Co-evolution: A Model for Renovation of Traditional Villages in the Urban Fringe of Guangzhou, China

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Abstract
With the expansion of urban areas, many traditional villages with high heritage values in the urban fringes in China are being destroyed. This study proposes a resilient method for renovating traditional villages in the urban fringe in Guangzhou, China. The authors begin with an analysis of two existing renovation models from the constitutional, economic, and social perspectives. Based on our reorganization of the advantages and disadvantages of the two models, the authors suggest the application of the co-evolution model, which entails the establishment of an intermediate space supporter between the urban area and the village. Consequently, urbanization capital can be accumulated and effectively distributed into relevant fields. The goals of this process include protecting cultural heritage, maintaining social networks, eliminating hidden social dangers, and creating new employment opportunities. The co-evolution model respects the development needs of both urban and rural areas, and seeks a win-win situation, wherein each party could adapt and renew themselves gradually and positively. Thus, this model has significance in the renovation of traditional villages in the urban fringe.

Keywords: traditional village; urban fringe; renovation; co-evolution

1. Introduction
The conservation of traditional settlements under the threat of urbanization has long been a critical issue in the field of heritage conservation (Horayangkura, 2005; al-Houdalieha and Sauders, 2009). This problem is more urgent in countries (e.g., China), which have a long history of civilization and are currently experiencing rapid urbanization. With the acceleration of urbanization in China, urban spaces, especially those in large cities, are continuously spreading outward. Hence, a large number of rural villages are being enclosed by urban areas. During this process, many traditional villages were demolished to build new apartments, with the objectives of eliminating the barriers to urbanization (Weng and Peng, 2011), enhancing land development efficiency (Lou, 2007), maximizing economic benefits (Zhu, 2000), and realizing the so-called "modern city landscape" (Zhu and Huang, 1999). As a result, the remaining villages have lost their heritage value because of arbitrary renovation.

This paper takes Guangzhou City as an example since it has long been considered the political, economic, and cultural center of southeast China for thousands of years. The city has had a long history of settlement construction, and most of the preserved traditional villages were built from the Song to the Qing Dynasties. Those villages are considered precious cultural heritages, because they preserve exquisite architecture with high historical and artistic value (Fig.1.). However, the built-up areas of Guangzhou are expanding rapidly because of the changes brought about by the Reform and Opening-up Policy. When the People's Republic of China was first established in 1949, the built-up area of Guangzhou City was only 54km². This figure increased to 990km² in 2011, more than 18 times higher than that in 1949 (Yu and Ng, 2007; Mou et al., 2007). During this process, most traditional villages were demolished or destroyed, and the remaining traditional villages located in the fringe of the newly built-up area are now facing the threat of being "urbanized."

Traditional villages—as part of the cultural landscape of the agrarian civilization—are essential in maintaining cultural diversity and historical context (Vos and Meekes, 1999). Unlike "cultural relics," these villages are "living heritage" sites that are currently in use and experiencing dynamic development. The idea that heritage conservation should adapt to socio-
economic changes has been widely accepted (ICOMOS, 2011); thus, there is a need to consider policies that can be implemented to protect traditional villages and enhance their adaptability to the new environment. This means that these villages should not only survive but also achieve sustainable development under rapid urbanization. The current study aims to probe this issue through thorough analysis of case studies.

2. Urban Fringe: A Special Location in Guangzhou Urbanization

The rapid expansion of built-up areas caused by rapid urbanization has led to the conversion of vast tracts of rural land into urban land. During this process, regions located in the rural-urban interface inevitably gain several dynamic and transitional characteristics. These regions, also called urban fringes (Ptyor, 1968; Gu and Xiong, 1989; Furuseth and Lapping, 1999), are special geographic locations with dual features. They distinguish themselves both socially and economically from urban or rural areas. The main characteristics of urban fringes are as discussed below.

Spatially, an urban fringe, when close to urban built-up areas, has the advantage of being involved in urban economic activities. Compared with rural areas, an urban fringe has better infrastructure, such as transportation, water, electricity, and other basic facilities (Song and Zhang, 2009). More importantly, this area is anticipated to be transformed into an urban area (Guo and Wang, 2004). Therefore, an urban fringe manifests "urban features." However, it still lags far behind urban centers in terms of service facilities, such as job opportunities, high-quality schools, and shopping centers (Cater, 1972). Lifestyle in an urban fringe, with its distinct "rural characteristics" (Chen and Pan, 1999), is also different from that in the cities.

