

From “Insertion” to “Incorporation”: the Hangzhou Example of the Transformation of the Railway in Chinese Urban Life

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1.0 Introduction

With the fast development of the national High-Speed Rail (HSR) network, the Chinese government is making efforts to maximise the geographical agglomeration effects that will be brought by the HSR, or in other words, it is planning to utilise the predicted “HSR” economy to “accommodate and channel the demand of urbanisation” (Chen, 2012: 315). We have subsequently witnessed a wave of building new towns around the station nodes in recent years. For instance, as Dong (2011) reported that, along the Beijing – Shanghai HSR line, almost all of the 24 stations have developed new town proposals, of which 16 are under construction. Therefore, we expect the development of an urban life that is tightly connected to, and fully oriented towards, the HSR infrastructure and station nodes within the new towns. Identifying how rail infrastructure has powered urban development and urban life over the century in China will help us to plan and design the new towns.

This paper takes Hangzhou City, capital of coastline Zhejiang Province, as an example, to explore such relationships between rail and urban developments in three typical historical periods: late imperial and early industrialisation (1900s-1930s), Communism industrialisation (1950s-1970s), and recent urbanisation (1980s-2000s). These periods witnessed noticeable developments in rail infrastructure and urban growth, which were however powered by substantially different mechanisms. By examining the connectivity between rail and urban life from various historical perspectives, we will have better understanding of today’s HSR town planning and design practices.

2.0 “Insertion”: The Late Imperial and Early Industrialisation Period (1900s-1930s)

Historically, imperial Hangzhou has a prestigious position within the urban hierarchical system in the Lower Yangtze Delta Region, and developed various scales of trading life in and outside of its city walls. The coming of the railways in the early 1900s, however, reshaped the urban system and the city’s identity, bringing a never before experienced prosperity to urban life.

2.1 Profile of Late Imperial Hangzhou

Sitting at the southern end of the Grand Canal and estuary of the Qiantang River, Hangzhou has been long established as the trading centre of the Lower Yangtze Delta Region, based on the water transportation network prior to industrialisation. Taking advantage of the canal’s role as the spine of north-south commodity trading in China, Hangzhou functioned as a trading hub. This trading system extended further west into the Jiangxi and Anhui provinces through the Qiantang River and its branches, which further consolidated Hangzhou’s dominant position among other cities since the period of the Southern Song Dynasty (AD 1127-1279), when this town was established as the imperial capital. Periods of prosperities have been recorded during near 800 years till late the Qing Dynasty (AD 1636-1912).

Over time, the walled up area of Hangzhou (i.e. the “Chengguo”) has most been retained and the area of city has remained relatively constant. As by the Hangzhou Municipal Government

in 1937, this is a traditional city with a long history; all of the buildings were built following ancient orders through dynasties, and variations in architecture were rarely challenged. There was however one area in Chengguo that distinguished Qing's Hangzhou from previous dynasties, also known as the "Qiyin", or, the Manchu Barracks. To symbolise the Manchus' occupation of this important town, especially as a regional military centre, the Qiyin was sited along the eastern edge of the West Lake, a place of natural beauty and cultural significance that the city had been long proud of. The Qiyin's 3-mile perimeter enclosure blocked direct contact with the lake from the town, and eventually shaped an urban life disconnected from the precious landscape (Wang, 1999). In-town commercial life was organised by the central axis street or, the "imperial spine" during the Southern Song. It was noticeable that the other major two markets were outside of the Chengguo: one in Gongchenqiao (wharf on the Canal) and the other in Zhakou (wharf on Qiantang River). This means the life inside and outside of the circumvallation was at different scales, the former focusing on local life while the latter represented the city's status in national trading.

