

Implementation of the Shanghai Master Plan (2001-2020)

Jinghuan He¹

1 Introduction

Urban planning is not ever just a tool that government distributes social/physical resources or guides the urban construction when China stepped into the market-oriented era. It becomes a strategy to direct future development of a city in coordination with market. Urban development is not necessarily following urban plans, but influenced by both plans and market. Hence implementation of urban planning becomes essential as Wildavsky (1987) reminded:

“If planning were judged by results, then planning has failed everywhere it has been tried. No one, it turns out, has the knowledge to predict sequences of actions and reactions across the realm of public policy, and no one has the power to compel obedience [p.37].”

This paper intends to evaluate implementation of *Shanghai Master Plan: 2001-2020 (01SHMP)*, which concerned peripheral development and urban restructuring. The evaluation concentrates on two aspects: 1) whether and to what extent has the plan been implemented to influence the actual spatial development? 2) Which factors are related to the success of planning implementation?

Evaluation of planning implementation has been studied for decades. The most acknowledged theories include conformance-based approach and performance-based approach (Berke et al., 2006; Laurian et al., 2004; Loh, 2011; Mastop & Faludi, 1997). Conformance-based approach highlights conformity between actual physical development and plans, which fits physical-oriented plans. Performance-based approach explores how the ideas within a plan are delivered and implemented. However, conformance-based approach has been only used to evaluate implementation of land use plans, while performance-based approach has never been utilized to a case due to its complex framework.

This paper employs conformance-based approach to compare the 01SHMP and actual spatial outcomes quantitatively (Loh, 2011; Tian & Shen, 2011).

¹ Delft University of Technology, Delft, the Netherlands – jinghuan.he@tudelft.nl

Conformance-based approach is not only used to compare land use plan and land development as before. It concerns both spatial outcomes and socio-economic influences of the 01SHMP due to its strategic and complex consideration on different aspects of urban developments.

Findings of this paper show to what extent has the 01SHMP been implemented. They also show which factors have influenced the implementation. Locations where plans have not been implemented require further exploration, for instance, how did local plans cooperate with the 01SHMP to influence actual urban development.

2 Shanghai Master Plan (2001-2020): the analytical target

2.1 01SHMP at metropolitan level

Chinese spatial planning has experienced significant transformation since the economic reform in 1978. Multi-tier planning system replaced a two-tier planning system, which contains master plan and site development control plan, when the City Planning Act was promulgated in 1990. City-region plans and urban system plans appeared above city master plans as products of a new administration system² in 1984. Medium and large size cities introduced district plans and detailed development control plans (DDCP) between master plans and site development construction plans (Gar-on Yeh & Wu, 1999). They played an intermediate role to connect master plans and site development control plans at micro level, which becomes urban design currently. Within such multi-tier planning system, only two levels of plans are legislative: master plans and DDCPs [see Figure 1].

² The new system merges several central cities and nearby small towns and counties into a large municipal government, which is acknowledged as city-regions (shiyu). This transformation intends to extend the administrative boundary of local government and to eliminate of urban-rural dual system.

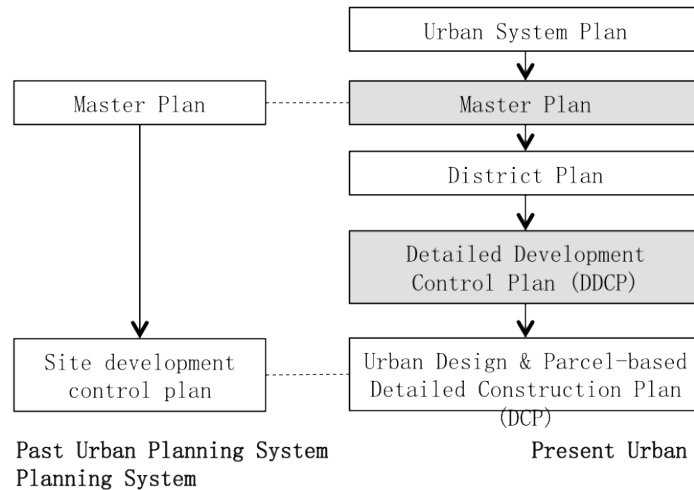


Figure 1 Different levels of urban plans (Yu, 2008f)

This paper intends to evaluate one of the legalized plans: Shanghai Master Plan (2001-2020). The 01SHMP concerns many aspects about future urban development at metropolitan level including the size of the city population over the next 20 years, industrial structure, housing development, land uses, infrastructure and citywide social amenities. The 01SHMP is theoretically a binding plan, which means deviation from the 01SHMP will lead to legal punishment. However, deviation is sometimes allowed after required procedures.