Demographically, two groups of people live in this area, namely, local farmers and rural migrants. Millions of rural migrants move into cities due to urbanization. (Saunders, 2010) However, these migrants often fail to compete in a highly mature job market because of their low educational level and work skills (Zhou and Wang, 2002). Therefore, they constitute the majority of the low-income population in cities. High housing rent in urban centers also makes it difficult for these migrants to find a suitable dwelling place. Consequently, most rural migrants choose to live in urban fringes. The other group of people living here are local farmers who own land and houses. Many of them are still engaged in agricultural activities, although a significant number now earn by renting out houses to rural migrants. The local people, similar to their new neighbors, also encounter difficulties in finding high-quality jobs in the city (Song, 2004).

From an institutional perspective, essential differences exist between an urban fringe and urbanized area despite their affinity. China adopts a dual-track system of land use. Based on this system, the entire country owns the urban land, while the rural land is collectively owned by the farmers. Urban land can be traded on the land market, while collective land cannot be sold unless the city government expropriates it (George and Samuel, 2005). This double-track system has led to the undervaluation of rural land, especially that located in the urban fringes (Zhu, 2002), and it is also the main reason why illegal land development activities are rampant in this region.

Generally speaking, urban fringe is a special region in terms of spatial, social, economic, and institutional aspects. (Scheffler, 2004; Ishii, 2014) Previous studies that discussed villages and cities separately are now insufficient in solving new and emerging problems, especially in the so-called urban fringes. Therefore, the renovation of traditional villages in an urban fringe must be discussed within a broader framework, which pays more attention to rural-urban interaction. In the following sections, the authors will first discuss the two existing models and analyze their formation mechanisms and consequences. A more resilient model—the co-evolution model—is then introduced. Finally, a detailed explanation of the co-evolution model is presented.

3. Two Existing Models for Renovating Traditional Villages in the Urban Fringe

3.1 Active Model

As one of the most essential social regulations in China, the Hukou policy should be discussed first to provide a better explanation of the active model. A Hukou is a record in the household registration system required by law in China. Based on this system, two kinds of Hukou are identified for families: urban Hukou and rural Hukou. Families with urban Hukou can benefit from various national subsidies, including those for housing, public health, education, and so on; by contrast, the welfare of rural families is significantly lower (Chan and Zhang, 1999). Furthermore, only city residents can apply for slots in the low-rent houses built by the city government, one of the most important scarce resources in the cities.
Rural immigrants, given that they earn low salaries, can neither afford high-rent houses in the urban regions nor apply for government-subsidized low-rent houses. As a result, they can only live in urban fringes where the cost of living is lower and the distance from the urban areas—where they find employment—is relatively shorter. The existence of urban fringes and the Hukou system, with their respective special features, has induced a huge demand for housing in this region. What local farmers need to do is to meet these demands in certain ways to obtain the hidden value of their lands. One of the most simple and realistic ways is to reconstruct their old houses for more building areas, and then rent them to the inflow population, namely, the migrants. Compared with land development in urban areas, building houses on their own land can help farmers save on expenses, such as land use fees, as well as the profit of property developers and sales companies. Thus, this practice can be regarded as a low-cost development model that can establish the financial basis of rent-oriented development of local farmers.

However, traditional buildings, being narrow but elaborate, fail to meet the needs of local farmers who want to maximize their land profit. Housing land for each family is limited, while the rent is proportional to the building areas; thus, villagers tend to build houses as high as they can. Consequently, most of the traditional houses are replaced by the simple "box" buildings. Completely eliminating this problem is difficult, even when the significance of historical heritage protection has already been widely recognized.

Shipai Village, located in Guangzhou City, is considered a good case in explaining the active model. Shipai Village, built during the South Song Dynasty, has a history of more than 730 years. In the 1950s, it was still a typical agricultural community where people earned by growing and selling vegetables. This village is approximately 3 kilometers away from the urban area of Guangzhou. Beginning in 1987, with the implementation of the Eastward Development Strategy, village farmlands were continuously expropriated. Along with the emergence and strengthening of location advantage, more local farmers plunged into a vigorous residential building movement, which marked the prelude of its active renovation.

