



## Studies on External Transportation Development and Spatial Structure Transformation of Modern Kunming from a Southeast Asian Perspective, 1885-1945

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From a regional perspective of Southeast Asia, the paper focuses on Kunming, a gateway between China and Southeast Asian countries. The research elucidates the planning ideas and construction process of external routes, via both land and air, such as Yunnan-Vietnam Railway, Yunnan-Burma Railway, Burma Road, Stilwell Road and Hump Airline in early 20th century. These external routes became the arteries of cargo transportation, and Kunming became a regional economic center and military command center during wartime. The paper further reveals the transformation of Kunming's spatial structures influenced by these external routes, which accelerated Kunming's urban growth along the traffic lines. The city center shifted to the Station area, where industrial and commercial developments also congregated. New industrial zones were planned to the east and north of the old city, where new passages brought more convenient transportations. The internal road network plan also emphasized the connection with new railway station and bus stations. The research construes the planning ideas and implementation, traces their theoretical origins, and uncovers their indigenous considerations.

**Keywords:** Urban Planning History of Modern China, Regional Perspective of Southeast Asia, Kunming, External Routes, Spatial Structures

**Fund Items:** Supported by National Natural Science Foundation of China (No. 51778403, 51478299) ; Innovation Project of University Students (No. 201710056339)

### 1 Introduction

Kunming is the capital of Yunnan and an important city in southwest China. As the birthplace of the ancient Southern Silk Road and the ancient Tea Horse Road, the southwest is the frontier of economic and cultural exchanges between China and Southeast Asia, and also the core area for inland opening to the outside world<sup>1</sup>. In modern times, Kunming once had a rapid development. After the Sino-French War of 1885, the French and British forces reached into Yunnan. In 1910, Kunming opened a commercial district and began its modernization. In 1937, with the full-scale outbreak of the Anti-Japanese War, the eastern coastal cities were blocked, a large number of people, factories and schools moved westward. Kunming became an important gathering place during the Anti-Japanese War. In modern times, Kunming built a number of domestic and international access roads, which had an important impact on the evolution of the regional structure of Southeast Asia and the internal spatial structure of Kunming. In combination with Southeast Asian regional perspectives, this paper attempts to explore the access construction between modern Kunming, the domestic and Southeast Asian countries and its impact on the evolution of urban spatial structures.

### 2 Development Background of Modern Kunming

#### 2.1 Urban development before modern period

Kunming is surrounded by mountains on three sides and Tien Lake in the south. It was an important population gathering place in ancient times and gradually became the center of politics, military, economy and culture in Yunnan. Tuodong city, built in the Tang Dynasty (618-907 AD), formed the embryonic form of Kunming. In the Song dynasty (960-1279 AD), the area was expanded. Zhongqing City in the Yuan Dynasty expanded to the north based on the city of Song dynasty. The city of Ming Dynasty (1368-1644 AD) continued to move north and the brick city covered an area of about 3 square kilometers (Figure 1). It was prominent for political and military function. The Qing Dynasty (1644-1911 AD) inherited the Ming and formed the main axis of space from South Gate to Wuhua Mountain. Before modern times, the urban spatial structure of Kunming gathered in blocks. The urban space expanded northward due to the influence of topography. The landscape pattern of "three mountains and one lake" was continued (Figure 2). With the opening of the commercial district in 1910, Kunming began its transition to modernization.

