

Urban Transformation of Fotang Town in the Recent 20 Years

—A sample in Small City Fostering Program of Zhejiang Province, China

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Abstract

This paper studies the recent twenty years' morphological change of a small city Fotang in China. Although many cities are shrinking at present, the coastal metropolitan areas in China are experiencing a continuing growth, both in terms of population and built-up area. Comply with such a trend, Zhejiang Province launched a "Small City Fostering program" starting from 2010, by which to cultivate certain qualified but low administration level "Zhen" (town) into small city. There were annual evaluations for these towns and Fotang always gain outstanding rating.

By a description of the town's morphological transformation process in the past 20 years, this paper analyses the influence and process of different agents to its morphological changes. The researchers collected historical satellite maps, and historical urban planning documents. Interviews to government officials and local residents were carried out, and on-site investigation are done to confirm the information. The changes of urban form in the recent 20 years are sorted out in chronological order. The growth and densification of the street network, the construction on plots, and the replacement of land use, are the main focuses of the analysis. By Space Syntax method, the structures of street network in four phases are depicted, namely 2006, 2010, 2016, and 2020.

This paper compares the real urban changes with the urban planning documents; and then reflects the spatial relation between the core of spatial structure and the functional live centres. It provided a vivid illustration for the urban transformation of Chinese small cities, which are rare in the current literature. The study shows how the top-down and bottom-up forces work together to shape the urban form of this small but vibrant historical city.

Keyword: contemporary urban transformation, Zhejiang Province, Small City fostering Program, self-organization

1. Introduction

1.1 the meaning of the case study

While Urban shrinkage and population decrease occurs in many places, the population of small cities on China's southeast coast continues to grow. Zhejiang Province of China has launched the Small City Fostering Program in 2010, to cultivate some qualified towns into cities. By now, the program has into stage four, 64 towns have participated in this program. Among the city levels, 'Zhen' has the lowest administrative level, and it has little research on its urban morphology.

Fotang is one of them. It is a historical town with a population more than 150 thousand. It is only 15 kilometres away from Yiwu City, which is an international city famous for its largest small commodity distribution function. Fotang has been developed well, both in term of economy and urban development. It accommodates a large number of rural migrants because of its strong industrial economy.

Speaking of administration level, Fotang is a 'Zhen', which is a lower unit under small city. 'Zhen' is a fundamental unit of the urban system and play a key role in Chinese urbanization. But due to its lower administration level, the urbanization of Zhen has not been studied independently. Zhejiang Province implements the Small City Fostering Program to upgrade certain big Zhen into small city to accommodation rural immigrants. In 2019, Longgang Zhen, which was in the list, has been approved to be upgrade into its higher administration level, namely to be a city.

There are very few morphological studies on 'Zhen's, while their urban form expands very fast in the contemporary era, which means they are worthwhile be to a proper research object. Generally speaking, they have a historical core, which formed in hundreds of years of natural evolution. This core always has a compact form and is pedestrian friendly. In the booming of Chinese urbanization start from 1990s, its fringe then been expanded rapidly, creating a new area which always been several times bigger than the original area. Take Fotang as example, the built-up area in 2008 was 8km², which was 10 times of its urban built-up area in 1990. This growth does not happen in even pace, but have a peak enlargement period around 1998. Correspond to Yiwu city's fast growth at that time, the adjacent town Fotang designate a new industrial zone on the southeast side of the town. The area it occupied has no big difference as today's built-up area's boundary. The historical core and the new industrial area were distinct parts at the beginning, not only in term of their scale, but also the public life. Now, after 20 years, these two parts are gradually merged into an integrated whole. How this mixing process happened is what the authors would like to describe in this paper.

Urban Morphology emphasizes the game between different agents in analysing the dynamics of urban evolution. The research by the University of Birmingham research group represented by Whitehand reveals the close relationship between morphological research and economic development (Whitehand, 1992). Victor (2016) pointed out that there are five types of agents that affect the evolution of urban morphology and analysed the evolution of urban morphology. This will become an important perspective for the analysis of this article. In addition, the spatial syntax theory is better than depicting the structure of urban fabric. There are many papers discussing the interaction between the spatial core and the vitality centre (Vaughan, 2009).

