
| RESEARCH ARTICLE

Planning of Cooperation Demonstration Zone under the Guidance of Economic Strategy: Analysis of Urban Positioning in the Houhuan Area of Zhuhai, China

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| ABSTRACT

China's urban development is undergoing a transformation from quantity to quality. As a public intervention in the process of urban shaping, urban design is an important starting point for improving the quality of urban space. The strategy of industrial and economic cooperation between the two cities can drive the construction of different cities. Before construction, the positioning analysis of the city is very important. Therefore, this research is carried out for urban areas of economic strategic cooperation through field inspection, industry analysis, and construction analysis. Finally, the proposed measures to enhance the value and function of the construction area are summarized.

| KEYWORDS

Economic Strategy; Cooperation Demonstration Zone; Planning Research; Urban Positioning; Zhuhai, China

| ARTICLE INFORMATION

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1. Introduction

1.1 Economic Cooperation Strategy

In China, the strategy of economic and industrial cooperation is an important measure in building urban areas. Due to the uneven development of regions, the carrying capacity of megacities and first-tier cities is close to saturation. By means of cooperation, some industries can be transferred to different places, reducing costs and, at the same time, promoting urban cooperation and economic development.

Deepening the cooperation and exchanges between Shenzhen and Zhuhai and promoting the integrated development of the east and west sides of the Pearl River Estuary is an important measure to seize the historical opportunity of the special economic zone, the Guangdong-Hong Kong-Macao Greater Bay Area, the Hengqin Guangdong-Macao Deep Cooperation Zone, and the Free Trade Pilot Zone. As the main engine, main front, and main battlefield for Zhuhai to implement the innovation-driven development strategy, the high-tech zone has initially formed an innovative and entrepreneurial ecological environment similar to Shenzhen. In the future, the ring area will be the pilot area for global bidding for urban design plans, and the planning and construction of the Shenzhen-Zhuhai Cooperation Demonstration Zone with a total area of 30.11 square kilometers will be promoted with a high starting point and high standards, which will provide the optimal development space for Shenzhen-Zhuhai industrial cooperation. Focusing on the three leading industries of software and integrated circuits, biomedicine and medical devices, intelligent manufacturing, and robotics, the High-tech Zone has set up a joint investment service office in Shenzhen to implement targeted and precise investment promotion for Shenzhen enterprises and do a good job in Shenzhen project resource docking and services. Make new and greater contributions to the high-tech zone to accelerate the construction of a modern, international, future-oriented, ecological, and intelligent Shenzhen-Zhuhai cooperation demonstration zone and to make every effort to build a high-quality new growth pole in Zhuhai. Up to now, more than 40 Shenzhen projects have landed in Zhuhai High-tech Zone, with a total investment of 12.4 billion yuan.

1.2 Zhuhai city reclamation

Land resources continue to be tight, and the acquisition of land by sea has become an inevitable path for land expansion in China's Pearl River Delta in recent years. According to statistics, the land area of Guangdong is only 178,000 square kilometers, and the per capita arable land area of the province is only 0.032 hectares, which is equivalent to 1/3 of the national average and far below the warning line of 0.053 hectares set by the United Nations. However, Guangdong Province has a sea area of 419,300 square kilometers, a coastline of 3,368.1 kilometers, and a tidal flat of 2,042.2 square kilometers. As early as 2011, the province approved major sea-use projects with an area of about 90 square kilometers, of which 25.02 square kilometers were reclaimed.

Zhuhai is the city with the largest ocean area, the most islands, and the longest coastline in the Pearl River Delta of China. But the land area is only about 1711.24 square kilometers, and the land area is the smallest in the province. With the advancement of urbanization, the ultimate bottleneck restricting urban development is land. Macau, next to Zhuhai, is a typical example. Therefore, in order to ensure sufficient land reserves and the stamina for development, it is a "last resort" approach for cities to seek land from the sea.

As early as 2008, the "Marine Functional Zoning of Guangdong Province" was promulgated, and there were 24 marine reclamation areas in Guangdong Province. Among them, seven planned reclamation areas are located in Zhuhai, namely Tangjiawan Reclamation Area, Jinding Industrial Reclamation Area, Innovative Industrial Reclamation Area, Yeli Island Reclamation Area, Hezhou South Reclamation Area, Bailongwei Reclamation Area, and Daping Bay Reclamation area. The total area is about 62 square kilometers, which is equivalent to filling out two Macaus. In 2013, according to the needs of urban development, Zhuhai planned to carry out reclamation construction. The urban construction area increased by 22 square kilometers, accounting for 30.7% of the total planned urban construction land. The new urban development areas are basically within the reclamation area.