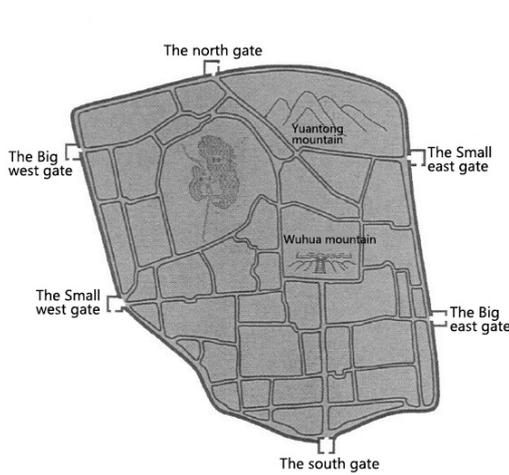


Figure 1: Kunming in Ming and Qing Dynasty

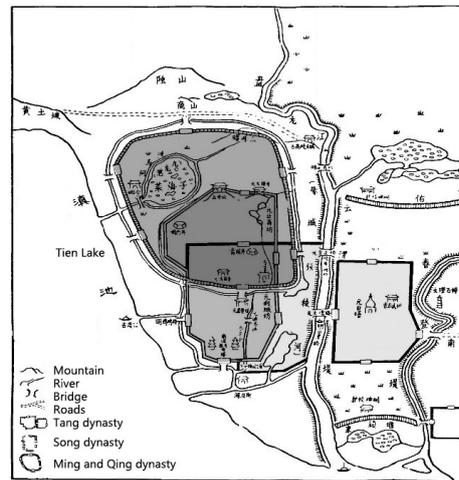


Figure 2: The changes of the city site in Kunming

## 2.2 Regional traffic development before modern period

The terrain of Kunming is dominated by hills and mountains. Affected by the terrain, traffic conditions before modern times were not very developed, but there were still accesses connecting inside and outside, such as the Southern Silk Road, the ancient Tea Horse Road, and Shu'an South Road. The Southern Silk Road had come into being before the Han dynasty, starting from Sichuan, went through Kunming to Myanmar and India (Figure 3). It was a business and cultural communication channel, linking Southwest China with South Asia. The Tea Horse Road was in contact with the "Great Triangle" areas of Yunnan, Sichuan and Tibet in China (Figure 4). And it extended abroad to India, Myanmar, Vietnam, Laos and Thailand. It was the important civil international trade channel and cultural communication center. Shu'an South Road was also one of the most important transportation routes in ancient times. It started from Sichuan, went through Yunnan to Vietnam. In addition, there were also some Horse Roads and water transportation routes that linked Kunming and the domestic areas such as Guizhou, Guangxi, Sichuan and Tibet. Before modern times, the main direction of communication between Kunming and the international countries was Vietnam, Myanmar, India and other Southeast Asia countries. This laid the foundation for the modern Kunming to expand its access to Vietnam, Myanmar, and India.

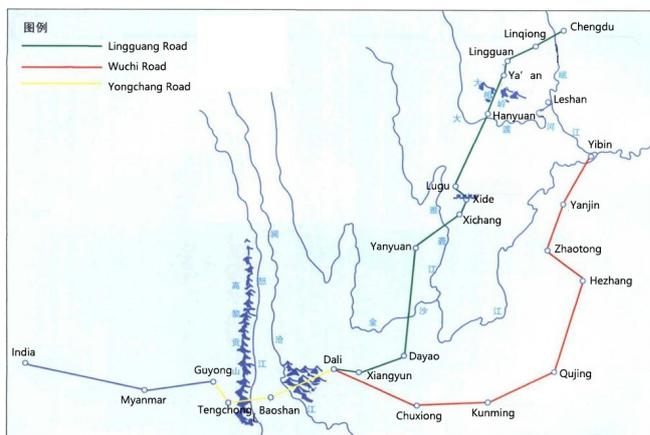


Figure 3: The ancient southern silk road

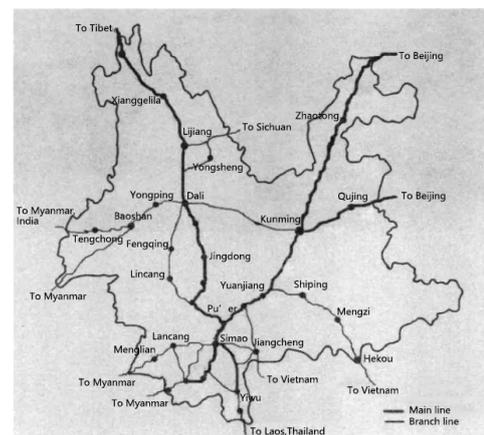


Figure 4: Road map of Tea Horse Road

## 3 Formation of External Routes in Modern Kunming

### 3.1 Routes between Kunming and Southeast Asian countries

#### 3.1.1 Routes between Kunming and Vietnam



In modern times, the transportation links between Kunming and Vietnam have been significantly enhanced, and the construction of the Yunnan-Vietnam Railway has been an important support. At the end of the 19th century, the British and France saw Yunnan as an export to develop trade network in China's inland. It urgently needed a railway to connect Yunnan<sup>2</sup>. Afterwards, the France obtained the Yunnan-Vietnam Railway construction right. The Yunnan-Vietnam Railway started from Kunming and stretched southwards to Vietnam (Figure 5). It was opened in 1910 and was one of the earliest international railways in China<sup>3</sup>. It formed a new pattern of modern external channels of Kunming. During the Anti-Japanese War, the Yunnan-Vietnam Railway was the traffic arteries in the early stage and assumed the most important task of transporting materials for aiding China.