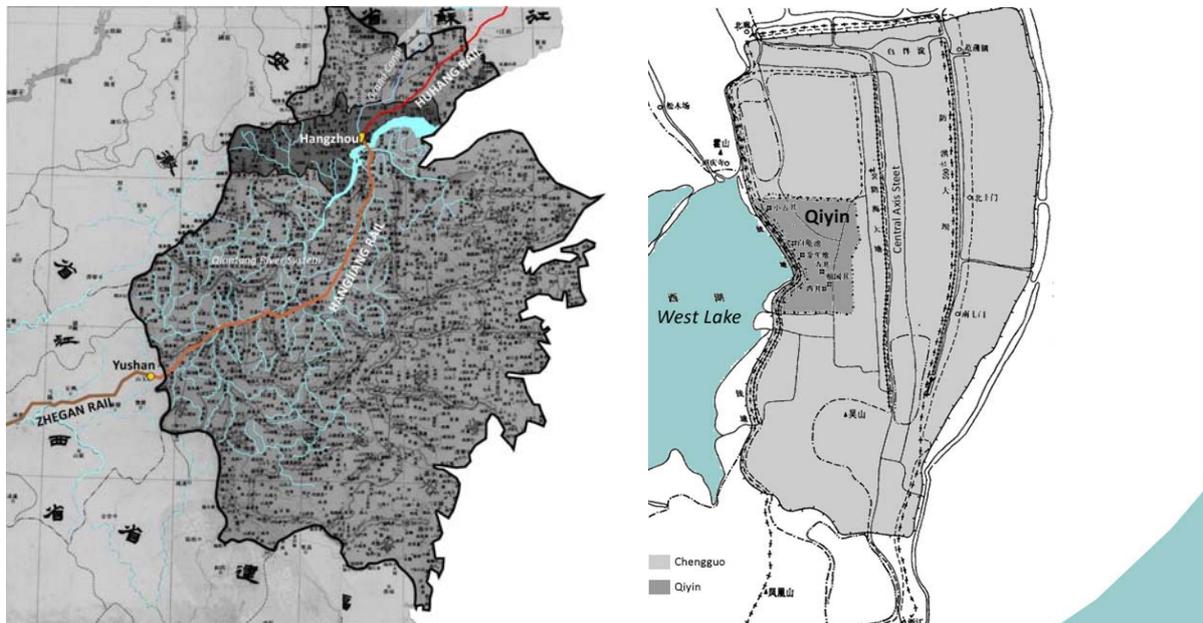


Figure 1: Map of Zhejiang in 1900s-1930s (left, adapted from ZASMAG, 2011: 150-1) indicating River and Rail systems and Hangzhou; Map of Hangzhou Chengguo (right, source: Yu, 1985: 63)

2.2 The Insertion of Three Rail Lines

In 1907, Hangzhou's first rail service, a 16 kilometre local line named "Jiangshu", was put into use after one year's construction. As a part of the proposed "Huhang" (Shanghai-Hangzhou) rail, this line connected both the wharfs of Gongchenqiao and Zhakou, which presented a clear attempt at improving the connections between the two water transportation systems of the Grand Canal and Qiantang River. This was a scale that did not involve the inner city life, which explains why the trains ran on a curve around the perimeter, and all of the five stations were placed outside of the city wall.

The Jiangshu Rail was partly connected with the Huhang Rail after two years' operation, and Hangzhou was for the first time linked with Shanghai by the 186 kilometre length of tracks in 1909 (Yu, 2005). This line was soon populated, but the stations outside of the city walls made trains less accessible, especially when the curfew system was still executed during the late Qing Period. Despite concerns of city defence, decision was later made to build a new station inside the "Chengguo" for direct connections. In 1910, parts of the walls were pulled

down and for the first time, the rail penetrated into the town to serve a new inner town station, "Chengzhan".

The third rail, initially named the "Hangjiang" Rail linking Hangzhou and Yushan County in Jiangxi Province has operated since 1933. In 1934, it was renamed "Zhegan" Rail with plans for further extension to Nanchang City, the capital of Jiangxi Province, and eventually Zhuzhou of Hunan Province, winding its way 1,008 kilometres (Yu, 2005). The extension was finished in 1937, stretching Hangzhou's accessibility further into the agriculturally productive inner-land provinces of Jiangxi and Hunan.

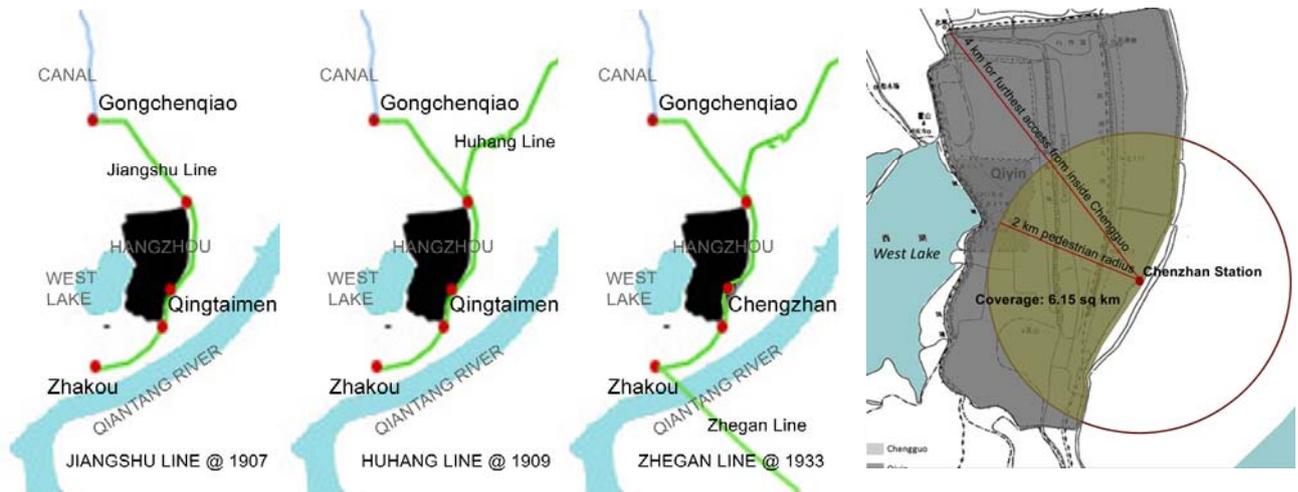


Figure 2: Insertion of three rail lines (source: Que, 1999; Hangzhou Archives, 2006) and the accessibility of Chengzhan (right end)

2.3 The Re-interpreted Urban Life of Hangzhou

By creating passage ways through the walls, the inner town of Hangzhou was connected into a new hierarchy networked by railways, which was centred in Shanghai. The increasing use of rail infrastructure (Ma, 2008) eventually defeated the traditionally dominating water transportation that had been historically established around Hangzhou, as widely documented (Ding, 2005; Su, 2011). Shanghai, powered by the rail lines linking Hangzhou and Nanjing and with the geographical advantage of the Yangtze River's estuary, experienced a dramatic industrialisation and expansion, and soon consolidated its leading role within the urban system of the Lower Yangtze Delta region.