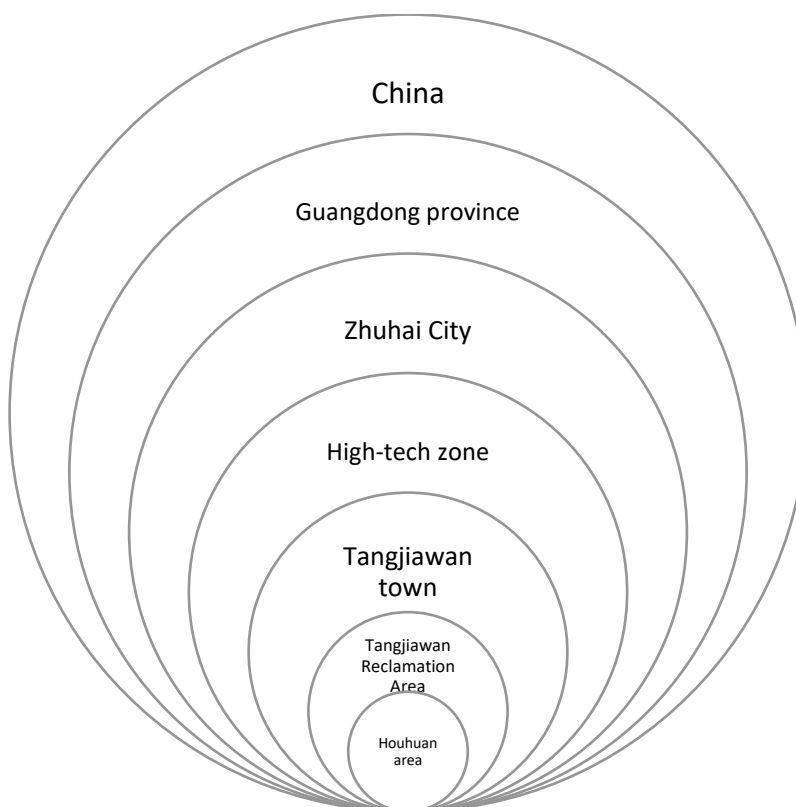


Figure 1. City-regional relationship
Image source: drawn by the author

1.3 Planning of Cooperation Demonstration Zone

The Houhuan Area of the Zhuhai Shenzhen-Zhuhai Cooperation Demonstration Zone is located in the High-tech Zone of Zhuhai City. It is located at the core location of the west coast of the Guangdong-Hong Kong-Macao Greater Bay Area and is an important node at the intersection of the Guangzhou-Zhuhai-Macao Science and Technology Innovation Corridor and the Guangzhou-Shenzhen-Hong Kong Science and Technology Innovation Walk. It is an important space carrier for Zhuhai to upgrade the city's energy level and participate in the integration of the Bay Area.

Houhuan fishing village in Tangjiawan town is located in the north of Zhuhai City, the westernmost port of the Pearl River. In November 1949, the Guangzhou municipal Party committee issued the decision on the establishment of the District People's government, which specifically established the Pearl River District as a water area to deal with the purchase of people. In the 1950s, the state subsidized the construction of houses and encouraged residents to move ashore from the perspective of consciousness, reform movement, and national security. Under the background of such a big era, residents living in the South China Sea of the Pearl River estuary for a long time responded to the call of the state and built houhuan fishing village after coming ashore. Houhuan fishing village belongs to the Houhuan Area.



Figure 2. The future development blueprint of the area
Image source: Photographed by the author

1.4 Methodology

The strategic positioning of the back ring is studied through methods of field investigation, planning text analysis, and architectural drawing analysis.

2. Site Analysis

2.1 Regional climate analysis

The high-tech zone is close to the South China Sea and is located at low latitudes, with obvious alternation of winter and summer monsoons, small annual and daily temperature differences, and a subtropical marine monsoon climate. The average annual temperature is 22.4 degrees, the average temperature of the hottest month (July) is 28.6 degrees, and the extreme maximum temperature is 38.5°C; the average temperature of the coldest month (January) is 14.5°C and the extreme minimum temperature is 2.5°C.