2.2 Peripheral development: core issue of the 01SHMP

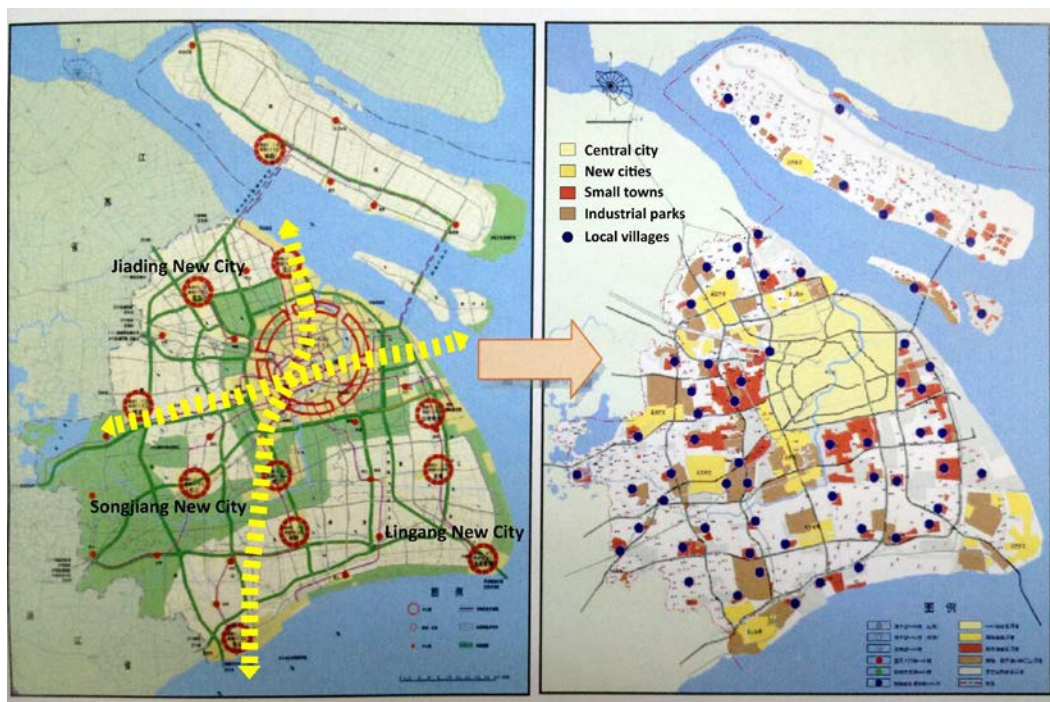
Shanghai retained the role of Chinese economic center after a series of reforms in the beginning of 1990s. Its population reached 23 million in 2010, representing an increase of 6.62 million from the 2001 size. Limited territory in the central city was not enough to accommodate such enormous population. Hence, the 01SHMP transformed the focus from regeneration in the city center to peripheral development. Shanghai Municipal Government planned to develop its periphery in order to decentralize large population, to prevent urban sprawl, and to attract more investment. A “multi-axis, multi-center and multi-level” urban structure became the core doctrine in this plan.

The 01SHMP planned a new development axis from old town in Puxi to Pudong district after the south-to-north axis defined in 1980s. This new axis was planned to consolidate Pudong’s role as Shanghai’s ‘dragon head’. These two axes formed a balanced urban structure for future development. Also, construction of new towns became the first priority of future development in Shanghai. “One City, Nine Towns Development Plan” in the beginning 2000s was a pilot project in the Tenth Five-year Plan (2001-05). Afterwards, the nine towns were upgraded to new cities in the year of 2004. Three new cities (Jiading, Songjiang and Lingang)

on three important economic corridors were further planned to attract 800,000 populations [see Figure 2(a)].

In the year of 2006, “1-9-9-6” model replaced “One City, Nine Towns Development Plan” and defined a new urban structure. Figure 2(b) showed a 4-layered urban structure. “1” referred to the central city, “9” represented nine new cities, the first “6” meant sixty small towns around the 9 new cities (50,000 to 150,000 residents), and the second “6” meant six hundred local villages in remote suburbs (Shanghai Municipal Government, 2001).

Besides, municipal government developed many industrial parks to attract factories from the city center and to integrate small-scaled industries in suburbs in the background of industrial restructuring [see Figure 2(b)]. It also promoted infrastructure development especially public transport in order to strengthen the connection between the city center and new cities. Housing development was another strategy to attract population to periphery. Hence this paper intends to evaluate implementation of the 01SHMP with particular focus on peripheral development.



a) One City, Nine Towns Program b) “1-9-6-6” Urban Structure Plan
 Figure 2 From “one city, nine central villages” to “1-9-6-6” system(Yu, 2008a)

3 Method

3.1 Conformance-based approach

Conformance-based approach and performance-based approach are two of the most frequently used methods to evaluate planning implementation. Selection of approaches to evaluate planning implementation depends on their position of understanding spatial planning. Conformance-based approach concerns planning outcomes and the linkages between plans and actual development. It assumes a rational model of planning, which are specific enough to guide future development (Wildavsky, 1987). A plan is considered implemented if development patterns adhere to its policies and meet its objectives.