Three urban changes were observed after the railways were built among Hangzhou's circumvallation, as discussed in the following paragraphs.

First, the direct contact of Shanghai with Hangzhou through the railway re-identified these two cities through increased competition and collaboration. As Shanghai became the industrialised centre of the Lower Yangtze Delta Region, Hangzhou was tightly integrated to this city by rail infrastructure, and gradually Hangzhou became the hinterland of Shanghai's economy (Tang, 2009). In fact, Shanghai nearly dominated the entire import and export trading businesses of Hangzhou (Han, 1951). Under the shadow of Shanghai, Hangzhou could hardly expect a return to the role of the "nationally important town of craft industries and enterprises" during the imperial era, as described by Fu (1985). By losing its long-established identities, Hangzhou City was in search of new methods to rebuild itself.

The rail brought this opportunity after the 1911 Revolution against the imperial monarchy. In Hangzhou, the new republican government took over power from the Manchus, and demolished the symbolic Qiying. Direct contact between lake and city was recreated. Based

on the natural and cultural landscape resources from the West Lake, land released from the Qiying provided an opportunity to shape a new industry: tourism. This land was developed fully oriented towards the needs of tourists, of which the emerging middle class in Shanghai made up the majority (Wang, 1999). With 3-5 hours' travel on the Huhang Rail, the Shanghai white collars were able to spend their weekends on the West Lake, which then earned the name of "Shanghai's backyard." The Zhegan Rail Company further amplified Hangzhou's importance in the new tourism industry by extending further west, into the freshly opened up mountains and rivers along its tracks. Through the rails, Hangzhou City successfully reshaped itself not only as a destination, but also a regional hub of the tourism industry, which has been lasting up to today.

Secondly, by passing through remote villages, the rail infrastructure powered Hangzhou's urban population growth in the 1930s. According to Ding (2009), the Zhegan Line penetrates the drainage areas of the Puyang River and Lanjiang River (both are branches of Qiantang River), with an estimated population of about 3.3 million during the 1920s/30s. Running on the Zhegan Rail, mountain topographies were never barriers, and images of the historically water-connected and rarely touchable cities such as Shanghai and Hangzhou were no longer mysteries. The rail access triggered the mobilisation of labour. Ding (2009) estimated that 7 million passengers travelled on the Zhegan Rail between 1930 and 1937, about one million annually, which was one third of the population along this rail. On the other hand, Hangzhou witnessed a fast population increase during the 1920s/30s. Ding (2007) revealed that between December of 1928 and July of 1930, a rise of about 42,000 urban dwellers was recorded, of which near 95% was from immigration.

Thirdly, the activated flow of passengers restructured Hangzhou's urban space. As the rail lines were serving as the artery of long-distance transportation, the historically dispersed inter-city traffics around the circular gates was condensed around the station area, gradually transforming it into a new market space. As recorded, there were hotels, restaurants (various flavours), and photo galleries clustering around the station (Yao, 2011). The flourishing market around the station area enriched the traditional single-core commercial layout of the city's inner area; and with the other emerging market on the Qiying's site, which was another benefit from the rail passengers, Hangzhou restructured its commercial layout into five markets of the city (Chen, 2008), each with a specific orientation and group of clients.

2.4 Analysis

To summarise, 1930s Hangzhou enjoyed a never experienced prosperity since the imperial ages. This was in large triggered by the insertion of rail infrastructure, bringing new industry, enriched constitution of population, as well as dynamic commercial life. If we have a closer observation, the following understandings are valuable for today's practice.

First, through the operation of rail, a certain level of urban agglomeration/competition between connected cities is observed. The increased mobility between cities allowed urban resources (especially the human and capital resources) to relocate themselves towards maximised efficiency/profit. This explains why Hangzhou lost its manufacture but gained the tourism industry. It is also noticeable that the capacity and efficiencies provided by rail infrastructure in 1920s/30s defines the geographical scope for such effect to take place. The 3-5 hour travelling time between Hangzhou and Shanghai indicates that cities within about 150km distance probably have the potential for effective urban industry re-distributions.

Secondly, increased connectivity between rural and urban China benefits cities with extended hinterlands into far remote areas. New resources such as raw material, market, and population were available to support the growth of industries and urbanisation. In Hangzhou, this was verified by the increased urban trading activities and population.

Thirdly, at the local scale, rail stations were easy to access. This enhanced the influence of rail infrastructure in urban life. In Hangzhou, the 13 square kilometre Chengguo extends about 5 kilometres north-south and 3 kilometres east-west. This is a typical size among the traditional walled-up Chinese cities, based on urban traffics from man/livestock powers. Even if the train station was sited to the east-south corner of town, the 2 kilometre pedestrian radius covers 6.15 square kilometres, nearly half of the urban footprint. And the furthest point from station was about 4 kilometres away, taking approximately one hour's walk. It was also important that the West Lake is 2 kilometres away to the west of the station, half an hour's connection on feet. Walkable connection of the station makes it accessible for almost the entire residents and visitors of this town.