The new districts of Fotang were converted from rural land. Kostof (1992) discussed the gridded extension in the book, *"The city shaped"*. He talked about the expansion of the city to the countryside, and stated that if the city government has the power to supervise the development of the suburbs, the new area and the old urban core area will establish a rational connection. The main axis of the old city will extend into the ed new

Urban Transformation of Fotang Town in the Recent 20 Years — A sample in Small City Fostering Program of Zhejiang Province, China city's grid. This statement is basically consistent with the situation of this case. The link between the new and the old axis will be described in detail below.

1.2 The current form of Fotang

According to the different urban forms of the land, Fotang can be divided into three parts: the historical zone with compact form, the residential zone with high density and the industrial zone with a square grid (Figure 1). Though there is a trend of integration between the old town and the new district, the intensity of activities in the old town is much higher than that in the new district. The scale of the three parts of the town and the streetscape are very different.

1. The historical zone: its urban formed after hundreds of years of natural evolution, the area is less than 1km²;
2. The residential zone: its urban form was established in the early stage of industrialization about 1990s, expanded from the edge of the historical zone to the north and south;
3. The industrial park: it is a new district located in the southeast of the town, with an area of about 7.5 square kilometres. Its predecessor is farmland. The scale is much larger than the old district. The nature of the land is transformed in the form of an industrial enclave. At that time, Yiwu had just become a world-renowned trading city. For economic benefits many surrounding villages and towns converted their farmland into urban land in large quantities, which became an industrial park that was not recognized by the central government and was criticized by name.



Figure 1. Fotang's three morphological parts

Since the historical data of the case is difficult to obtain, this article starts from the situation in 2000. At this time, the framework of the new urban area has taken shape, and subsequent changes in the urban form are mainly intensification.

1.3 research questions:

The research should explore the mechanism of the growth and transformation of the growth and transformation of this small city. Specifically, answer the following questions:

- 1 what are the differences between the real development and the Urban Masterplan's vision.
2. what are the transformation process in different parts of Fotang and what are the roles of different agents?
3. what is the change of spatial core depicted by space syntax method? And whether the power of this structure is reflected in the changes of urban tissues?

2. Methodology

There are four types of data are used in this research: Historical map of Fotang town; the satellite map of Fotang from 2006-2021; planning documents of Fotang as well as Yiwu city; interviews with government employees.

Based on the satellite map data, spatial syntactic modelling of the street network structure was carried out and computed in the four phases of 2006, 2010, 2016, and 2020, to reveal the change of Space structure core

The study reviewed of urban planning documents both from Yiwu city and Fotang town. Preliminary analysis found that there are two conflicts between these plans. One is the difference between the road network and land use positioning of the Fotang in the Yiwu planning and the corresponding content in the independent planning of the Fotang. The second is the difference in planning in different years.

Interviews are also conducted between government departments and residents, also the on-site investigation. Interviews showed the nature of the land ownership has had a great impact on the development and renewal of the land. Although the built-up area is continuing, the ownership of these lands is different. One is urban land which owned by state, the other is rural land belongs to collectives. The latter has greater autonomy.

3. Urban Transformation in Fotang Town

3.1 Transformation of real urban form and street networks

By reviewing the records of Fotang in local chronicles, the changes in the urban form of Fotang is sorted out in chronological order. Through the uncalculated model of the space syntax, the growth and encryption of the street network and the infill of the new industrial block are expressed.

Due to its proximity to the Yiwu River, Fotang has a long history as a commercial port town since 16th century. Because of the slow industrial development, the historical form remained unchanged until the 1980s. The industry then developed rapidly, nearly 30 enterprises built, distributed in the periphery of the town. The original waterway gradually declined, new roads were built to Yiwu and Jinhua, as Construction Road to Yiwu, Shuanglin Road to the neighbouring village. The city expands outward, Fotang Bus Station, People's Hospital, Cinema, Fotang Middle School, etc. have been established. The area south of is gradually developed. (Local chronicles,1984,1991,2011)²⁻⁴(Figure 2-3)

