated with the city as the center, it provides an opportunity for urban expansion. It crosses the railway and combines with large-scale facilities to further promote city development (Lee, 2012). (3) Railway construction has different effects on the change of area. For Hankou, the initial role of the railway is to guide. After breaking through the railway boundary, the railway assists with the integration of both sides of the railway. For Hanyang, the railway has a limited impact on the expansion of the urban area because the functions of the railway are fragmented as an industrial complex railway. For Wuchang, the planning of the railway and the development of surrounding land have potentially guided the city's expansion. (4) In the process of modernization with railway construction, the function of three cities shows different characteristics: Hankou has become an economic central city integrating finance, commerce, and transportation. Hanyang is a heavy industrial city, and Wuchang is an administrative and educational city. All these affect the nature of Wuhan today. (5) The railway has affected the relationship among the three cities, from the original competitive relationship to a cooperative and win-win relationship due to the construction of Beijing-Hankou Railway and Guangdong-Wuchang Railway. Railway construction has guided the expansion and accelerated the integration of these three cities.

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