3.0 “Isolation”: The Communism Industrialisation Period (1950s-1970s)

Within the Communism Industrialisation period, the national strategies for fast modernisation and socialisation dictated both rail and urban developments, and is typically represented in the policy of heavy industry development prioritisation and the “Hukou” (dual residence registration)¹ system between rural and urban dwellers. As a result, however, history witnessed a process that rail was disconnected from urban life.

3.1 Hangzhou’s Dilemma between “Consumption” and “Production”

In March 17, 1949, the *People’s Daily* published the editorial article, titled as ‘*Transform the Consumptive City into the Productive City*’. This announced that heavy industry developments would be prioritised following the establishment of the People’s Republic, as a fast way to achieve the nation’s modernisation.

The national orientation at the heavy industries put Hangzhou, with its established reputation of tourism, into a dilemma between “consumption” and “production”. Although the city’s first planning drafted in 1953 valued its established importance of culture and landscape (An, 2011), it was unfortunately hardly executed in the following years. Since the launch of Great Leap Forward initiated in 1958, the Chinese cities were exclusively involved in the national fever of industrialisation that “overwhelms everything” (Meisner, 1999). In 1959, Hangzhou drafted the second planning proposal with its urban character redefined as “hybrid industrial city based on heavy industries” (Bian, 2008).

In fact, Hangzhou did not see a booming urban transformation into an industrial centre during the years that followed. The new cluster of factories was built on remote agricultural lands far from the centre, typically as the Iron and Steel Factory of Hangzhou (ISFH). Within the planned economy system, this factory was later developed into a self-sustained industrial town that provides from “cradle to tomb” services for its “cadres and workers”. In compare, the conventional town area of Hangzhou was branded with “non-production”, and was unavoidably led to the wane during the three decades since 1950s. To secure the limited resource for developing heavy industry, the percentage of state investment in central Hangzhou dropped significantly from about 50% in middle 1950s to slightly over 20% in 1960s/70s (Hangzhou Revolution Committee, 1981: 7). No doubt the city was struggling to provide basic life support in the 1970s, and won it the famous folk saying, “beautiful West Lake, ragged town.”

3.2 Unbalanced Rail Development and Isolated Urban Life

Within 1950s/70s, the rail infrastructure saw an unbalanced growth in freight and passenger transportations, making unequal choices between “production” and “consumption.” The target of industrialisation powered sharp increase of freight transportation on tracks. In compare, the rail passenger number experienced fluctuations in 1960s and had a slower

growth afterwards (Ministry of Rail, 1999: 373), which is mainly accused to restrains in “consumption” and rural population movements.

In Hangzhou, the only new rail line built during this period was the freight line connecting the ISFH to the national rail network, to support the steel manufactures. Since Hangzhou developed a very different urban life in the ISFH area and city centre area, the following discussion will interpret their relationships with rail separately.

Given the poor social documentation during the decade of the Cultural Revolution (1966-1976), the *Simplified Hangzhou Traffic Map* published in 1971 is analysed in this study to describe the relationship between the rail and civic life. This map clearly shows the bus routes serving metropolitan and regional destinations. Considering Hangzhou's urban transportation of that age, when there was no metro-line, few taxis, and nearly zero private vehicles, the bus route map recorded the movements of urban life. Through summarising this map, we find that urban transportation was structured by a number of bus hubs, namely Wulinmen, Hubin, Nanxingqiao, Genshanmen, Gongrenlu, and Gongchenqiao. These hubs networked on both metropolitan and regional scales. The rail station, however, was not among the named hubs. It was connected only with in-town destinations, which means that regional passengers had to access the station via any of these bus hubs. If we do a closer study of the number of bus lines connected, the station was served by only three in-town lines, compared with Wulinmen, a hub next door to the coach station, which was served by 7 lines of which 2 were regional.

This map clearly indicates that: a) the rail station was connected mostly with urban dwellers, and; b) villagers from nearby rural Hangzhou were the major visitors in this town, as indicated by the number of bus lines connecting coach/rail stations. As rail was serving as the main transportation for long-distance travels, the weak connection between rail station and urban transportation hierarchy tells that 1950s/70s Hangzhou was not closely integrated with the rest of China, neither urban nor rural.



Figure 3: *Simplified Hangzhou Bus Map, 1971 (left) and Hangzhou Planning Map, 1973, showing the location of ISFH in relevant to the conventional centre (source: Que, 1999)*

The ISFH area is sited 12 kilometres north of central Hangzhou, therefore developed as an "industrial island floating on the agricultural lands." As a typical example of state-owned large size industry within the planned economic framework, a "worker's town" (Shenghuoqu) was

built near the factory site to accommodate its staff. Instead of a satellite town, this is a self-sustained "living workshop" incorporating various life supporting facilities, such as massive rowed apartment housing, hospital, schools, and shops. During the 1980s, the Shenghuoqu grew to a size of about 9,746 residents (Zhang, 1985). As described above, a rail line was constructed in the late 1950s to link the ISFH into the regional rail network. This line was then used exclusively for freight services. As there was only one direct road link between this industrial dwelling town and the city centre, with one bus route that normally took about 40 minute-1 hour to access the edge of the city, there was however never a plan to provide passenger service on the established rail.