From 1994 to 1998, Shipai Village had been a large construction site. Most of the families here invested all their money into extending or rebuilding their respective houses for rent. During this period, most of the historical buildings were demolished. With the dramatic increase in the number of rental houses, Shipai Village became one of the most famous dwelling places for the so-called "floating population." At the end of 2000, the number of local villagers was 9181, while that of the floating population who rented houses in the village reached 42,000 (Lan, 2005). The gathering of a large floating population brought many social problems, such as rising crime rate, drug use, and conflicts between local villagers and the floating population (Yan; Wei and Zhou 2004). Consequently, the city government realized the necessity of renovating this community. However, the renovation cost could reach as high as RMB 4.5 billion based on the lowest compensation price that local farmers may accept (Lan, 2005). These extremely high costs were not affordable, which resulted in a dilemma on the part of local farmers.

We can learn from the aforementioned case that in the active model, local villagers integrate a series of advantages to renovate the village at low costs and in a decentralized way to absorb the added value of their
land, which is a result of their advantageous location. This model plays a role, which the government "is not able to play" and which the market "will not play." To a certain extent, the model meets the urgent demand of the city for spatial expansion, making it a reasonable idea. However, this independent and scattered way of rental house construction has inevitable negative effects. On the one hand, the "individual rationality" of villagers for maximizing their economic benefits brings a "collective irrationality" consequence. Disordered development leads to the rapid decline of historical landscapes. On the other hand, the urban village phenomenon, as previously mentioned, tends to cause numerous social problems that are difficult to solve in a short period (Lin; Bruno and Wang, 2012). Therefore, the active model, which significantly satisfies the private economic interests of local villagers, could actually neglect the cultural heritage value of these areas. Hence, although the economic cost is relatively low, the social cost is extremely high.

3.2 The Passive Model

The passive model, which is led by the government, is also stimulated by economic and constitutional regulations. Based on rent theory, the price of land is higher in urban centers than that at the outskirts because city centers have more infrastructure and public facilities (William, 1964). After 30 years of rapid development, the land available in urban centers has become scarce. However, the social and economic functions of the city expand continuously, and require appropriate spaces for accommodation. Relatively, an urban fringe is not so far away from an urban area compared with outer suburbs. Land price here is significantly lower, and the ecological environment is better than that in the city center. Continuous development in an urban fringe allows the government to save expenses on infrastructure development because of the presence of built infrastructures in this region.

From an institutional perspective, China practices a dual-track land-use system. Based on this system, if the rural land needs to be developed, then it should be converted into urban land first. Moreover, the city government has the exclusive right to expropriate rural land. The key problem is that the compensation price for rural land expropriation is not determined by the market but the current land output value (The Central People's Government of the People's Republic of China, 2004), which is significantly lower than the actual market price. This means that the city government can obtain rural land for a significantly low price without any competition, and then sell it on the land market that employs an auction. Consequently, the selling price can always be surprisingly high. Hence, rural land expropriation has become one of the most important city development-supporting strategies because the huge land revenue serves as the main source of funds for city construction (Cao; Feng and Tao, 2008).

In this situation, the city government also includes traditional villages into the urban construction areas through planning tools, by which the land is endowed with circulation rights. Afterwards, the land of the villages will be expropriated and put up for auction on the market. Finally, it will be used by land developers based on their own needs and on certain planning regulations. Within this development model, traditional villages are often entirely demolished, and only a few historical buildings with high heritage value are preserved. However, the remaining buildings inevitably become isolated from the newly built environment and the significance of being part of the entire traditional settlement is lost.

Fig. 4. Passive Model Mechanism

Liede Village can be regarded as a representative case of the passive model. Liede is a typical traditional fishing village with a history of more than 800 years. Its traditional environment was well maintained before the reform and opening-up campaign. In the 1990s, with the expansion of the Guangzhou urban space and the emergence of location advantages, Liede was gradually surrounded by urbanized areas. In 2007, the village was removed as part of efforts related to the hosting of the Asian Games, which also ended the historical pattern of this traditional village.

The Liede Village reconstruction plan could be divided into three parts: a residential area (partly comprised of houses for the previous villages), an official area, and a luxury hotel. All reconstruction projects were up for auction. The housing price around Liede Village was approximately 20,000 RMB/m² at that time, a price the rural immigrants who used to rent rooms in the village could not afford. They had to move out and find another place where the rent was relatively lower. Imagining that other suburban villages were likely to become their new dwelling site was not difficult, which meant that the housing problem of rural immigrants was not solved but merely transferred to another area.

The compensation plan for local farmers entailed building areas that were legally in their homestead areas which were sold for urban development. This might mean that the housing problem of rural immigrants was not solved but merely transferred to another area.

