

From Reclamation to New City: A Case Study on the Mechanism and Development Strategies of Town Spatial Expansion in Hangzhou Urban Fringe

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Abstract

With the acceleration of the spatial expansion of big cities, the cities and towns in their marginal areas have increasingly become among the most active areas of urbanization. Based on the spatial development process and expansion mechanism of Guali town in Hangzhou analysis, this paper summarizes the characteristics of its urban function and spatial structure, and highlights factors affecting Guali town's development such as market economy, regional environment, and public policy. Under the background of 2022 Asian Games' construction plan, it is highly significant to study the evolution characteristics and mechanism of its spatial form for the public policy-making and institutional arrangement of small towns around metropolis.

Keyword: Urban Fringe; Spatial Structure; Town Spatial Expansion; Urban Space; Guali Town

Introduction

The cities and towns in big cities' fringe area show unique spatial development characteristics due to strong radiation from the central cities in adjacent areas. Simultaneously, being an important network node external to the big city, they contribute to big cities' spatial development, which is reflected in the gradual evolution from the relatively independent development form and integration into regional development. In recent years, the research has investigated the relatively macro-level discussion on the spatial development mode and evolution mechanism of the fringe areas in fringe areas' spatial development in China, while there is limited micro-level investigation. (Rong, YF., Guo, SW. and Zhang YF. (2011)) Therefore, through taking typical cities and towns in urban fringe areas as objects to discuss their spatial development trend and characteristics under the influence of big cities from a micro level, and clarifying their development mechanism and main problems, the development characteristics and inherent differences of urban fringe areas can be deeply understood. It can further offer notable advantages to formulate specific and targeted policies and planning strategies.

For the purpose of analysis, Guali Town has been considered, which is subordinate to Xiaoshan District of Hangzhou City. It is divided into two parts: north and south by water network. The south is hilly and lake terrain, while the north is plain formed by river and sea alluvial reclamation, which provides significant reserve land resources for Hangzhou's urban development. Its change highlights spontaneous urbanization evolution process brought by rural industrialization after the reform and opening up policy implementation

in 1978. Over time, Hangzhou metropolitan area expansion after 2000 and the influence of Hangzhou Airport Economic Zone have contributed to the rapid Eastern expansion of urban center of Xiaoshan District in Hangzhou (Figure 1). In this regard, the factors affecting Guali Town’s spatial form evolution and the influence of top-down regional development on the bottom-up urbanization process are of considerable importance. This will be valuable to understanding the spatial development law of small towns around metropolitan area.

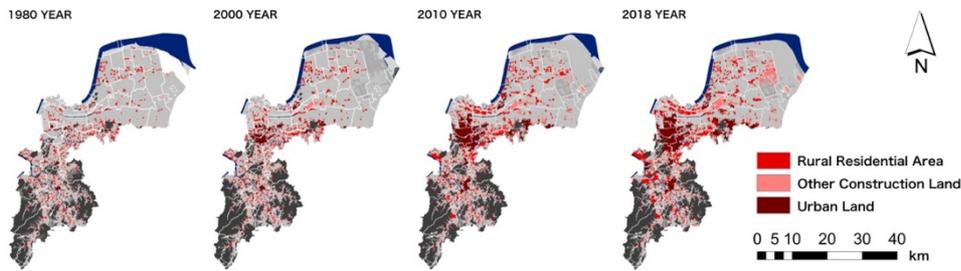


Figure 1. Expansion of urban land in Xiaoshan District to the East (1980 to 2018)

Characteristics of urban development in Guali Town

Guali Town (Figure 2) has a total area of 126.9 square kilometres and it is located around 25 kilometres southeast of Hangzhou City, 13 kilometres away from Xiaoshan District, and adjacent to Hangzhou Xiaoshan International Airport. It has been regarded integral to centre and provincial centre towns’ cultivation and represent the first 27 pilot towns in Zhejiang Province. There were different periods that explain the development of the region. Before 1980, there was limited urbanization (Figure 3) of Guali Town and the irrigation water system generated by reclamation drove the agricultural settlement in the region along with the road grid situation later on.