3.3 Analysis

In general, rail developed very different connectivity of freight and passenger transportations for this period, as a result of the national strategies and policies. Rail played important role in developing national heavy industries. On the other hand, the connectivity between rail and urban life was declining or even missing, as presented in Hangzhou's case.

First, the practice of urbanisation during this period was applied as a facilitating instrument for national industrialisation, such as the Shenghuoqu in the ISFH case. The Communist pattern for "production" was developed in a self-sustained template and isolated from life in conventional urban centres. The move of goods is prioritised than people. There is hardly any necessary connection between the rail infrastructure and the urban life emerging around new factories, which explains the never appeared transformation of freight link into passenger service in ISFH.

Secondly, for the conventional cities, the compression of "consumption" led to serious damage of the urban industries which had been long established prior to the coming of Communist industrialisation. This included businesses born from the early coming of rails, such as the tourism. The decline of urban "consumption" industries limited rails connectivity with conventional city centres.

Thirdly, as the Hukou system successfully screened massive rural population out from immigrating into cities, urban China merely became destinations of short travels from nearby villagers. The connectivity between vast rural China and rail was unfortunately lost.

Although industrialisation promoted rail technologies into higher speed and capacities since 1950s, the dis-connectivity with people suggests that rail failed to power urban developments. This is also true for the emerging new towns around factories.

4.0 "Marginalisation": The Recent Urbanisation Period (1980s-2000s)

The fast and large scale urbanisation within the recent three decades re-powered developments in transportation. The rail, with a constant focus at the national scale operation, was not successful in keeping its connectivity with the fast physical expanding of urbanities. Eventually rail developed a marginal role in the urban life which was overwhelmed by roads and vehicles.

4.1 Hangzhou's Fast and Large Scale Urbanisation

Since 1980s, Hangzhou reshaped its identity through three urban planning amendments in 1983, 1999 and 2007, achieving a balance between "consumption" and "production". The tourism industry was rebuilt with respect to the city's rich culture and landscape resources, and targeted at national and international tourists. The re-oriented and growing urban ambitions triggered fast and massive urban expansion, as well as population inflation of Hangzhou during the recent three decades.

There were two municipal boundary expansions in Hangzhou between the 1980s and 2000s. Beyond the inherited municipal area of 430 square kilometres in 1970s, the first expansion in 1981 extended south across the Qiantang River for an extra 253 square kilometres to accommodate new industrial developments. In 2001, a second expansion merged two districts from north-east and south-west, making Hangzhou occupying 3,068 square kilometres and “the second largest city next to Shanghai within the Lower Yangtze Delta Region” (Zhu, 2002: 23).

In parallel, the urban footprint size rose sharply during the same period. Starting from 102 square kilometres in 1981 (Hangzhou Revolution Committee, 1981), about 80% increase was recorded within the two decades that followed. In the next ten years, however, soaring developments further doubled the size of urban footprint, standing at 413 square kilometres in 2010 (Hangzhou Statistics Bureau, 2012), 31.8 times of the ‘Chengguo’ size from imperial Hangzhou.

Hangzhou's population growth saw a similar record with the urban expansion which is not only a statistical increase, but geographical re-distribution. The entire population had a rise of over four times within the three decades starting from 1980, reported at 4.35 million in 2010 (Hangzhou Statistics Bureau, 2012). Meanwhile, the central area lost about 30% population between 1990 and 2000, with peripheral areas densified 3 times by new dwellers in the same period (Feng & Zhou, 2002).