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This situation led to a significant increase in the wealth of local farmers in a short period. Nevertheless, most villagers did not know how to deal with such a huge amount of money because of their low educational level; in fact, a few of them indulged in extravagant consumption. They did not work anymore and became "subjective surplus labor forces" (Li, 2002). Faced with a new urban lifestyle, many farmers, who became urban residents overnight, had difficulty adjusting and encountered problems in positioning themselves in the new social network (Zhou, 1993). This "overnight" reconstruction model has the disadvantage of a lack of social concern. One-time compensation and replacement are not enough for them to prepare their future lives as urban residents.


As already discussed, urban fringe located in the transition zone between city and village, is in a fast changing process. To renovate the traditional villages in this area, a more resilient and dynamic model which can coordinate the relationship between city and village is crucial. The following suggested objectives also need to be achieved during the renovation process:

- To protect cultural heritage;
- To ensure protection of the interests of local villagers;
- To care for rural migrants; and
- To achieve land value appreciation.

4.1 The Concept of Co-Evolution

"Co-evolution," originally a biological concept, refers to the change of a biological object triggered by the change of a related object. Each party in a co-evolutionary relationship exerts selective pressures on the other, thus affecting the evolution of one another. Charles Darwin stated, "I can understand how a flower and a bee might slowly become, either simultaneously or one after the other, modified and adapted in the most perfect manner to each other, by the continued preservation of individuals presenting mutual and slightly favorable deviations of structure" (Darwin, 1859).

This concept provides the wisdom to handle the relationship between two things, which is to seek a win-win situation wherein each party can gain progressive development in a dynamic framework, rather than achieve unilateral, rapid development at the expense of sacrificing the interests of the other. If we employ this concept in renovating traditional villages in the urban fringe, then we should respect the development requirements of cities and villages and adopt the following ideas:

- From the spatial dimension, the renovation process should optimize the spatial structure between the urban area and the village;
- From the time dimension, renovation should be a long-term and gradual integration process, rather than an overnight and disjunctive replacement;
- From the methodological dimension, the urban area and the village should be modified and adapted by the continued preservation of individuals presenting mutual and slightly favorable deviations of structure, instead of the village being "devoured" by the neighboring city.
4.2 Co-Evolution Model

By applying the advantages of the two models mentioned above, and combining the specific requirements generated from the traditional villages in the urban fringe, the authors suggest the Co-evolution Model. This model is established on the basis of respecting the characteristics of both cities and villages. Through a mutually beneficial way, it not only pays attention to improvement of the physical environment, but also is concerned about the development of the social and economic aspects. More importantly, this model will contribute to the development of the people, especially the villagers and vulnerable groups, so as to facilitate the harmony of society. Thus it is a superior way for renovating traditional villages in the urban village.

In this model (Fig.6.), an organizational framework of multi-party cooperation is established. The representative of villagers will be the main controller to handle renovation matters; the floating population and other developers can be the participants, while the government plays the role of a supervisor. And a negotiation procedure among stakeholders is adopted to build a platform for expressing the interests of each party.

At the same time, a development transfer area between the village and the urban area is established. This area plays the role of a spatial carrier that accommodates the development volume transferred from the traditional village. This model is similar to a dam that accumulates the flood of urbanization capital, and then distributes it into various fields planned for cultivation. Without this dam, the traditional village will be inundated by the "tide" of urbanization.

To ensure that all aspects of the model run smoothly, a series of supporting policies is formulated, such as low-interest loans from banks, pooling rural land as shares or mortgages, transfer of development right, and the establishment of traditional village renovation and employment funds. In summary, the basic logic of this model is to promote interaction and development between both rural and urban areas through the establishment of an intermediate carrier. Such interaction can lead to the achievement of the following goals: protecting cultural heritage, realizing land appreciation, enhancing the employment skills of villagers, and providing low-rent housing for rural migrants. A detailed explanation of this model is presented in the following sections.

4.3 Development Transfer Area

A development transfer area between the village and the city must be built in order to:

- Enjoy the benefits of development, which is generated by land appreciation inside the traditional village;
- Provide a resettlement space for villagers during the renovation period, if necessary;
- Build low-cost housing for rural migrants who are living in the village; and
- Provide space for urban functions.