Performance-based approach focuses on whether and how the plan is consulted in subsequent planning process. It seems more proper to evaluate strategic plans. This approach should correspond to a detailed analysis of the decisions and actions of a number of actors that are supposed to receive the plan messages (Oliveira & Pinho, 2010). A plan is considered implemented if it is used or consulted in decision-making processes, no need to be strictly adhering to the actual outcome. Departures from a plan may be also considered implemented if they are rational or inevitable (Alexander & Faludi, 1989; Faludi, 2000; Mastop, 1997; Mastop & Faludi, 1997).

Shanghai Master Plan (1999-2020) set many macro targets such as spatial structure, population growth, industrial structure, and infrastructure development. Qualitative measurement seems more appropriate to this target-oriented and physical-preferential master plan. It helps to explore influences of the plan and interventional factors of planning implementation. Hence the following section evaluates planning implementation in two dimensions based on conformance-based approach. The first is to examine the accomplishment of quantitative objectives according to planned issues. The second is to analyze spatial distribution in terms of selected variables respectively [see Figure 3].

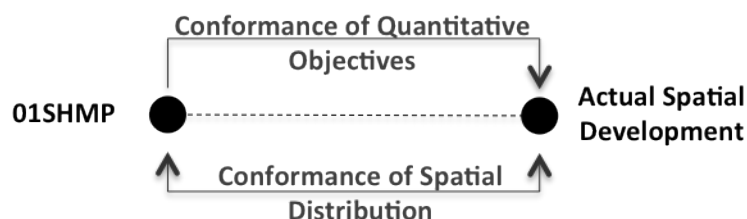


Figure 3 Analytical frameworks

3.2 Selection of variables and indicators

This study is not able to evaluate all aspects of the 01SHMP. Thus it chooses several essential variables, which are significant to demonstrate the peripheral spatial features. Moreover, these variables must be also important strategies in the 01SHMP. Five variables are selected according to the above-mentioned considerations. They are:

- Population growth³. Population is frequently used to demonstrate a socio-spatial structure, the real use of a specific area and also trend of urban development (Laquian, 2005; Sue Warn, 2005). Meanwhile, forecast of the future population growth was also the most important and fundamental task of the 01SHMP.
- Land development. Land development crucially shows the direction of urban growth. Period of land development reflects spatial organizations according to the economic situation and policies. The 01SHMP addressed importance to the land use plan as before. It identified functions and their densities deliberately in different locations.
- Industrial structure. Industrial restructuring is the most important target of the 01SHMP as stated. In the 01SHMP, industrial land use occupied most proportion of the peripheral territory compared with other functions. Hence industrial structure and its spatial distribution are significant to represent spatial organization in the periphery.
- Infrastructure. Development of infrastructure is the most important strategy not only in the 01SHMP but also in the National Twelfth Five Year Plan at national level to improve living environment and enhance city competitiveness. It influences the future urban development through establishing a transport framework.
- Green space. The 01SHMP used green space as an important strategy to prevent urban expansion. However, new development always appears on the planned green sites. Hence evaluation of planning implementation in terms of the most conflicting variable would be interesting.

Each variable could be measured through different indicators depending on the availability of the data and the degree of the indicators' significance. There are two categories of indicators including quantitative objectives and spatial distribution. Table 1 identifies different indicators of the five selected variables for the following evaluation.

³ Population here refers to the resident population including those who live in Shanghai for one year or more either with or not with household registration. Household registration is a unique product in China that is originally used to control population movement. People without household registration of a specific place were not allowed to stay for more than three months. However, this system was loosening presently, and has been influenced current population movement.

Variables	Indicators	
	Quantitative objectives	Spatial distribution
Population	Population scale	Spatial distribution of population
	Employment structure	
Land development	Total area of developed land	Spatial distribution of developed land
	Total area of residential land use (*)	Spatial distribution of residential land use
Industrial Structure	Industrial development (area and proportion)	Spatial distribution of secondary industry (and industrial parks)
Infrastructure	Length of roads (*)	Road system
	Length of metro lines (*)	Spatial distribution of metro lines
Green space	The area of undeveloped land	Spatial distribution of strategic green space (*)

Note: * represents lack of data

Table 1 Variables and indicators for the evaluation of planning implementation

3.3 Unit of analysis: the urban street

Selection of a proper analytical unit is crucial to evaluate implementation of the 01SHMP. Shanghai's administrative system consists of four tiers: city level, district level, urban street level (equivalent to township level in countryside), and neighborhood level. Urban street level is the lowest formal tier with government offices in Chinese administrative organization. It is also the basic unit for official data such as census, administrative territory, etc. Hence it becomes basic unit of the DDCPs in Shanghai [see Figure 1].