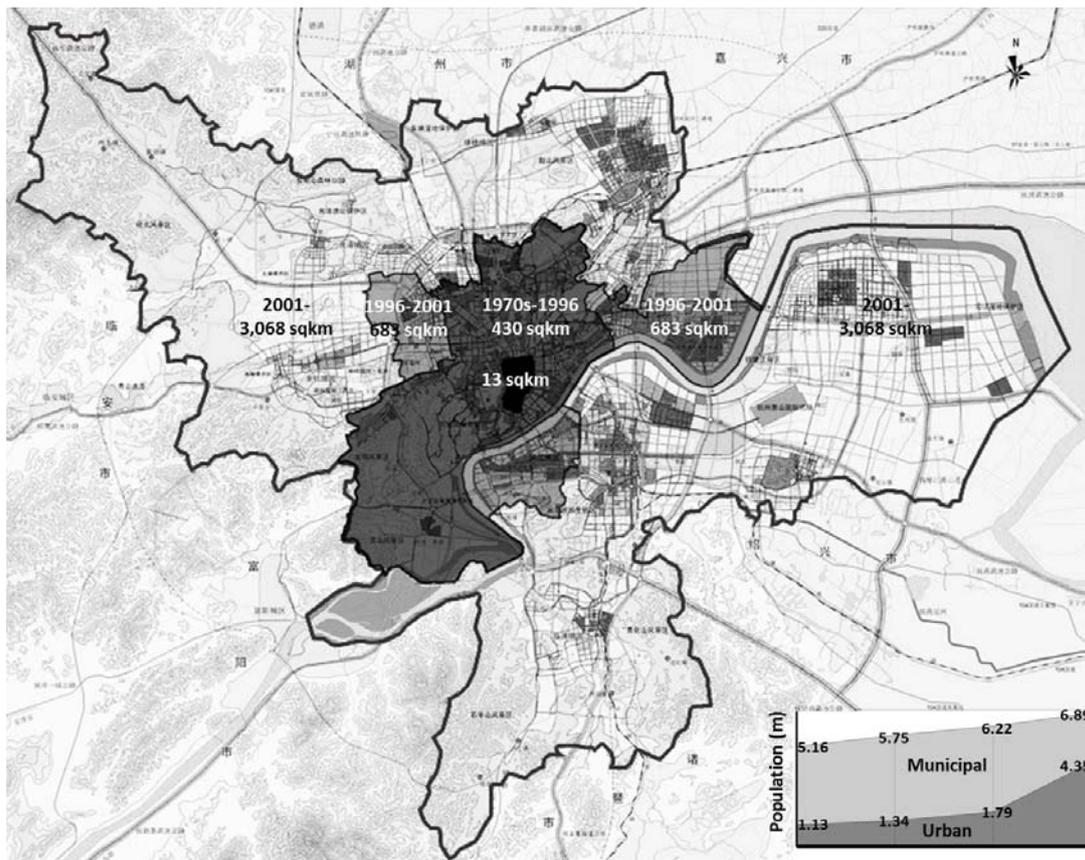


Figure 4: Municipal Boundary Expansion and Population Increase of Hangzhou (source: Hangzhou Planning Bureau; Hangzhou Statistics Bureau)

Despite the fast expansion, Hangzhou did not see the dispersing of its centre. The central area, which largely overlaps with the imperial Chengguo, remained a strong core integrating the major public urban lives, such as political, commercial, cultural, and financial centres

(Luo, 2005). The recently developed fringe areas were struggling to establish contact with the conventional centre.

By putting together the above information, we find expanded urbanity, a robust central core, an increasing population and growing fringes. It is a safe prediction that the traffic demands between the new developed peripheral areas and the conventional city centre will exhibit constant growth. How much, then, does the rail system channel these demands?

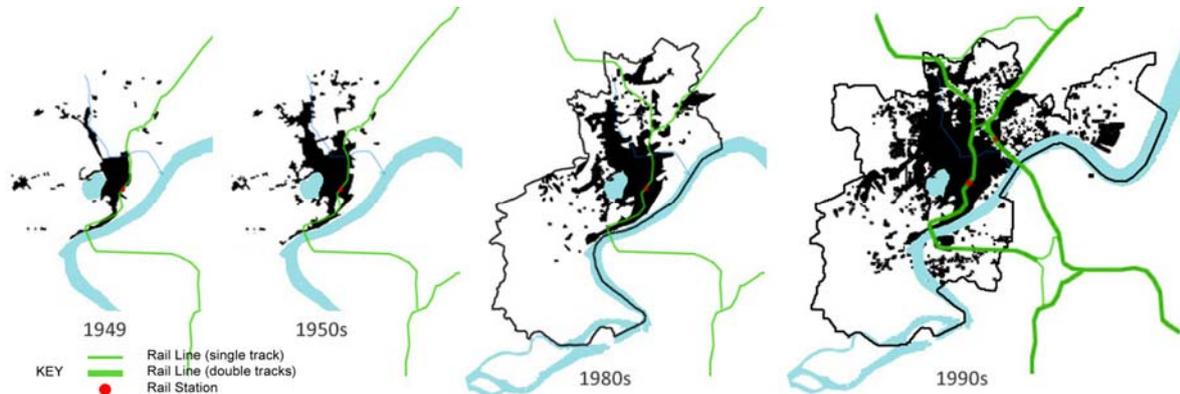


Figure 5: Hangzhou Urban Footprint and Rail Developments between 1949 and 1990s (source: Feng, 2003; Qin, 2010; Yu, 2005)

4.2 The Competition between Rail and Road Infrastructures

The rail lines around Hangzhou were improved since the 1980s principally in three ways: Existing single track rail lines connecting Hangzhou to major domestic destinations were upgraded to double tracks; new lines cutting through the town was built to release traffic pressure on old lines, including a second rail bridge on the Qiantang River; and a passenger line, named Xuanhang Rail linking Hangzhou to Xuancheng in Anhui Province about 230 kilometres away.

To accommodate the growing number of passengers, the old station, Chengzhan, was rebuilt in late 1990s and stretched vertically on its old site. The previous Nara style building was replaced by an 18 floor high-rise complex, integrating commercial, hotel and administration functions. Another station, “Hangzhou East” was built in 1992, sitting on the new rail link penetrating the east part of the city. As a complementary station, it serves the passenger trains that pass through Hangzhou, while the Chengzhan was targeted at termination services.

In principle, we have seen new tracks and stations developed between 1980 and 2000, targeting at improving Hangzhou’s connection with the rest of China, and enhanced the rail’s capacities on transportation. Nevertheless, if we overlap the rail map on top of the vastly expanded municipal boundary and urban footprint of Hangzhou, it is disappointing that the tracks are not supporting the city’s geographical growth. The railway has been focusing on linking national destinations while local/regional coverage was not within its scope. This is verified by the transportation performance statistics in Hangzhou, both for freight and passenger services. The percentage of passengers travelled on rails dropped over half during the three decades, while the percentage of freights unbelievably shrunk over 90% (Fig.6)

In compare, we have witnessed constant growth in road users in the past 30 years. The percentage of vehicle passengers rose nearly 1.5 times since 1980, close to 90% in 2010; while the freight traffic doubled respectively (Fig.6). This is even true by reading the increase

of road length, four times between 1990 and 2010 (Wang, 2005); and spring vehicle registrations, increasing near fifty times for the same period (Zhong et al., 2013). It is safe to conclude that the vehicles have channelled most of the growing demands for transportation that rail has failed to meet.