Accordingly, development profits generated by the development transfer area are channeled mainly into the following fields:

- The development profits of village community and other developers;
- The "renovation fund for traditional villages," which continuously provides financial support for heritage conservation;
- The "employment fund" for villagers and immigrants, which provides employment skills training and consulting; and
- The accumulation of funds of the village and the individual bonuses of the villagers

For this region, the transfer of land development rights, which is a flexible method of land management based on market mechanism, is referred to. Admitting...
that each parcel of land has an equal right to be developed, transfer of land development rights can lead land development activities toward more suitable areas to protect cultural heritage, environmentally sensitive areas, and the lands that have strategic positions (Johnston and Madison, 1997). The core of this theory is to transfer the development right from protected areas (generally called the "sending areas") to non-protected areas (generally called the "receiving areas"). In practice, developers purchase the development right of protected areas and build higher or denser buildings in the non-protected areas. Once the development right of the "sending area" is purchased, the land is no longer developed. The owner of the land can obtain economic compensation in the transfer process and share the profits of land development (Ding et al., 2005).

In the co-evolution model, the traditional village is regarded as the sending area, and the development transfer area is regarded as the receiving area. When the land development right of the village is transferred, the village is protected instead of being developed by estate developers. In the meantime, the receiving area would have more volumes for land development after receiving the transferred right from the village.

The start-up capital source for the development transfer area is a core issue of this model. The authors suggest that if the site of the receiving area is located in the rural land of the village, then pooling land as shares should be allowed. If the receiving area is located in the urban land, then the collective land or other properties of the village can be used as mortgage. Through policymaking, the government should assist the development of a receiving area by enforcing tax relief or by providing project loans to extend the financing channels of the village community. At the same time, market-oriented companies should be allowed to participate in the project, but they are treated as a supplement of the village community, rather than its substitute.

4.4 Interest Distribution Pattern

There are two methods employed in the model to ensure the impartiality of benefit distribution. The first is to restore the profit of public development. This is because the increase of development profit is not solely created by developers but partly through the development of the adjacent land, as well as the construction and maintenance of a series of public facilities that enhance the quality of service for the community. Hence, a part of the development profits should be channeled into the public fund.

In the co-evolution model, the village community is regarded as the main "developer," which means that the restored fund will be collected mainly from the villagers. Villagers mainly have three sources of income: the bonus of development profits of the village community, the rent of their own rental housing, and their job incomes. Among these, bonus and housing rent are partly based on public development profits, which should be transferred to public funds through taxes.

The second method is the transference of development profits. Here, the development capacity is transferred into the "receiving area". Hence, it will generate more development profits. Therefore, a part of the profits can be transferred back to the traditional village by establishing the renovation fund for a traditional village, which is then used to support cultural heritage conservation and village renovation. Creating the employment fund, which is prepared for villagers and immigrants "incapable or unwilling" to find jobs, is also necessary. This fund links employment to the bonus, provides employment training and referral service, and offers opportunities to provide start-up capital for those who want to start their own businesses. Through the joint force of pull and push factors, this fund can help solve the employment problems of villagers and migrants. The mechanisms of the aforementioned methods ensure that part of the development profits and social welfare are channeled to support the renovation of traditional villages, provide care for socially vulnerable groups, and restrict developers in monopolizing the development profits.

4.5 Renovation Process of a Traditional Village

Under the situation in which we have to face a fait accompli, the authors suggest the formulation of a gradual renovation method. A development shortage may be experienced because the main developer is the village community, and the support offered by the government is also limited; thus, implementing a large-scale renovation at the very beginning is impossible. In addition, profits of the receiving area are gradually generated, and the property tax and rents are also gathered annually. Consequently, the cash offered by the receiving area for "renovation fund for traditional villages" will be a gradual process. All the aforementioned considerations suggest that a small-scale and progressive approach to renovating a traditional village is more practical and feasible.

5. Conclusion and Discussion

Based on this study, neither the bottom-up active model nor the top-down passive model can effectively protect traditional villages in the urban fringe. The fundamental reason is that these two models only consider the unilateral interests of urban or village residents, rather than the maintenance and development of bilateral relations in a sustainable way. Therefore, the two models fail to bring mutual benefits. By contrast, the proposed co-evolution model meets the actual needs of both parties: it seeks a win-win solution wherein each party could renew, adapt, and change themselves gradually and positively. Based on this model, the surging urban capital would be collected through an intermediate supporter, and then distributed effectively to relevant fields based on public policies. In the process, cultural heritage is protected, social network is maintained, security risks are eliminated, and a large number of employment opportunities are
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