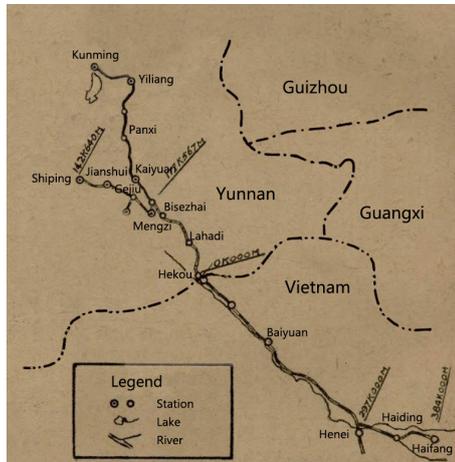


Figure 5: Road map of Yunnan-Vietnam Railway

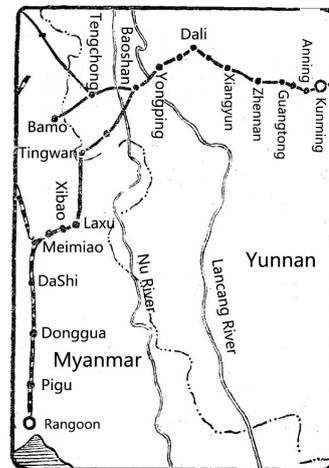


Figure 6: Road map of the Burma road

### 3.1.2 Routes between Kunming and Myanmar

During the Anti-Japanese War, under the pressure of the Japanese military's blockade to southeastern coastal cities, the access between Kunming and Myanmar has been further developed. In 1937, Long Yun, Chairman of Yunnan Province, proposed to Chiang Kai-shek the "Plan for the Construction of the Yunnan-Burma Road and the Yunnan-Burma Railway"<sup>4</sup>. In 1938, the Burma Road opened. It travelled from Kunming to Xiaguan, Baoshan in the west, and to Bamo in Myanmar. It communicated with the inland provinces of Yunnan, Sichuan and Guangxi and the outland of Myanmar's Mandalay and Yangon (Figure 6). After the Yunnan-Vietnam Railway was cut off, the Burma Road was once the only international communication landline in the rear of Anti-Japanese War, called the lifeline<sup>5</sup>. The Burma Road had the second largest traffic volume, just after the Yunnan-Vietnam Railway. Although it was dominated by military transport, it was also a trading road<sup>6</sup>. Another route linking Burma was the Yunnan-Burma Railway which had been proposed during the late Qing Dynasty. However, due to various factors in wartime, this line only partly built.

### 3.1.3 Routes between Kunming and India

In 1942, Japanese invaded Myanmar and cut off the access between China and Myanmar. This provided an opportunity for the expansion of the Kunming-India access. In order to transport aid supplies, the US military opened up the Hump Airline (Figure 7). It was an air corridor from Kunming, flying over the Himalayas to reach India. It was the only transportation line that offered international assistance in the late Anti-Japanese War. There was also a road linking China and India, the Stilwell Road (Figure 8). At that time, the Yunnan-Vietnam Railway and the Burma Road were both cut off. The transportation of the Hump Airline was limited and the transportation costs were high. Therefore, the construction of the landline between China and India was necessary<sup>7</sup>. The Stilwell Road was built by China, America and Britain from 1942 to 1945. It started from Redo in India, went through Myanmar entered the western Yunnan and finally reached Kunming. It was the most convenient land route connecting China, India and Myanmar to the Southeast Asia.