This paper employs urban street as unit of analysis for the evaluation because it supplies reliable and specific information to illustrate the trends and spatial characteristics of peripheral development. Shanghai has nine peripheral districts including Chongming Island. Each peripheral district has about 20 to 35 urban street units, which is about 25km² of area.

4 Results of conformance-based evaluation

Absorbing population from city center, industrial restructuring and establishing a multi-layer urban structure become the main goals of peripheral development in the 01SHMP. The following section examines the implementation status through selected variables such as population, land development, industrial structure, and infrastructure and green space respectively in order to evaluate the planning implementation. We analyze the results according to two categories for each

variable. One is to examine the accomplishment degree of the quantitative objectives through documentary and literature review. The other is to examine the accordance level of the spatial distribution through spatial mapping.

4.1 Population

A city master plan works on the premise of forecasting future population and guiding population movement (Friedmann, 2005; Ma, 2002). Thus analysis of the population development and its distribution is crucial to demonstrate socio-spatial structures and trends of development (Sue Warn, 2005). The following paragraphs evaluate population development in three terms: the population growth, the employment structure and its spatial distribution.

Population growth

Population is measured through two criteria: residents and registered population. Residents refer to people who live in Shanghai more than half year either with Hukou⁴ or not. Registered population is those who have Hukou and live in Shanghai more than half year. The 01SHMP predicted steady growth of population. The residents of Shanghai would increase from 14.57 million in 1998 to 15 million in 2010, and reach 16 million in 2020. But the actual population reached 16.41 million in 2002, which already exceeds the planned amount in 2020. It further climbed to 18.58 million in 2007, and 23.02 million in 2011 (National Bureau of Statistics of China, 2011). The Immediate Urban Construction Plan (2003-07) (03IUCP) and Immediate Urban Construction Plan (2006-10) (06IUCP) amended the figure in order to adjust to the changing situation, but it never caught up with the dramatic population growth.

Unlike the rapid growth of residents, the registered population in Shanghai remained stable, which basically conformed to the plan. The registered population is planned to rise from 13.07 million in 2000 to 13.8 million in 2010, and 14 million in 2020. It actually had grown only 0.9 million within past ten years from 13.2 million in 2000 to 14.1 million in 2010.

Employment structure

8.47 million residents were employed in 1997. The employment structure was 12.7% in agriculture, 49.1% in secondary industry, and 38.2% in service. The 01SHMP intended to promote modern service industry and advanced manufacture in order to improve the competitiveness of Shanghai. It predicted

⁴ Hukou is basically a resident permit given by the government of China. It is issued on family basis. Every family has a Hukou booklet that records information about the family members, including name, birth date, relationship with each other, marriage status (and with whom if married), address and your employer. It was used to control population movement in every aspect before 1990s. Hukou system was loosening after 1990, which made it possible for many immigrant workers to leave their hometowns and go to cities for labor-intensive works.

the employed residents would be 8.62 million in 2010 and 9.1 million in 2020. The employment structure was planned to be 5%, 45% and 50% in 2010 respectively; and 2%, 38% and 60% in 2020 respectively (Yu, 2008e).

Employed residents reached 8.86 million in 2006, which accomplished the aim of the 01SHMP. Figure 4 further shows that employment structure followed what was planned. Proportion of employment in third industry increased over the past years and reached 55.92%. The counterpart, secondary industry and agriculture, decreased slightly.

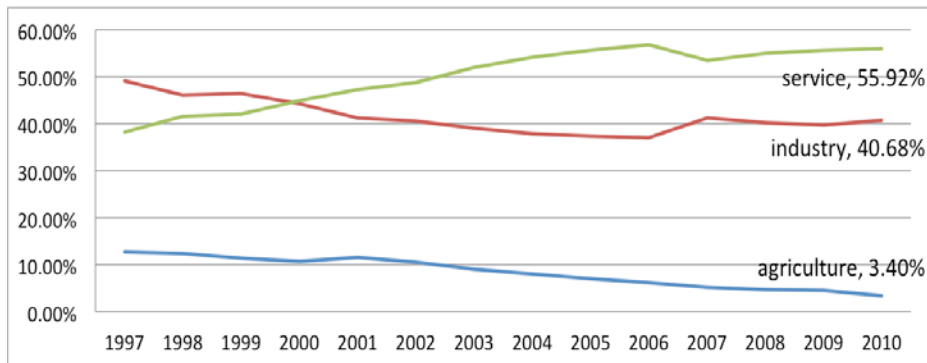


Figure 4 Transformation of employment structure
Source: (Shanghai Statistical Bureau, 2009, 2011)

Spatial distribution of population

The 01SHMP intended to export population from the central city to the periphery in order to shape a multi-centered urban structure. New cities and central towns in suburbs are the main locations that would accommodate the relocated population [see Figure 5]. Peripheral Shanghai is planned to accommodate same amount of population as the city center, which is 8 million (Shanghai Municipal Government, 1998).