The northeasterly wind prevails in the high-tech zone in autumn and winter, and the southeasterly wind prevails in spring and summer, with an average wind speed of 2.5 m/s. June to October is the typhoon season, with an average of 3.6 typhoons affecting the Zhuhai area per year. The high-tech zone is located in the rainy area of Guangdong, with an average annual rainfall of 1700-2300mm. May to September is a concentrated rainfall period, with a rainfall of about 1700mm, accounting for about 80% of the total annual rainfall. The pre-flood season is generally in late April, and the post-flood season is between July and September. The

tides in the high-tech zone are irregular semi-diurnal tides, with an average annual tidal range of about 1 meter, belonging to the estuaries of weak tides.

2.2 Regional scope

The project scope includes three levels: overall research scope, urban design scope, and detailed design scope. (1) Overall research scope: including but not limited to the core area of the Shenzhen-Pearl Cooperation Demonstration Zone. The land area is about 30 square kilometers, of which the Houhuan area is about 6.63 square kilometers, and the Qi'ao Island area is about 23.48 square kilometers (the range of the dark blue dotted line in Figure 3 below). (2) Urban design scope: The Houhuan area is about 6.63 square kilometers (the red dotted line in Figure 3 below). (3) Scope of detailed design: Select a core area with a total area of about 1-2 square kilometers within the scope of urban design to carry out the detailed urban design.



Figure 3. Regional scope
Image source: drawn by the author

2.3 Topographic landform

The overall terrain within the site is flat. The slope is $0^{\circ} \sim 2.0^{\circ}$, and the elevation of most sites is 3.0m~4.0m. Most of the Houhuan area is reclaimed land, the terrain is relatively flat as a whole, and it belongs to the sedimentary geomorphic unit of sea-land alternating facies. The strata from top to bottom are:

- Artificial plain soil fills about 3m;
- 10-15 meters of silt layer, gravel, silty soil, silty clay;
- The underlying Yanshanian granite residual gravel clay;
- Yanshanian granite weathering zone.



Figure 4. Site topography
Image source: Photographed by the author



Figure 5. Site topography
Image source: Photographed by the author



Figure 6. Site topography
Image source: Photographed by the author

2.4 Current civil construction

Most of the 6.63 square kilometers of land in the urban design area are unbuilt. The built land is 0.92 square kilometers, including industries, villages, docks, substations, and some roads under construction (construction has been suspended). Part of the road subgrade has been implemented for the internal roads within the urban design scope according to the original plan. The conditions of each tender section of the road under construction (the construction has been suspended) are as follows: The pipeline network project of tender section I is basically completed, the roadbed preparation stage has been entered, and the construction of the main structure of the bridge project has been completed. 70% of the pipeline network works in the II and III tenders are completed, and the bridge pile foundation construction is completed.



Figure 7. Current civil construction
Image source: Project bidding official website



Figure 8. Current civil construction
Image source: Photographed by the author

2.5 Traffic Analysis

(1) Railway transportation: Guangzhou-Zhuhai Intercity has Zhuhai North Station and Tangjiawan Station in the high-tech zone; it can reach Zhuhai Gongbei Port, Hengqin and Zhuhai Airport in the south, and Guangzhou South Station in the north.



Figure 9. Existing fishing boat
Image source: Photographed by the author

(2) Road traffic: The main external traffic is the Western Coastal Expressway, the Beijing-Zhuhai Expressway Zhuhai Link, Gangwan Avenue, and Jinwan Hengqin Expressway. The Xingye Express Line is under construction, and the West Line is expected to open to traffic by the end of the year. The Eastern Line is expected to open to traffic in 2023. As the starting point of the Zhuhai section of Guangdong Binhai Tourist Highway, the construction of Lovers North Road is expected to start by the end of the year. Part of the road subgrade has been implemented for the internal roads within the urban design scope according to the original plan. At the same time, there are some temporary roads around the supply terminal of the original Hong Kong-Zhuhai-Macao Bridge.

(3) Water transportation: There are mainly Tangjiagang passenger and cargo terminals under construction (after completion, the route from Tangjia to Shenzhen port will be opened), and the original Hong Kong-Zhuhai-Macao Bridge supply terminal (reclaimed state-owned, used to be determined).