Figure 7: Route map of the Hump Airline

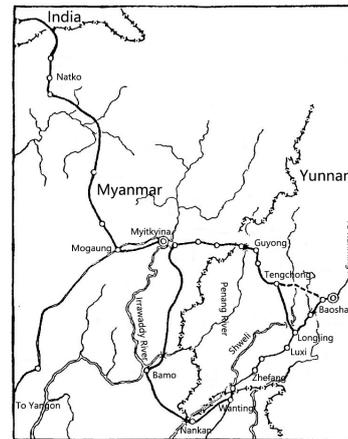


Figure 8: Road map of the Stilwell Road

### 3.2 Domestic Routes of Kunming

In addition to international links, Kunming also strengthened its transportation links with other parts of China in modern times, which changed Yunnan's situation of accessible to foreign countries but inaccessible to domestic cities, thus formed China's southwest national defense transportation network.

As for links with other provinces, roads between Kunming and Guizhou, Sichuan, Guangxi, Nanjing were main construction projects. As important domestic railway transportation routes were cut off during the Anti-Japanese War, roads became key access to the southwest. To promote provincial roads connection in southwest and unify planning and management, the national railway department of the Ministry of Communications established southwest highway transport authority in 1938, planning to open Changsha-Guiyang-Kunming-Chongqing and other major channels<sup>8</sup>. The main roads completed in the early period of the Anti-Japanese War include the Yunnan - Guizhou road, Sichuan - Yunnan road, Yunnan - Guangxi road and Beijing - Yunnan road. In addition, since modern times, the caravan transportation has gradually declined. In order to restore the caravan post transportation during the Anti-Japanese War, the original post way in Yunnan was renovated, including the Sichuan and Yunnan post transportation and the Yunnan-Tibet-India post transportation. They also bore the heavy burden of transporting materials to China's war zone and played an important role in logistics support<sup>9</sup>. In the aspect of railway construction, railway from Yibin of Sichuan province to Kunming was planned to put up in 1937, but only part of it completed due to the war. In addition, Kunming also opened up air routes to Chongqing, Nanjing and Fuzhou.

As for links between domestic provinces, the government of Yunnan province listed road construction as one of the four most important political issues in 1928. In the same year, Yunnan provincial highway administration was founded and Kunming was designated as the center of "four main roads and eight districts" highway planing<sup>10</sup>. In this planning, the east Yunnan road connects Yunnan and Guizhou, the northeast Yunnan road connects Yunnan and Sichuan, the west Yunnan road connects western Yunnan and the south Yunnan road connects Yunnan and Guangxi.

### 3.3 Summary

In modern times, the access between Kunming and Vietnam, Myanmar and India gained rapid development. Especially after the outbreak of the Anti-Japanese War, the authorities attached importance to international route. With Kunming as the heart, roads and railways as the backbone, the construction of transportation networks has enabled Kunming to display an enormous advantage in the international, inter-provincial and provincial relations.

The external access constructed of Kunming leads the regional spatial structure of Yunnan (Figure 9). After the opening of the Yunnan-Vietnam Railway, it has been the most densely-connected external channel for the people, logistics, capital and information in Yunnan<sup>11</sup>, forming the Yunnan-Vietnam Economic Corridor with the "Yunnan-Vietnam Railway" as the main axis and the group of towns in Southeast Yunnan. During the Anti-Japanese War, the construction of life lines such as the Burma Road, the Hump Airline and the China-India Road has enabled Kunming to become a hub city for relief supplies. The Burma Road and the China-India Road have helped to form the Yunnan-Myanmar-India Economic Corridor and the group of towns in West Yunnan. Meanwhile, the construction of the inter-provincial traffic of Xukun Railway, Yunnan-Guizhou Road, and the



provincial road network also strengthened the links between Kunming and inland China. Huge amounts of aid materials were transferred from Kunming to Sichuan, Guizhou and Guangxi through these accesses. Kunming has become a key fulcrum supporting China's wartime economy. In Yunnan, a regional spatial structure, with Kunming as the center and traditional central cities as the nodes, has come into being.