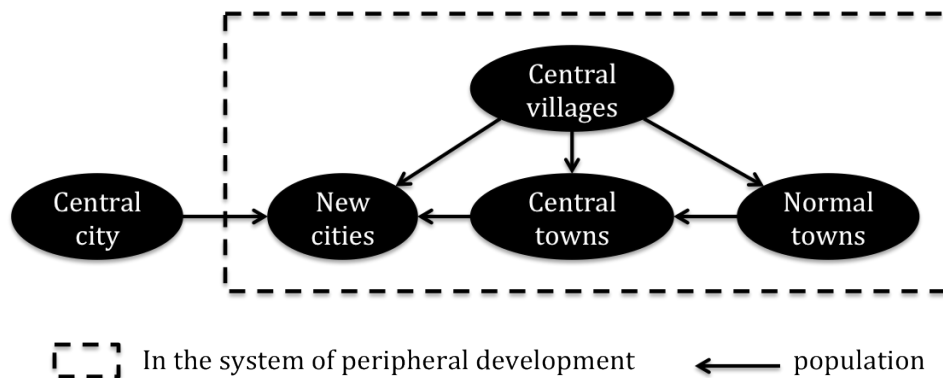


Figure 5 Population migrations in the 01SHMP

The population in the central city remains 9.99 million, while its counterpart

beyond the outer ring road reaches 13.04 million, which has experienced 6.56 million of growth in the past 10 years (Shanghai Statistical Bureau, 2011). Figure 6 suggests that those relocated population in periphery gathers either in nearby suburbs (Minghang and Pudong districts) or along transport axis (Songjiang and Jiading new cities).

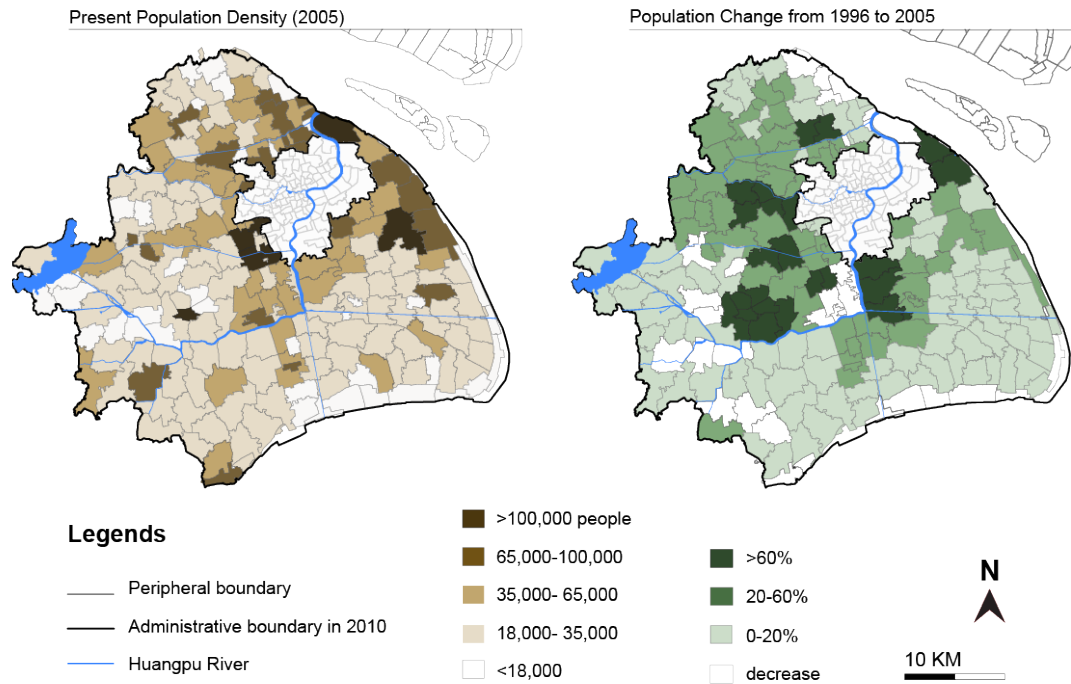


Figure 6 Population densities and their transformation

Even though, four types of periphery performed differently in accommodating the relocated population from 2000 to 2006. Figure 7(a) shows that planned new cities had 20.8% of population growth. But only nearby new cities such as Songjiang, Jiading and Minhang developed fast due to their convenient accessibility. Majority of the central towns lost population during that period, which did not meet the expectation of the 01SHMP. Only those along outer ring road experienced population growth [see Figure 7 (b)]. Figure 7(c) illustrates the quick development of industrial parks which had 31.2% of population growth (Yu, 2008e).