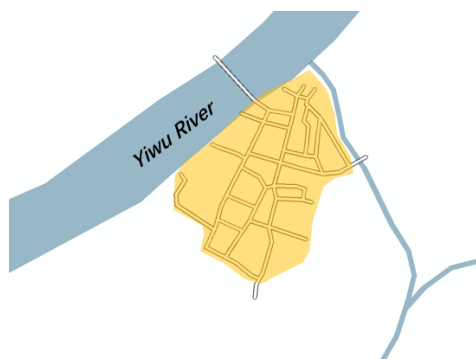


Figure 2. The town before the 19th century

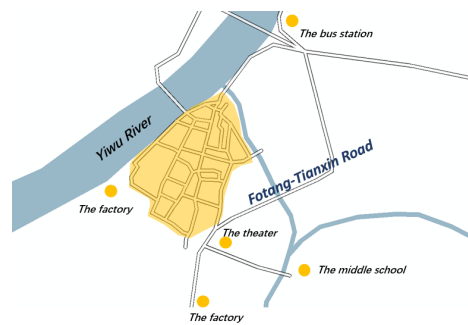


Figure 3. The town after the 19th century

In the late 1990s, a new industrial park was built in the southeast of the old town which has a completely different urban morphology and spatial structure from the old town. The street network in the new district presents a geometric radial pattern, while in old town, it has higher density and nature distribution. The new district is connected to the old city by two main longitudinal roads — Duqing Road and Chaoyang Road. Chaoyang Road located in the middle of the new district and planned to be the main axis of the whole town with many important public facilities placed alongside, such as nature park, Talent Building, Government Service Centre. Through the detailed review of historical changes, we found that after the great leap of urban form in 2000, the speed of urban growth slowed down.



Figure 3. The position of Duqing Road and Chaoyang Road

3.2 Different Urban Masterplans and their Influences

3.2.1 Two different types of urban masterplans

According to the different planning subjects, planning documents related to the Fotang can be divided into two categories (Table 1), plan made by Fotang and the plan made by Yiwu city. According to county records, in 1986, Fotang Town established a master plan for the first time. Since then, the development of Fotang Town has been formally guided by the plan. Special note, the early lack of formal planning text, now it is difficult to trace back. Planning is changing with each passing day.

According to hierarchy of administration level, Yiwu city is the upper power over Fotang town. However, as an individual administration unit, Fotang still have its own will. Therefore, there are differences in many aspects between city planning and local planning, such as city positioning, industrial layout, development expectations, etc.

Regarding Fotang as a subsidiary area, Yiwu’s master plan about Fotang is rough and incomplete. This may also be the reason why the higher-level planning has not fully implemented the guiding role of the lower-level cities.

Table 1. Classification of plan documents.

Established by Yiwu city	Established by Fotang Zhen
<i>Yiwu City Master Plan (2000-2020)</i>	<i>Fotang Town Master Plan (2006-2020)</i>
<i>Shuangjiang Lake Regional Plan (2017)</i>	<i>Detailed plan for the protection and renovation of Fotang Town (2008)</i>
<i>Yiwu City Master Plan (2013)</i>	<i>Comprehensive environmental improvement plan for Fotang</i>

3.2.2 Urban masterplans which endure a constant adjustment

Compare the *Fotang Master Plan (2006-2020)* with the current status of urban development, some planned roads were abandoned or changed the direction during the construction. Building progress reflects the power of investors and companies as agents in the transformation of urban morphology. The road network in the industrial zone was the first to be built, with the gradual development of the industrial zone's land. But when the road network extends outside the park, the progress was delayed. Fangshan road and Jiangbei road are still under construction. In addition, the eastern part of Qingyun Avenue, the southern part of Wuzhou Avenue as well as the road alongside the Wuxi river, will not be built. Because the planning target is not in line with reality. (If roads are built, cultivated land needs to be requisitioned. The law does not allow the occupation of cultivated land.)

In the process of plan and implementation, the town government's view for land use is changing. The plot along the Wuxi River was planned as industrial land in *the Master Plan of Fotang Town (2010-020)*. In 2017, the greenway project implemented. In consideration of the concept of ecology and liveability, greenways are vigorously constructed in urban development, all industries are removed, and gentrification appears in the waterfront area.