Figure 10. Bridge connecting Qi'ao Island
Image source: Photographed by the author

3. Industry Analysis

At present, the high-tech zone has formed a modern industrial system dominated by high-end industries such as software and integrated circuit design, biomedicine and medical equipment, intelligent manufacturing and robotics, and intelligent industry. In 2020, the total number of high-tech enterprises in the high-tech zone will reach 1,031, taking the lead in forming an innovation incubation chain from maker space to incubator and accelerator in Zhuhai. This provides a solid industrial foundation for the construction of the Shenzhen-Pearl Cooperation Demonstration Zone.



Figure 11. High-tech Zone Industrial Planning
Image source: High-tech Zone official website

It is worth mentioning that human resources are also potential industries. At present, there are famous historical and cultural towns in China (Tangjiawan Town), provincial historical and cultural blocks (Tangjia, Huitong, Qi'ao), traditional villages, cultural relic

protection units, and historical buildings around the site. As well as 4 institutions of higher learning, including Sun Yat-sen University Zhuhai Campus, Beijing Normal University Zhuhai Campus, UIC, and Beijing Institute of Technology Zhuhai Campus.



Figure 12. Historical and cultural towns in China (Tangjiawan Town)
Image source: Photographed by the author



Figure 13. Historical and cultural towns in China (Tangjiawan Town)
Image source: Photographed by the author



Figure 14. Historical and cultural towns in China (Tangjiawan Town)

Image source: South China University of Technology Architectural Design and Research Institute

4. Results and Discussion

Judging from the current situation, the cooperation between Shenzhen and Zhuhai is only a strategy to promote the construction of the Houhuan area. However, from the perspective of the construction of the site, there are still many places that are debatable.

From the perspective of upper-level planning and construction guidelines, the Houhuan area is located in the important hinterland of Zhuhai High-tech Zone, which is the driving force for the development of the area. In March 2021, Zhuhai National High-tech Zone will focus on attracting investment from leading industries. The High-tech Zone will seize the historical opportunity of 'dual-zone driving' and focus on planning and promoting the Shenzhen-Zhuhai Cooperation Demonstration Zone to accelerate the construction of a base in Zhuhai, integrating into the Bay Area and linking the world. The Central Innovation District. On the basis of highlighting the contribution of scientific and technological wisdom to urban renewal, the "Central Innovation and Intelligence District (CID)" further emphasizes the role of innovation-driven, dual-chain integration of the innovation chain and industrial chain and the integration of industry and city. "Creation" is reflected in the system integration of idea innovation, technological innovation, management innovation, and system innovation. "Intelligence" is reflected in the aggregation and integration of "wisdom, intelligence, intelligence".

Some scholars have also proposed that an ecological area should be built here. For example, build some sponge cities and functional wetlands. Because of Zhuhai's current reclamation expansion, the ecology of many sea areas has further deteriorated. At the same time, the adjacent Qi'ao Island needs to protect the ecology of mangroves. There are 695 species of vascular plants in 165 families, 470 genera, and 556 species of vascular plants (140 families, 398 genera, and 556 species of wild plants, respectively)

and 139 species of cultivated plants in 65 families, 106 genera). Among wild vascular plants, there are 19 families, 28 genera and 39 species of ferns, 3 families, 3 genera and 4 species of gymnosperms, and 118 families, 367 genera and 513 species of angiosperms. Among them, mangroves reach 10 families, 13 genera, and 15 species, accounting for 83.3%, 86.7%, and 55.6% of the existing mangrove families, genera, and species in China; semi-mangroves reach 7 families, 9 genera and 9 species, accounting for 83.3%, 86.7% and 55.6% of the existing mangrove families, genus and species in China. There are 77.8%, 90%, and 90% of the semi-mangrove family, genus, and species; the mangrove associated plants are 11 families, 15 genera, and 15 species, accounting for 73.3%, 71.4%, and 73.3% of the Chinese mangrove-associated plant family, genus and species respectively 68.2%.

However, urban development also faces urban difficulties and practical problems. In China, especially in coastal cities such as Zhuhai, contiguous and yet to be developed large-scale plots are very scarce. All planning can start from a blank sheet of paper, avoiding troubles such as demolition and reconstruction. There is no doubt that this 17-square-kilometer land will become a new star for urban expansion in Zhuhai in the future. Reclaiming land from the sea is still a popular development model in some coastal areas of the Pearl River Delta. Even driven by the interest in skyrocketing land prices and property prices, some places use land reclamation to build real estate. Due to the eagerness for instant success, the newly built real estate has appeared in dangerous scenes such as sinking. The cost of reclaiming one mu of sea is generally 200,000 yuan, and the cost of reclamation is 300,000 yuan. The local land price is at least 1 million yuan per mu, and the profit must be at least 500,000 yuan per mu, which can easily be doubled. Under the premise that reclamation costs a lot of money, we should think about how to enhance the economic value of the land. But it seems that ecology and economic development can only choose one. In this regard, the author also gave some thoughts on the concept of the draft.