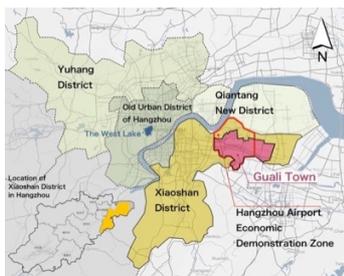


Figure 2. Location map of Guali Town (Rose red block)

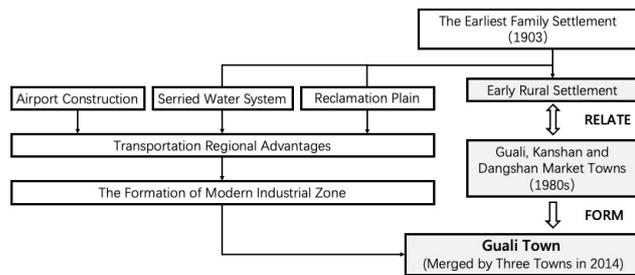


Figure 3. Background of Guali Town formation

Spatial Expansion History

During 1970 to 2000, the Guali Town’s urban construction land reflected diffuse development characteristics. Following, urban construction land started to rapidly expand involving the basic form of land reclamation, construction land expanded southward, and the formation of the spatial form of "grid + multi-group" (Figure 4;5). In later stages, the urban development was primarily internal filling with insignificant change to discrete multi-group’s change. In this respect, the regional economic development has substantially affected urban

development including major infrastructure construction around Hangzhou City. Generally, the urban spatial form development in Guali can be divided into three stages: Diffuse Development Stage (1970-2000), Spatial Agglomeration Development Stage (2001-2010), and Regional Overall Development Stage (2011-present).



Figure 4. Characteristics of typical rural land use in Guali Town (Duan, W. (2013))

Figure 5. Scene of the relationship between reclamation and rural residence in Guali Town

Diffuse Development Stage (1970-2000)

Guali is located in the economically developed coastal area of Zhejiang Province where opening up reform policies helped rapidly develop township enterprises resulting in numerous factories in labour-intensive industries. These had a staggered and mixed layout causing deep ecological environmental impact. Moreover, urban population and construction land grew rapidly, and space development mainly presented scattered layout characteristics. Guali Town is also densely populated with rivers with villages and towns historically laid out along rivers. In terms of road construction, the rural, provincial, and national highway construction were gradually netted with urban construction concentrated along the highway.

Spatial Agglomeration Development Stage (2001-2010)

The development of small towns flourished during the Spatial Agglomeration Development Stage in Zhejiang Province. In 2000, the government implemented policies to promote small towns development owing to issues emerging from disordered development and environment issues associated with scattered layout of existing small towns. The government enhanced policy support to promote the cultivation and development of central towns by the strategy of withdrawing and merging townships and restructuring space. In addition, the public service capacity and the living environment of the town improved with the construction of public facilities, new urban residential areas, and supporting service facilities. In general, during this period, the urban land layout gradually centralized to the town with improvements in service capacity.

Regional Overall Development Stage (2011-present)

The development accelerated during the Regional Overall Development Stage. The larger region overall development started with the listing of Guali as a pilot town for construction of "small cities" in Zhejiang Province in 2010 and the administrative division adjustment in Xiaoshan District in 2013. In 2014, Guali evolved from a "town" to "city" owing to emerging urban infrastructure construction, key nodes and blocks, airport new city, and improving urban service functions (Figure 6). Simultaneously, the planning and

construction of Hangzhou Airport Economic Zone enabled Guali to take the advantages of its location and develop modern logistics industry involving dock warehousing, bonded logistics, distribution intermodal transportation for trade, international airport, Hangzhou-Yong high-speed, and canal terminals. Further, efforts started to build modern logistics base around Hangzhou Bay, industrial and trade satellite city around Hangzhou Metropolitan Economic Circle, and so on.

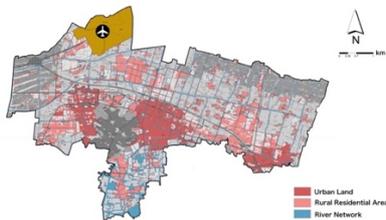


Figure 6. Urban and rural land use in Guali Town in 2014

Construction land and scale

The scale of construction and land use witnessed substantial increase from 2003 to 2018 i.e. from 550 hectares to 1830 hectares. This reflects 8.34% CAGR with expectations of reaching 4060 hectares in 2040. In this way, the functions of Guali Town have also changed with increasing construction land usage. In 2003, it was mainly residential and industrial town with insignificant public service function. However, during 2003-2011, the function of integrated services in cities and towns rapidly improved along with strengthening industries. Further, the function of cities and towns gradually evolved into an integrated small town of industry, residence, and service. More recently, it has been experienced that the relocation of industrial land and well-developed residential and public facilities land, the "service and residential" town image has strengthened. Generally, located in close vicinity to the Hangzhou big city, Guali town has evolved from a general small town to a crucial city area. Its functional service objects have changed from a "small town" to an "urban" type. The spatial structure of Guali Town has also changed from the single axis and three cores with their own development structure (Figure 7) to the "one main core, two axes and many pieces" spatial development structure (Figure 8).