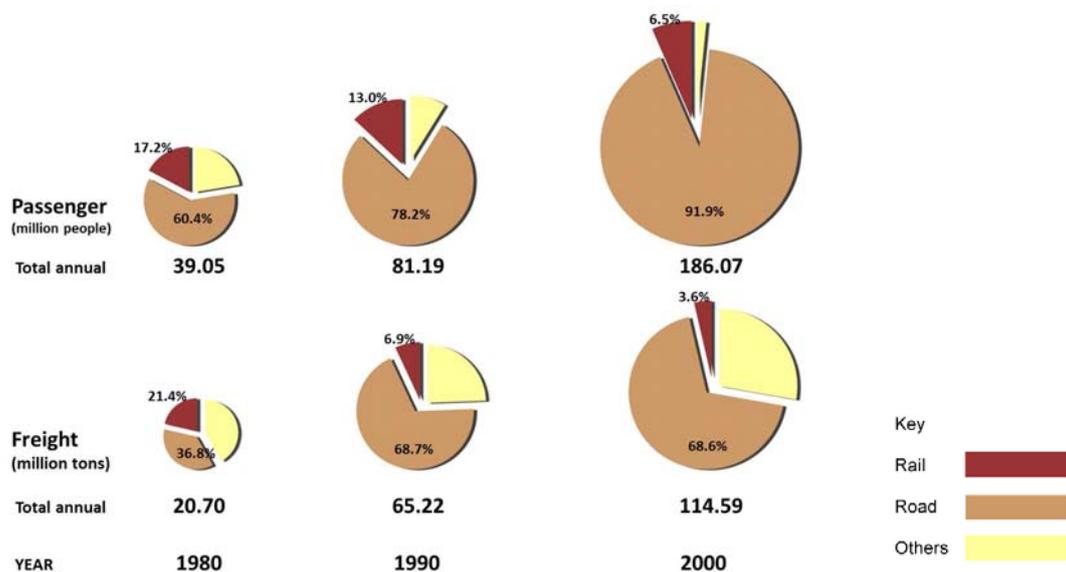


Figure 6: Total Annual Transformation Performance of Hangzhou between 1980 and 2000 (source: Hangzhou Statistics Bureau, 2012)

4.3 Analysis

Compared with the Communist industrialisation period, the economic reforms since 1980s triggered dramatic rise in urban mobility demands. However, the rail's strategies to connect cities at large scale make it disconnected with a big proportion of local urban residents, especially under the competition with road infrastructure.

On one side, the motorised urban transportation did not improve accessibilities of the rail station. Trains are less accessible with the fast expanding of urban footprint and population re-distribution. In Hangzhou, the reported average peak time vehicle speed on major metropolitan roads has been dropping down from about 26 km/h in 2006 (Yang, 2006) to about 15 km/h in 2013 (Hu, 2013). The half-hour vehicle accessibility radius to train stations shrunk into about 5 kilometres if considering reasonable parking time. Around the two currently operating stations, this radius covers about 110 square kilometres urban footprint, about 25% of Hangzhou's total urban footprint, and roughly 3% of the city's vast municipal area. For bus users, the half-hour travel radius is similar, as buses share most roads with vehicles. Due to the higher dwelling density in conventional centre, the population percentage covered by above radius is probably higher than 25%, but this will be declining in the long term along with the de-centralised population distribution trend.

On the other side, the use of vehicle transportation was stretching beyond local/regional scales, thanks to the large amount of new freeways between major and minor cities. In addition, the advantages of door-to-door travel convenience and ride comfort-abilities that trains were struggling to provide made road infrastructure able to challenge rails even at the inter-city scale transportations.

5.0 "Incorporation": A Fully Integrated Urban Life with Rail (Conclusion)

In 2010, the Huhang HSR was operating and connecting Shanghai and Hangzhou at 350km/h, which means the arrival of a "New HSR Era" in Hangzhou. The Hangzhou East

Station, built in 1992 as a complementary option to the Chengzhan Station, was upgraded into a giant terminal hub, standing among the largest of its scale in China, housing six HSR lines (including one Maglev Line) that connect to all domestic destinations. The new station is designed to serve 200,000 passengers daily. Around this terminal, a new town oriented at the predicted “HSR Economy” is proposed, covering an area of 9.3 square kilometres and accommodating 200,000 residents. This new town is centred around the HSR station physically and economically, and requires invention of new urban lives fully integrated with railway infrastructure.