Figure 15. Thoughts on draft concept
Image source: drawn by the author

5. Conclusion

Combined with the actual situation, in the future, three directions for the development and exploration of the rear ring area can be considered: ① A new driving force for high-quality economic development. Through the development of the Houhuan area, the accumulation of high-end industrial resources, human resources, and scientific and technological resources will be accelerated, providing an important driving force for promoting the high-quality economic development of Zhuhai. ② A new high ground for

reform and innovation. Carry forward the special zone spirit of Zhuhai's daring to be the first, dare to try, make full use of the excellent conditions of the Houhuan area, vigorously promote innovation in systems and mechanisms such as scientific and technological innovation and talents, and create an advanced experience.^③ An important platform for regional cooperation. Taking advantage of the favorable location and other conditions of the back ring, deepening the cooperation between Shenzhen and Zhuhai, and striving to become an important platform for promoting the cooperation between Shenzhen and Zhuhai.

Explore three strategies for implementation:^①Hold high, high-end positions. It is necessary to adhere to the concepts of internationalization, modernization, intelligence, ecology, and the future, make full use of the resource endowment conditions of the back ring, and gradually strive to become a high-end industrial cluster, high-end talent gathering, high-end service facilities, and high-quality urban demonstration.^②The environment is friendly, and the talents are friendly. Make good use of Zhuhai's livable and business-friendly signs, strive to build an environment-friendly, talent-friendly, youth-friendly, and culturally inclusive high-end talent gathering area, and provide a comfortable, convenient and flexible working and living space for talent innovation and entrepreneurship. Create attractiveness to outstanding young talents, and provide high-level service guarantees from the introduction of talents, services, housing facilities, and other aspects. In these three stages, we also particularly hope that the high-tech zone can implement the strategy of giving priority to talents, especially outstanding young talents so that the high-tech zone can always become a gathering of young talents and can drive our Zhuhai science and technology innovation ecology. Talent gathering place.^③Industry-city integration and smart ecology. Based on Zhuhai, serving the Bay Area, we will select the important point of the industry to build a strong chain and create a high-level, high-energy, high-value-added industrial production. At the same time, it pays attention to the flexibility, elasticity, and toughness of urban space development and strives to create a livable and workable environment where "the city is in the scene, and the scene is in the city".

This paper studies the Houhuan Area of Zhuhai City. However, each region has its own architectural identity and different cultural heritage. Our current direction in the future can only be borrowed from historical villages of the same type or buildings in the same area. This is also a limitation. In the future, you can also try to add quantitative research methods to make design decisions more scientific.

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References

- [1] Fu, Y., & Zhang, X. (2018). Two faces of an eco-city? Sustainability transition and territorial rescaling of a new town in Zhuhai. *Land Use Policy*, 78, 627-636.
- [2] Hong, G. (2017). Locating Zhuhai between land and sea: a relational production of Zhuhai, China, as an island city. *Island Studies Journal*, 12(2), 7-24.
- [3] Lai, H. M. (2007). Zhongshan, Zhuhai, and Macau: Geographical and Historical Notes.
- [4] Liu, Y., Li, C., & Li, Y. (2021). Impact of leisure environmental supply on new urban pathology: a case study of Guangzhou and Zhuhai. *Humanities and Social Sciences Communications*, 8(1), 1-13.
- [5] Sheng, N., & Tang, U. W. (2013). Zhuhai. *Cities*, 32, 70-79.
- [6] Xian, S., Li, L., & Qi, Z. (2019). Toward a sustainable urban expansion: A case study of Zhuhai, China. *Journal of Cleaner Production*, 230, 276-285.
- [7] Yang, C. (2006). The geopolitics of cross-boundary governance in the Greater Pearl River Delta, China: A case study of the proposed Hong Kong-Zhuhai-Macao Bridge. *Political Geography*, 25(7), 817-835.