Figure 7. Development structure of Guali Town before 2014

Figure 8. Development structure of Guali Town after 2014

Spatial development characteristics of Guali Town

The Guali Town urban space form has experienced a process from decentralized to centralized development along with a larger regional space integration. Nonetheless, there are three main problems:

1. The boundary growth is fuzzy, and the space of urban and rural construction spreads disorderly

During the urbanization process of Guali Town, there is a lack of clear demarcation between urban-rural areas with rural spaces infused with certain town areas. The multi-directional gravity in Hangzhou metropolitan area has adversely affected the development of land use space causing a loss of its leading direction. Earlier, land use in Guali Town evolved around the basic form of reclamation. The agricultural settlements developed linearly along rivers and roads, and industrial developments emerging in small-sized independently owned lands causing major spatial fragmentations. It caused notable "land vacuum" that was counterproductive to orderly and efficient urban space utilization and enhanced the challenges to link urban blocks. It further weakened the organic connection within the town.

2. Decentralized industrial space layout and weak public service function in town

The mixed distribution of rural settlements and industrial parks diminishes public service centres and urban living areas' quality. Alternatively, there are issues of traditionally limited public and living service facilities. There lower levels of interaction between the industrial development and urban functions of Guali has kept the spatial development relatively separated. Thus, the existing urban living service facilities and capacity cannot absorb higher urban population.

3. The scattered town context and poor ecological environment

The canal navigation and river system has maintained high importance for Guali town considering the traditional and cultural context. Nevertheless, industrialization in the automobile era has made it challenging for the canal system to remain the link of urban functions. The residents have moved away from river areas with an increasing abandonment of function, scattered space, and marginalization of culture. Thus, industrialization and urbanization have contributed to ecological space becoming increasingly scattered, broken and weakened, and reflecting urban-rural homogeneity and environmental deterioration trends.

Urban spatial development mechanisms in Hangzhou urban fringe

Town development under the influence of multiple subjects

Over time, infrastructure and urban service function around Guali has gradually improved. However, the current space of Guali has remained relatively scattered. Due to its own location particularity, multiple subjects including the government, industrial enterprises, real-estate developers, and residents affect the urban construction in the urban fringe and jointly restrict the town's spatial development trends. In the urban fringe, government intervention is more prominent. For example, Guali town is under the management of multi-level government involving the city, district, and town multi-level governments that drive urban

construction. Consequently, the functional positioning and planning layout of Guali block are frequently modified causing the urban construction to be constantly adjusted with issues in coherence and order.

There are issues with the relocation of the industries from scattered areas as well. Since the late 1990s, the enterprises are concentrated in the industrial park, but Guali industrial land is highly scattered causing high relocation costs making it challenging to move concentration of industrial land in a short-time. Moreover, numerous farmers have started to inhabit the urban areas with private housing construction enjoying the social and public welfare of citizens, but maintaining the village homestead. They consider the village homestead important to their own economic interests, which has increased the growth of the village construction land. Thus, the proportion of population urbanization is meaningfully higher than the level of spatial urbanization. The living willingness of farmers and housing construction behaviour lead to the homogenization of urban and rural space.

Morphological changes under the impetus of industrial changes

With the outward expansion of big cities, the function renewal and structural adjustment are constantly localized. The increasing economic and environmental costs also cause industries in the central urban area to move outward. In this case, owing to the proximity to the central urban area, the marginal towns become the first choice for industrial relocation in big cities. The industrial relocation of the central urban area gradually surpasses the town's local urbanization and becomes the primary driving force of its spatial expansion. Zhejiang's economic development model is an endogenous regional economic development model involving market-orientation, institutional innovation driven by people, and rural industrialization and small town development. In the early stage of reform and opening up, every village in Guali small town set up factories independently, which caused the extremely scattered spatial layout and challenges associated with industrial pollution. During 1995-1999, China began to have national overproduction causing the village and town-run industries to gradually transform into private enterprises, and elevating the merger and integration of the village and town spaces. The problems in the early stage of development attracted government attention, but the space governance costs limited government's ability. However, improvements have taken place with time resulting in the government accommodating the current development and adopting progressive governance. In the 21st century, according to the national policy, Guali town focuses on planning and developing villages with low urbanization levels to promote tertiary industries, such as tourism, health care, catering, and others leading to the whole town present the pattern of differentiated development (Figure 9).