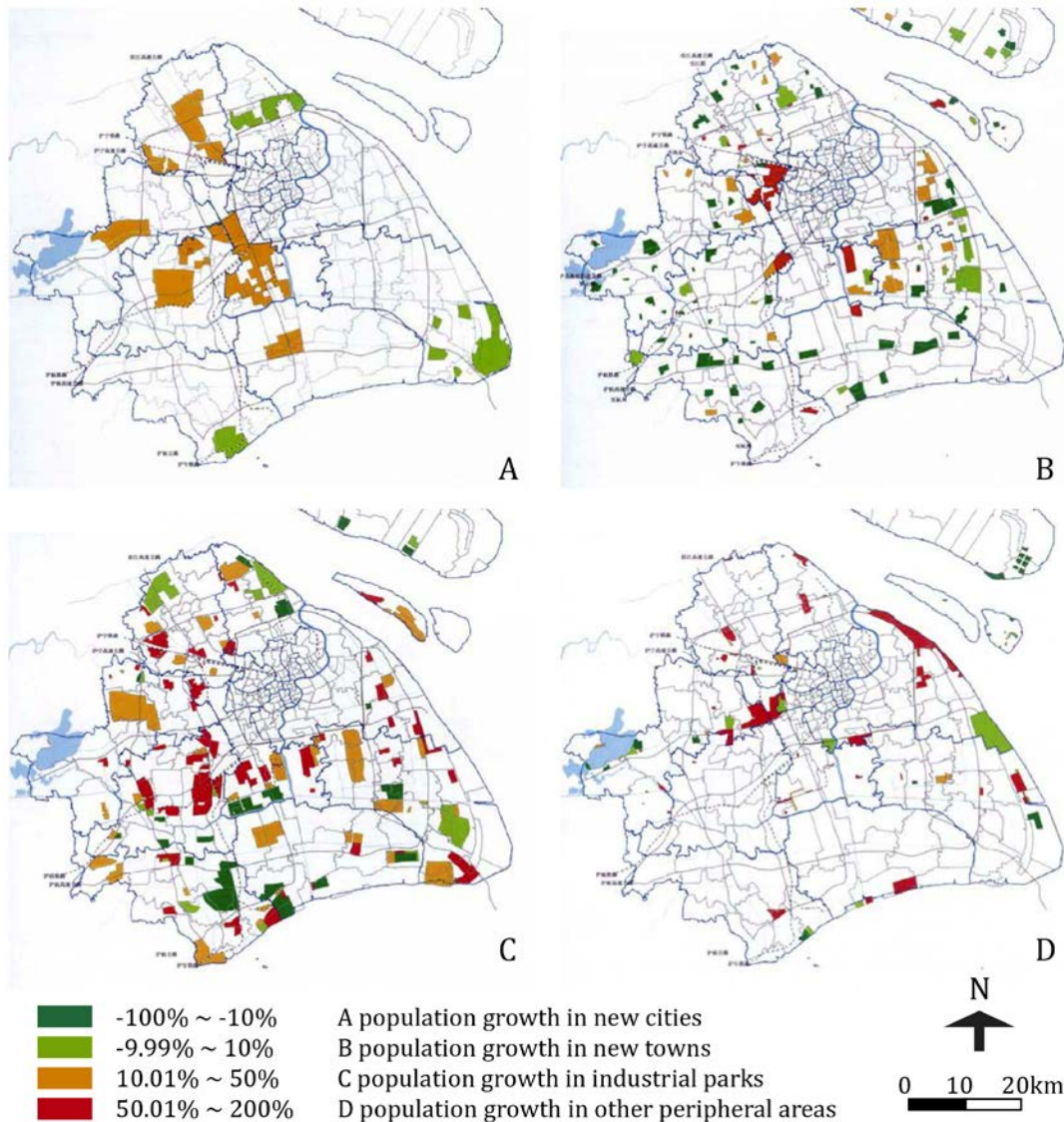


Figure 7 Population change in different types of periphery from 2000 to 2006
 Source: (Yu, 2008e)

4.2 Land development

Growth of land development

Rapid urbanization in Shanghai is not only embedded in the increasing number of inhabitants, but also in terms of land development. The area of occupied land increased from 1073.1km² in 1997 to 2080.3km² in 2006, which represents 93.9% of growth in the past 10 years. Such rapid land development is mainly due to the developments in the periphery beyond the outer ring road, which increased from 626.9 km² in 1997 to 1536.7 km² in 2006 (145.1% growth) (Yu, 2008d). Figure 8 suggests that developed land in suburban districts (excluding Jinshan and Chongming) and Pudong District in 2006 doubled the area in 1997. Occupied land in the periphery reached 73.9% in 2006 instead of 58.4% in 1997.

However, the periphery is unevenly developed. Inner suburban districts such as Minhang, Baoshan, Jiading, Songjiang develop much faster than remote suburban districts. Recent Suburban Program (2006) (06RSP) modified the 01SHMP based on the actual development. Even though, limited space in nearby suburbs is available for future development [see Figure 8].