The third reason changing the original plan contributes to Yiwu city's urban plan. The master plan of Yiwu established in 2000 draw a quick plan for Fotang without thinking through. The planned built-up area is much larger than the actual development of Fotang. The master plan designed a Science and Education Park at the north of the town but not implemented. In 2017 based on the Shuangjiang Water Conservancy Project, Yiwu re-planned the land in the northern of Fotang. The new plan will serve as a new science and education park, including the north river plot of Fotang. At this time, the construction of the land for science and education really started.

The fourth type of change is the adaptation of the plan to urban development. At the first place, the industrial park was arranged far away from the old town, served as a pure production space. But over time, the old town and the industrial area have more connections with each other. Both land use requirements and functional requirements have increased. The positioning of Fotang in the plan changed from an industrial town to a comprehensive town.

3.3 Land's Ownership and the Urban Morphological Transformation

3.3.1 within the old town

Chaoyang Road is planned to be the main axis linking the new district and the old city. It is located in the centre of the town. Most important public service facilities in the new district were placed alongside the road.

The east side of the road is connected to the old town. In the process of urban renewal, the plot alongside this road has different changes. The renewal of buildings in the plot is related to the ownership of the land.

The Wuxi Village lies on the south side of Chaoyang Road. The village maintained the architectural form and texture of the original village until 2006. The renewal of this plot started from the buildings along the street. For the ownership of the land as well as the buildings, belongs to state. The Government has full right to decide on the construction. As for the building inside the plot, both land and the building belong to the collective, the renovation starts in 2010, later than the road facade. In addition, the renewal form of rural housing is usually 3-4 storey buildings and rebuilt on site. In this process, the government only supervises whether the planning and the construction of the building meets the specifications.

The plot at the east end of the Chaoyang Road, is named Dongwang plot. Chaoyang Road is planned to pass through the ancient town and the Yiwu River in the form of a tunnel. The tunnel entrance at the middle of the plot's southern edge. The plan for the underpass tunnel was established in 2010, but the land use rights sold in 2020. The renewal of the plot is carried out simultaneously with the construction of the tunnel. The original residents on this plot were resettled offsite, different from the residents of Wuxi. That is because the plot is owned by the state. Owned by collective, Villagers have a greater influence on the urban form.

Interestingly , the two plots encountered a similar problem during the renewal process —— Whether to demolish the family temple on the site. On the urban plot, the temple was relocated on the other side of the river, while the temple on the rural land maintained as same. The reason behind this may contributes to different economic interests.

3.3.2 inside the new industry district

The industrial district was established in the 1990s and is converted from agricultural land to urban land for industry. The newly-built industrial park has a completely different urban form from Fotang. The urban form presents as grid, the original village texture basically no longer exists.

The ownership conversion of the land in the district was finished in 1990s. The construction of the district was finished in 2020. The construction of the industrial park is the simultaneous construction of road network and land filling. The filling is carried out with the government's land transfer plan. First is occupied by industrial function. The planning of the industrial park did not take service function into account, thus there has no school, hospital or planned residential area.

When the land ownership converted, some rural land was maintained to for the villagers to live in. The satellite image in 2006 showed that there were 5 original villages within the industrial zone (Figure 4). Until 2021, all the original rural self-built houses in the plot were renovated and their architectural form are consisted with Wuxi village. According to the distribution data of commercial POI in 2019, it can be found that commercial activities basically overlap with the locations of these rural lands. Reserved rural land provides a variety of important life service functions for the pure production space of the industrial park.



Figure 4. the villages in the industrial park

3.4 Spatial Cores and Functional Live Centres

The study paid special attention to the location changes of the spatial core at different stages of urban growth. The spatial model used in this project is spatial design network analysis (sDNA) (Cooper et al., 2016). Shared similar principle with space syntax theory, this tool and can be directly used in GIS platform. The structures of street network in four phases are depicted and computed, namely 2006, 2010, 2016, and 2020. The research chose the abbreviations of BtA (Angular Betweenness), radius n to represent the spatial core's position. (Dai,2020). The results (Figure 5 and 6) show that the special cores in different periods overlaps with the original core of the old city, so this inertia leads to a slower development of the new district. The vitality of the old city slowly overflowed linearly. Several important functional line segments in the new area slowly form a new core.