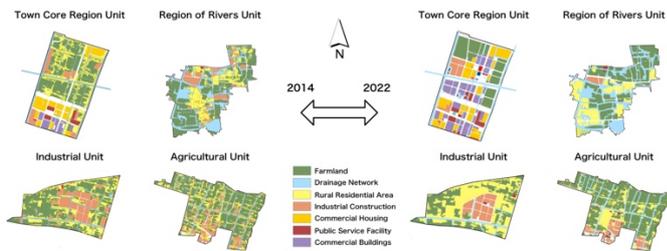


Figure 9. Morphological state of typical land units in Guali Town

Spatial development guided by major events

In the backdrop of globalization, urban events have become tools that urban governments administration can employ to achieve urban development strategic goals. Hence, it can indirectly affect the evolution of urban spatial structure. For example, urban events such as the 2016 G20 summit in Hangzhou and the 2022 Asian Games, the impact on the urban spatial structure of Hangzhou involves the functional changes of the city, spatial expansion, urban agglomeration, industrial structure adjustment, social population distribution, traffic structure, and other aspects. In 2022 Asian Games in Hangzhou, around 6 million people are expected to participate resulting in the scattered construction of the Asian Games venues causing a major impact on the urban spatial structure. In this regard, Xiaoshan District, largest land stock area in Hangzhou, provides most of the construction land, and the urbanization of Guali town is integral to urban spatial structure adjustment (Figure 10). For example, Xiaoshan International Airport, with a short-term planning land area of 2,375 hectares and a long-term planning land area of 3,117 hectares, has also contributed to the urban space reconstruction of Guali.

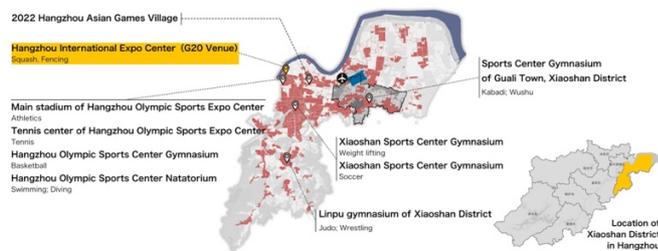


Figure 10. Distribution of new construction projects for the Asian Games and G20 in Xiaoshan District of Hangzhou

Conclusion and Strategies of Spatial Development in Hangzhou Urban Fringe

Guali Town has had a far-reaching influence on urban landscape formation in the urban fringe of Hangzhou over the last 70 years and act as the representative of Hangzhou industrialized towns' to develop as cities. The morphological framework formed by the reclamation plain construction in the east of Hangzhou represented by Guali Town has become an important constraint for the subsequent landscape development and evolution outside the Hangzhou central city. However, because of the characteristics of rapid construction, large area coverage, and low construction intensity during the early period of Guali Town formation, it has constantly faced the pressure of urban renewal and real-estate development along with

relative location change and the construction of city deputy centre in the subsequent periods. The specific form evolution also undergoes the transformation and substitution of intrinsic type. Simultaneously, with newly initiated urban construction campaign, the edge zone characteristics of Hangzhou urban centre edge area have gradually disappeared and the integrated with Guali Town's construction area has started.

Under the function of space expansion and functional evacuation of big cities, cities and towns in the fringe areas of big cities develop rapidly due to their own location conditions. They also become the new space growth points on the periphery of big cities. Moreover, with the influence of big cities, the diversified dominance of urban construction, the industrial relocation of central cities, the independent development of large-scale projects, and the development mode along the transportation trunk line make the cities in marginal areas display the characteristics of function composition, space structure, and form in the process of spatial expansion.

Similarly, the rapid and disordered expansion of urban space has also led to many problems, such as decentralized urban functions, fragmentation of land, slow renewal, weak spatial connection, and others. These problems lead to space utilization and environmental problems in the region leading to restricting the development pace of small and large regional cities. The spatial evolution of Guali Town reflects the urbanization process under the comprehensive influence of top-level public policy, market economy logic, and regional environmental restrictions at the macro level. At the micro level, it reflects the impact of each space construction subject making their own construction behaviour choices according to their own interests and under the system constraints on the spatial evolution. Therefore, the mechanisms to effectively guide the scientific and orderly development of cities and towns in the urban fringe areas of big cities and gradually integrating them into the central cities require overall consideration from the aspects of policy, system, planning, and others. The construction of a common decision-making framework for multi-participation in the development of fringe areas, formulation of a two-way integrated space development plan for the fringe areas, and establishment of a compact and orderly space development sequence for the fringe areas need the collective working of various stakeholders. It requires promoting the renewal of old cities in harmonious and liveable border areas.

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