The three studied periods present substantially different political and economic backgrounds to study the relationship between rail and urban development. It is however clear that the connectivity between rail and passengers dictates its role in urban life. The early years since 1900s saw urban prosperities fully powered by rails well connected with people from the widest range of background. However, this close integration disappeared during the following two periods. It is difficult to believe that this has happened in parallel with the soaring development of rail/train technologies from 20km/h steam engines in the 1900s to the 200km/h electronic locomotives a century later. If not considering the influence of policies between the 1950s and 1970s, a noticeable reason is that the higher the speed is, the less the train stops. Through improving speed, the trains are less accessible by people from remote and mid-way towns. It is even worse that within the expanding urbanities and fragile urban traffics, the stations are squeezed to peripherals in urban life, although they never moved away from the city centre.

With the arrival of new technologies that power trains at 350km/h, it is worthwhile to further discuss this disconnection. Certainly we cannot deny the progress of improvements in rail technologies, and in fact, we expect that the “HSR economy” as predicted will agglomerate urbanities from geographical distances.

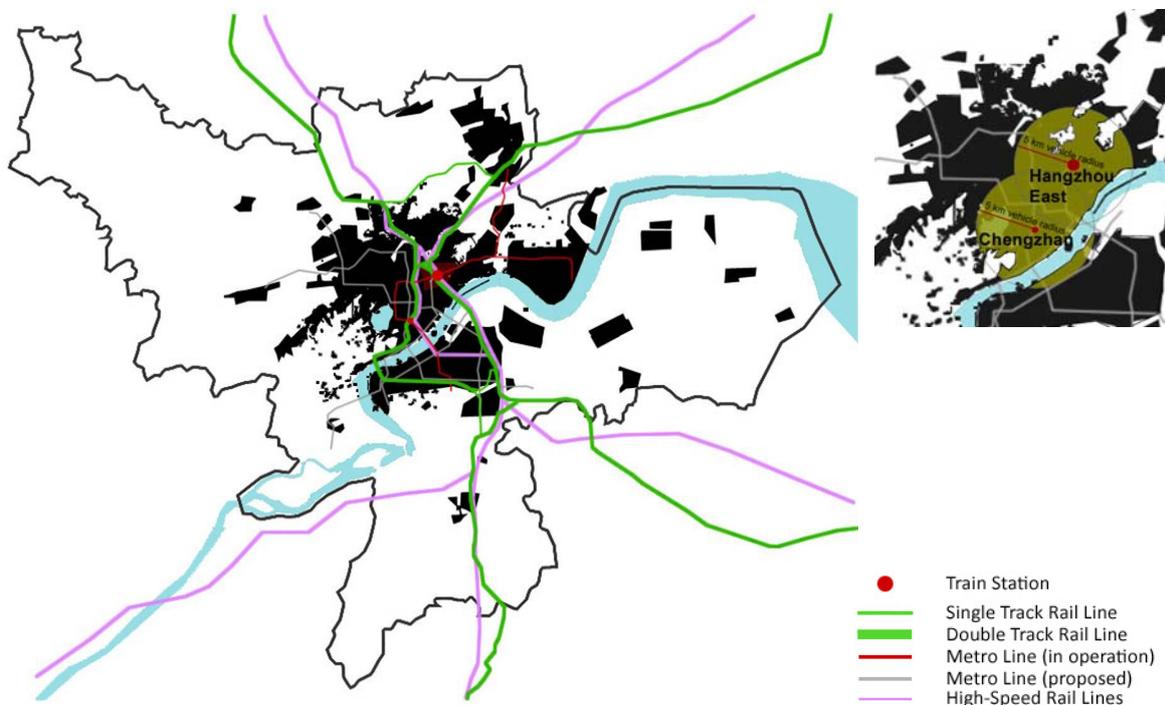


Figure 7: Proposed Hangzhou Rail Hierarchy in 2020 (left, source: Hangzhou Planning Bureau) and the half-hour vehicle accessibility circle overlapped with the urban footprint (top-right)

The missing part from a complete model for such an HSR-oriented urban life is the effective connectivity of the HSR that links with all scales of destinations, from local, regional to national, which includes rural and urban residents. This connectivity is provided by a complete hierarchy of the rail transportation system. The increased train speed and passenger capacity defines rail as a highly concentrated public transportation right, which cannot be dispersed immediately into private (vehicle) rights in the station area. A third level of transportation that bridges public/private rights should be introduced. This will help the HSR to extend its “roots” at the local/ regional scales that are now under the dominance of vehicles.

A second lesson to learn is for the urban functions around HSR station nodes. Within an urban hierarchy system structured by rail infrastructure, the urbanity around rail stations presents an interface of a city for dialogues with the rest. This trend is visible in the case of Hangzhou’s early year’s re-building of tourism industry, and is clearly reflected in the ISFH study where rail connected factories between cities to form a large scale “assembly line.” During the recent practice, as rail’s role faded in urban life, the station area developments were comparatively ambiguous.

Around the HSR infrastructures, as 3-5 hours’ commuting radius has dramatically increased from 150 kilometres in early years up to around 1,000 kilometres, it is predicable that new urban systems with never experienced sizes and complexities will appear. The planning around these stations will undoubtedly narrate the city’s position in the urban hierarchy. For the decision makers, it is important to realise how to avoid over flow of urban resources from lower level to higher level cities in the hierarchy. However, it is even vital that a city should be prepared to challenge itself with new urban identities, which is formed by its own characters and advantages, for future regional competitions.

Endnotes:

1. “Hukou” (dual residence registration): this system became effective in 1961, with the purpose of controlling rural residents immigrating into urban dwellings.

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