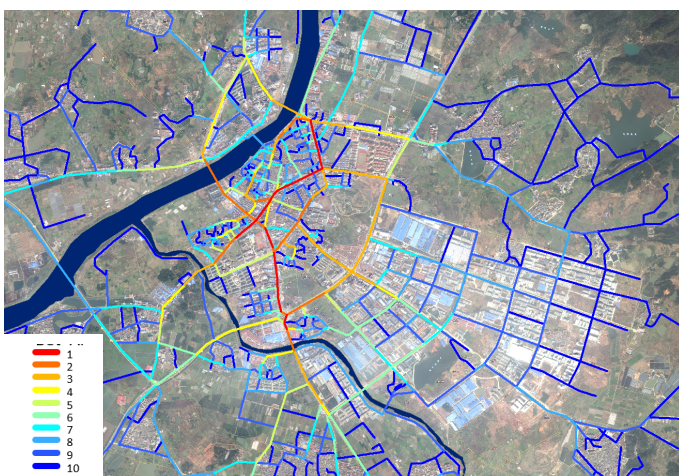


Figure 5. BTA, R=2400, in the year 2010

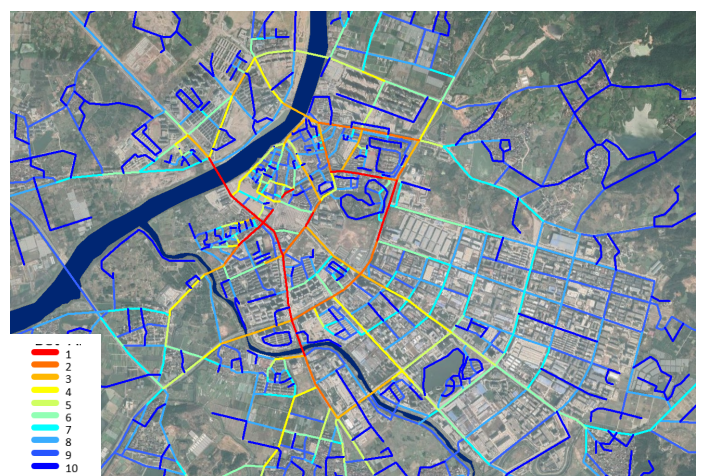


Figure 6. BTA, R=2400, in the year 2020

In addition to the planned urban axis, Chaoyang Road, there is another road, Duqing Road, is more central. The calculation of the sDNA model shows that the Duqing road is always an important axis linking the old district and the new district. Therefore, Baolong Mall (Figure 3.), the largest commercial complex in Fotang, is located here, not in the centre of the plan. The result suggest that spatial structure has a self-organizing effect on urban vitality. This also reflects the private developer agent's understanding of the urban structure.

4. Findings and Conclusions

This paper uses morphological analysis to understanding the morphology transformation of Fotang in recent 20 years. Two types of forces, namely the top-down and bottom-up forces, work together to shape the urban form, and took in charge in different circumstances. The key findings are as following.

1. Over time, the input of new urban planning knowledge changed the government's planning decisions;
 - a. Positioning of the new city: at first, it was considered to be a pure industrial area, not closely related to the old city. Now, it was considered to become a comprehensive urban quarter. Educational and medical functions need to be provided accordingly.
 - b. The earlier stage, the government make plans without careful consideration. The plan is just a kind of "hanging on the wall" vision, complementation is not the key concern. Therefore, many planned roads are actually not be constructed or change its location after a careful survey.
2. Due to the ability to attract funds, the growth rate of Fotang Zhen is lower than the planned vision. After the rapid expansion around 1998, the urban form change within the new industrial park is mainly infilling.
3. There is a difference between small cities and large cities in China. In the process of urban construction, top-down force constantly adjusted to adapt to the current situation of urban development
4. The two types of land ownership also affect the actual implementation of urban plan. The dual land-ownership system has made the phenomenon of villages in cities. Land properties determine its function and floor area ratio. The rural lands have a greater autonomy to comply with the spatial law of self-organization.
5. It is found that functional live centres at various stages always overlap with the spatial core. As the earliest road network in the industry quarter is not accessible in many places, the location of spatial core changed in different stages. A phenomenon was identified, that the allocation of the new functions always appeared first, then the continuity of the surrounding street network would improve, and accordingly the spatial core of the whole town would extended to this direction.

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