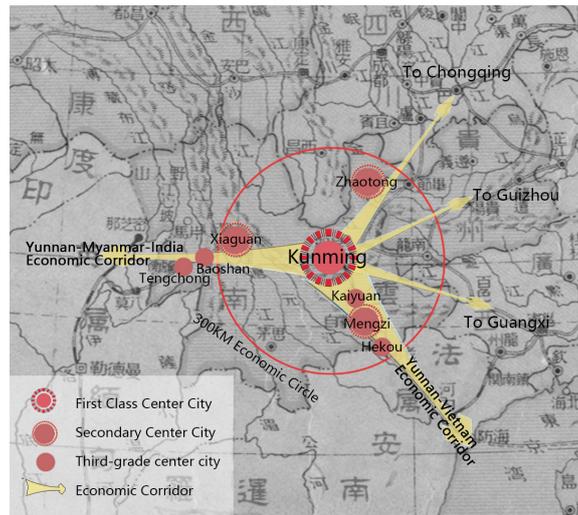


Figure 9: Diagram of modern Kunming regional spatial pattern

## 4 Corresponding Transformation of Kunming's Spatial Structure in Modern Period

### 4.1 Formation of Dual-core Structures (1910-1936)

After the opening of the Yunnan-Vietnam railway in 1910, the railway economy became an important factor in the reconstruction of the urban structure of Kunming. The commercial district centered on the Yunnan-Vietnam Railway Station, which was located outside the South Gate of Kunming (Figure 10). With the opening of the Yunnan-Vietnam Railway, Kunming's commercial trade quickly flourished<sup>12</sup>, forming an early business district. At the same time, urban space began to expand eastwards and southwards, presenting the “dual-core” structure of Kunming's old city district, where government offices and temples are the centers, and the commercial district<sup>13</sup>. In terms of urban road network, unlike the old city, commercial district adopted a small-scale grid to pursue higher commercial land value.

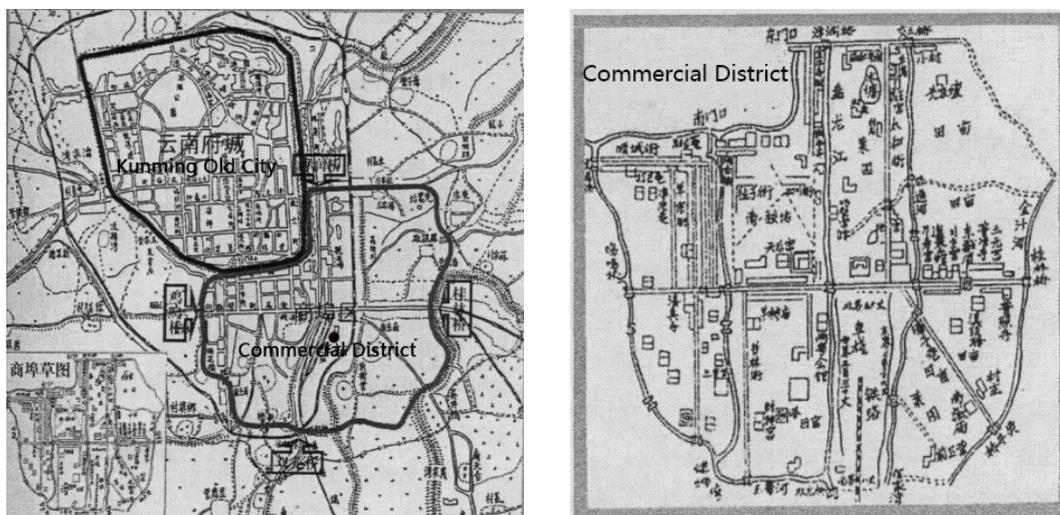


Figure 10: Location map of Kunming commercial district, 1920s

In 1922, the Kunming Municipal Public Office was established and a new urban construction plan was introduced. Its executive was Zhang Weihai, supervisor of Kunming Municipal Public Office. Zhang Weihai went to Tokyo Imperial University and the Tokyo Municipal Research Society in 1919 for learning the constitution



and the municipal administration<sup>14</sup>. The experience of studying abroad in Japan made Zhang Weihan deeply influenced by theories such as Garden City. He proposed that in the future expansion plans, it was necessary to adopt the latest approach so that the industrial and commercial areas also included appropriate garden areas<sup>15</sup>. The plan confirmed that urban space would continue to expand to the south area and serve as an industrial and commercial area. In addition, the opening of the Yunnan-Vietnam Railway also affected the traffic network in Kunming. At this time, the railway station became an important transportation node. In order to dredge the traffic between the railway station and the old city, Zhang Weihan drafted the demolition of the South Gate Tower and built a ring road, vigorously transforming the old streets, and letting the road connect to the train station so as to get maximize traffic utility.