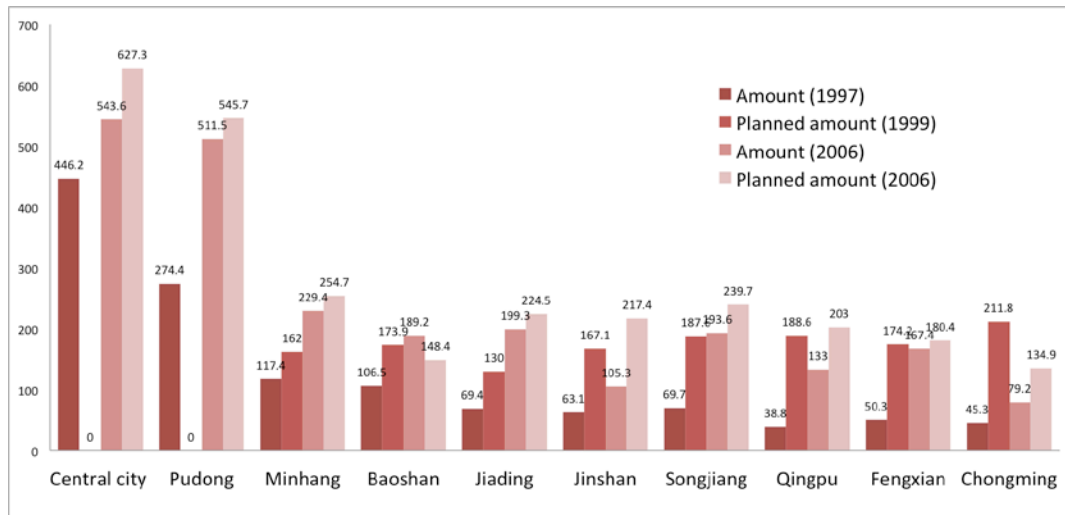


Figure 8 Actual land development and land development plans in the year of 1997 and 2006 (unit: km²)

Source: Shanghai Statistical Yearbook (1998, 2007)

Spatial distribution of land development

The 01SHMP highlighted three points of future development: 1) to promote new development axis from Puxi to Pudong district; 2) to prevent urban sprawl within the outer ring road; 3) to develop suburbs, especially remote new cities and central towns.

Actual land development exceeds the goals of the 01SHMP. Spatial distribution of new development further represents a failure of planning implementation. Figure 9 shows that new developments do not avoid urban sprawl. More than 45% land in Puxi area has been developed. Expanding development connects new cities in southern west direction with the central city. The green belt along outer ring road, which was planned for preventing urban sprawl, is never maintained. Enormous leapfrog developments appear in isolated territories instead of local villages. Nevertheless, west-to-east axis forms. Several development axis connecting the central city and new cities, and an offshore development axis are also shaped. Development of new cities is on the right track.