In 1928, the Kunming Municipal Government was established. In order to better meet the needs of car travelling, the municipal government has vigorously rectified the traffic in the city. In 1930, it proposed the construction of Ring Road. In 1931, it proposed the "New Market Development Plan" to mainly renovate the streets. In 1935, it formulated a detailed plan for the transformation of the city roads. In 1936, it implemented the "8-Street Plan" for remodeling the streets. Before the Anti-Japanese War, Kunming had formed a new road network. In addition, there has been a marked expansion of urban space (Figure 11). Except for district 4, which were affected by the topography and developed northward, the overall urban space still extended eastwards and southwards.

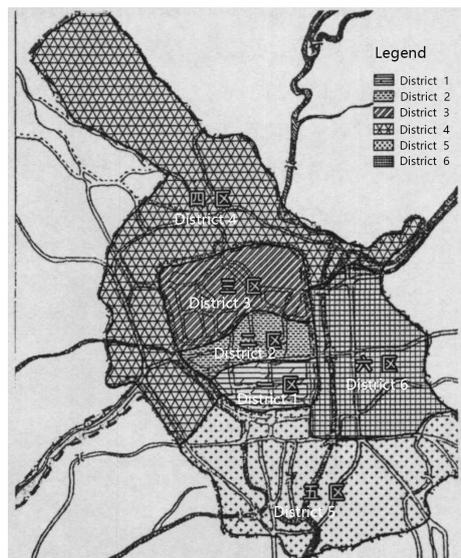


Figure 11: The urban zoning plan, 1935

#### 4.2 Development of Concentric Zone Model (1937-1945)

During the Anti-Japanese War, China's social and economic center moved inland. With the construction of international routes and the domestic southwest road network, Kunming's urban status was even more important. It was not only the political, cultural and economic center of the Yunnan, but also a traffic hub and strategic point for domestic and foreign connection. During this period, Kunming had two important planning. The first was the "Great Kunming City Planning" in 1939. It could be regarded as the rudiment of regional planning, proposed by Ding Jishi, Director of the Kunming municipal public works who had studied in Germany. The other important planning was the "Outline of the Three-year Construction Plan of Kunming", drafted by Tang Ying in 1941. Tang Ying also studied in Germany. The concepts of Urban Zoning, Garden City, and Satellite City were introduced in the plan.

The Outline proposed a long-term plan for the scale of urban development land of 170 square kilometers. The municipal authorities also proposed that the density of urban population should not be too large. It should adopt Garden City, the evacuation development method which combined rural and city, and expand radioactively along railway lines or road to form a multi-point satellite urban system<sup>16</sup>. The Outline proposed the concept of urban zoning (Figure 12), delineating administrative areas, cultural areas, commercial areas, residential areas, industrial areas, scenic areas, cemetery areas and forestry pastoral areas. Urban zoning took into account the impact of traffic on different functional areas. For example, the industrial area was outside the city, located in the eastern and northwestern parts of the city for transportation convenience, with the Yunnan-Vietnam Railway, Yunnan-Burma Railway, Xukun Railway and the Burma Road, Yunnan-Guizhou Road outside and inner-city roads. During the



Anti-Japanese War, Kunming formed several important industrial districts (Figure 13). They formed independent groups around the city and had a convenient transportation link to the city center. The business district was located in the area around Yunnan-Sichuan station and Yunnan-Vietnam station where there were a lot of people and logistics.

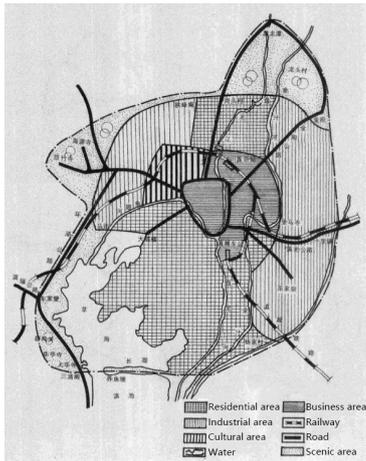


Figure 12: The zoning plan in Kunming, 1943

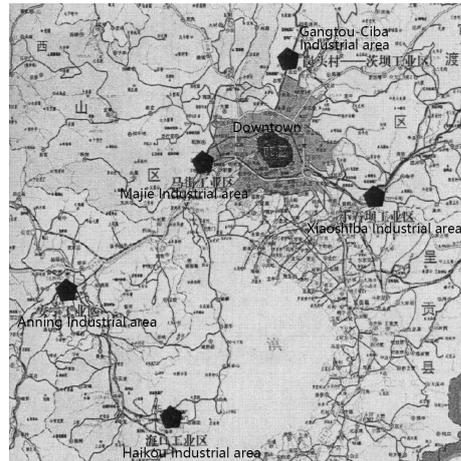


Figure 13: The industrial layout of Kunming during the Anti-Japanese War

In terms of traffic network, in order to meet the requirements of urban evacuation development and contact with external traffic, the “Outline” proposed the road system adopted a ring with radial structure (Figure 14). The external accesses of the Burma Road and Yunnan-Guizhou Road were radial and connected with the loops. The east ring railway and city road were also provided to connect the North Yunnan-Sichuan Railway Station and the South Yunnan-Vietnam Railway Station. In addition, from 1938 to 1942, the “Ten Street Project” was implemented to renovate the city street. In 1942, the main street design of Kunming was proposed (Figure 15) and the main roads were widened. The urban form at this stage basically formed the spatial structure of the “Concentric Zone Model”, with the circular radiation path as the skeleton<sup>17</sup>.

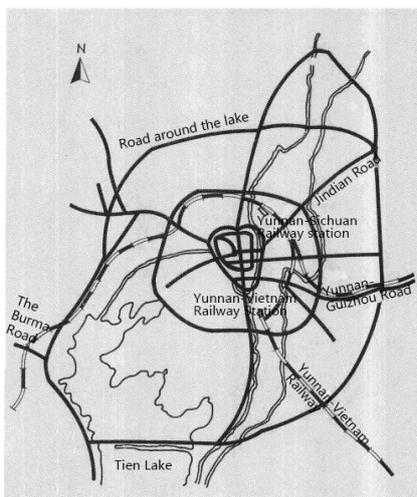


Figure 14: The planning of the main road system, 1943

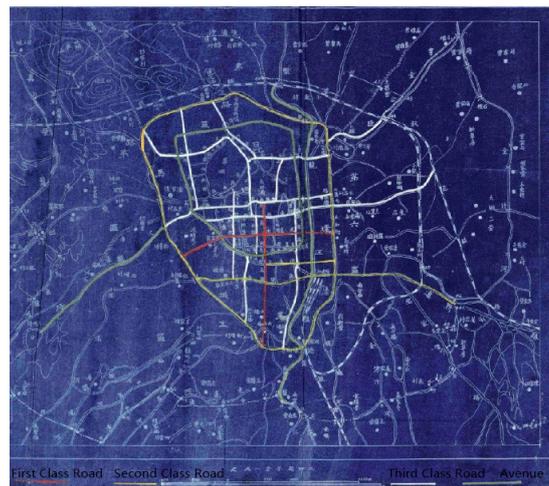


Figure 15: Design of main street in Kunming, 1942

### 4.3 Summary

Table 1: Summary of planning practice in modern Kunming

Period	1900-1921	1922-1927	1928-1936	1937-1945
Historical Development	Opening Commercial	Kunming Municipal Public Office	Kunming Municipal Government	During Anti-Japanese War



	district in 1910	was established in 1922	was established in 1928		
Construction of External Access	Yunnan-Vietnam Railway	—	Yunnan-Guizhou Road; Yunnan Road Project	The Burma Road, Yunnan-Burma Railway, the Hump Airline, the China-India Road, Xukun Railway, Southwest Road Network	
Major Plan and Planners	—	Kunming New Urban Construction Plan, Zhang Weihan (1923-1928)	Plan for New Market Development, The Kunming Municipal Government(1931)	The Great Kunming City Planning, Ding Jishi (1939)	The Outline of the Three-year Construction Plan of Kunming, Tang Ying (1941)
Planning urban area	The newly opened commercial district was located outside the South Gate.	The planned urban area was 50 square miles, and the urban area focused on the southward development.	The city continued to expand eastward and southward	Delineated with Tien Lake as the center, all counties around Tien Lake were within the scope of Kunming City	Planned the urban area a scale of four-ring 170 square kilometers
Urban road network	Small Scale Grid in commercial district	Planning radial road network in the south, keeping the chessboard road network in the north and renovating the old roads	Mainly to renovate the streets	Constructing the road around the lake linked with the urban areas, counties and areas around the lake	Ring with radial road network; the loop was connected with the external roads, and connected to railway stations
Urban Zoning	New commercial district and old city	Old Northern District, New Southern District as the Industrial and Commercial District	6 administrative districts	Making simple functional division according to the original county area	The concept of urban zoning was proposed, taking the impact of traffic into account
Major planning concept	—	Garden City, City Beautiful Movement	—	Decentralized development, the rudiment of regional planning	Urban Zoning, Garden City, Satellite City

Recalling the development of Kunming in modern times, the construction of external accesses was an important factor in promoting and influencing its development. From the end of the 19th century to 1945, Kunming's urban space generally expanded eastward and southward along the major traffic routes. The urban area expanded from 3 square kilometers to 7.8 square kilometers. The spatial structure evolved from the early lumps to dual-core structure and to the concentric zone model. The road network in the city was gradually improved to meet the needs of the automobile era. Several important external stations had a good connection with urban road networks. Urban functional zoning was also affected by external accesses.

Table 2: Urban growth of modern Kunming



Urban Built-up Area			
Period	Qing Dynasty	The 1920s	The 1940s
Historical Development	—	In 1910, the Yunnan-Vietnam railway was opened, and in the same year, it opened the commercial district.	During the Anti-Japanese War, the opening of multiple domestic and international accesses made Kunming a strategic place for the rear.
Urban Expansion	Mainly concentrated in the city	Extended eastwards and southwards	Expanded along the traffic lines
Urban Area	About 3 km <sup>2</sup>	About 6.08 km <sup>2</sup>	About 7.8 km <sup>2</sup>

### 5 Conclusion and Discussion

Traffic is the foundation of a city's development, especially in the special period of modern times. The construction of modern external accesses in Kunming is formed under the dual thrust of foreign forces and domestic reform. It vigorously promoted the modernization of Kunming and southwest China, making Kunming a hub city of the Anti-Japanese war and a military and economic center rather than the frontier military town in early period. Kunming became the forefront of opening to the outside world in southwest China. The Kunming-centered transportation line is the material carrier of Kunming's external access and the artery of southwest economic transportation. The construction of external access has extended the scope of economic and cultural communication. It affected the spatial pattern of the entire Yunnan and southwest China. It constructed the Kunming-centered China-Vietnam economic corridor and China-Myanmar-India economic corridor, strengthened the economic interaction between Sichuan, Guizhou and Guangxi provinces. It has promoted the development of towns along the routes as well.

The period of the Anti-Japanese War is an important stage for the construction of Kunming's external accesses. It provides a direct impetus for Kunming's urban development. Kunming obtained the external power of urban development through external transportation, which supported its wartime operation, and played multiple roles in political, military and economic aspects. It profoundly affected the spatial structure of Kunming. The development of external access changed Kunming's traditional "walled city" form, expanded urban space and provided a new axis for urban growth. When the transportation is still underdeveloped, the urban spatial structure is a concentrated mass. The construction of external accesses made the urban spatial more decentralized and flexible, promote the expansion of urban space, present the embryonic form of concentric zone model and display a decentralized industry area layout. The urban space gradually expanded to the east and south, and the urban center shifted to the railway station area where the industry and commerce have been developed. The urban road network has also undergone adjustment accordingly. In addition, in the course of the construction of Kunming's external accesses, some western planning concepts have been absorbed, such as Garden City and Urban Zoning, which injected new ideas for urban planning in Kunming. It's worth noting that Kunming's reference to western planning ideas was selective and localized. For example, Zhang Weihai's understanding of Garden City was translated from Japan. The Garden City movement in Japan was developed and promoted as a high-level residential area in the suburbs of large cities<sup>18</sup>. However, Zhang's understanding of Garden City focused on the construction of material landscape environment and urban livability.

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