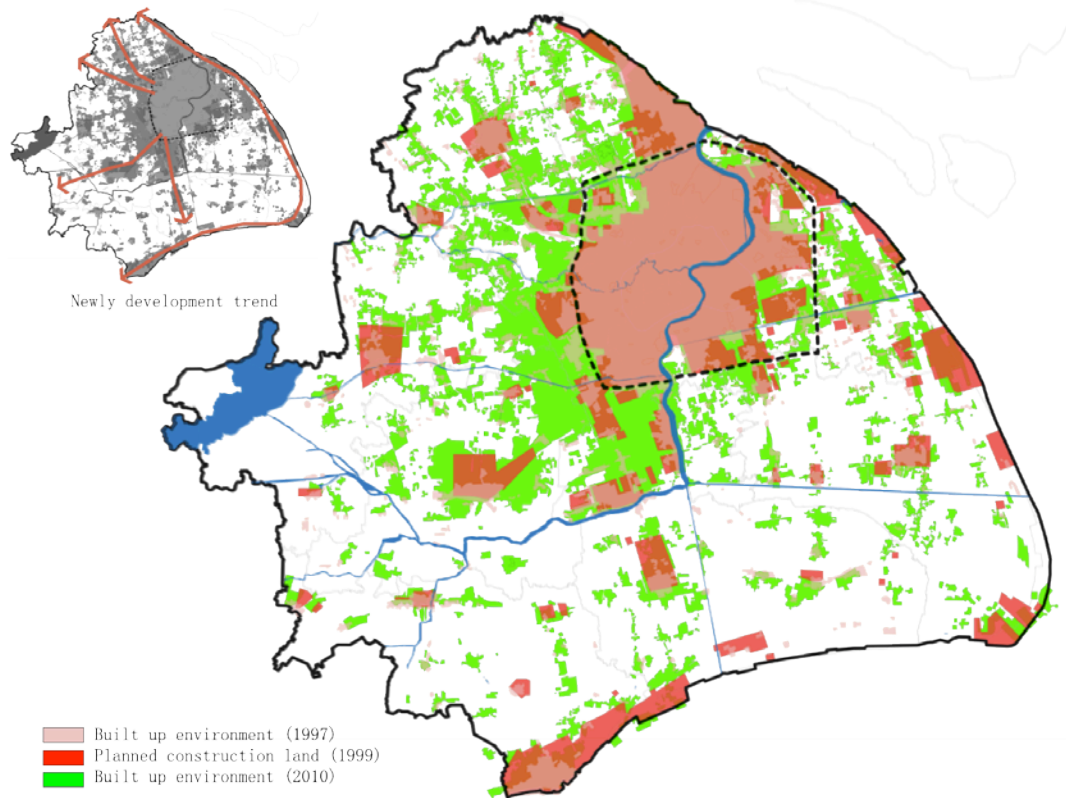


Figure 9 Spatial distribution of new development from 1997 to 2010

Residential land use development

Industrial and residential developments are two main issues for peripheral development. 20% of the peripheral land is planned for residential uses in the 01SHMP. Majority of residential developments are planned along the metro lines or in new towns between the inner ring road and the outer ring road.

New developments for residential use increased rapidly from 250.6 km² in 1997 to 448.6 km² in 2006. Within such growth, 40.2 km² was in the central city and other 157.7 km² was in the periphery. Residential land development gradually spread from the city center to the periphery. Peripheral residential land use occupied 59% of total residential land in 2006 instead of 42% in 1997 [see Figure 10]. The proportion of residential land development is in accordance with what was planned in the 01SHMP. Enough land is left for future residential development according to 06RSP.

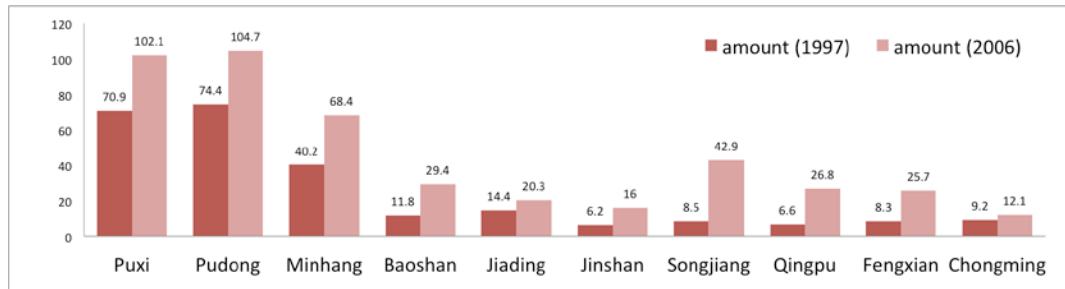
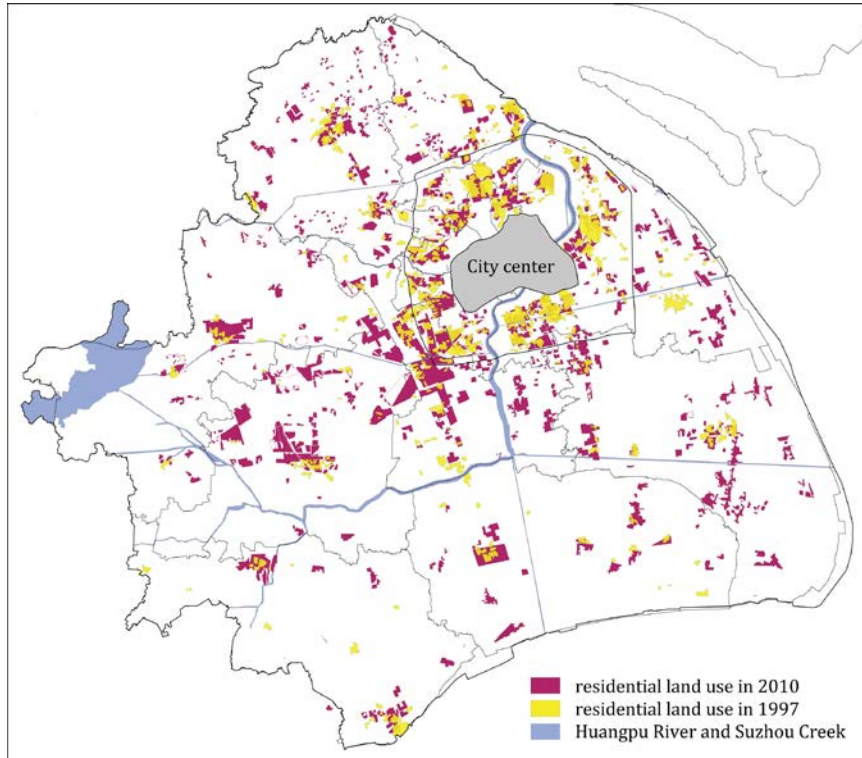
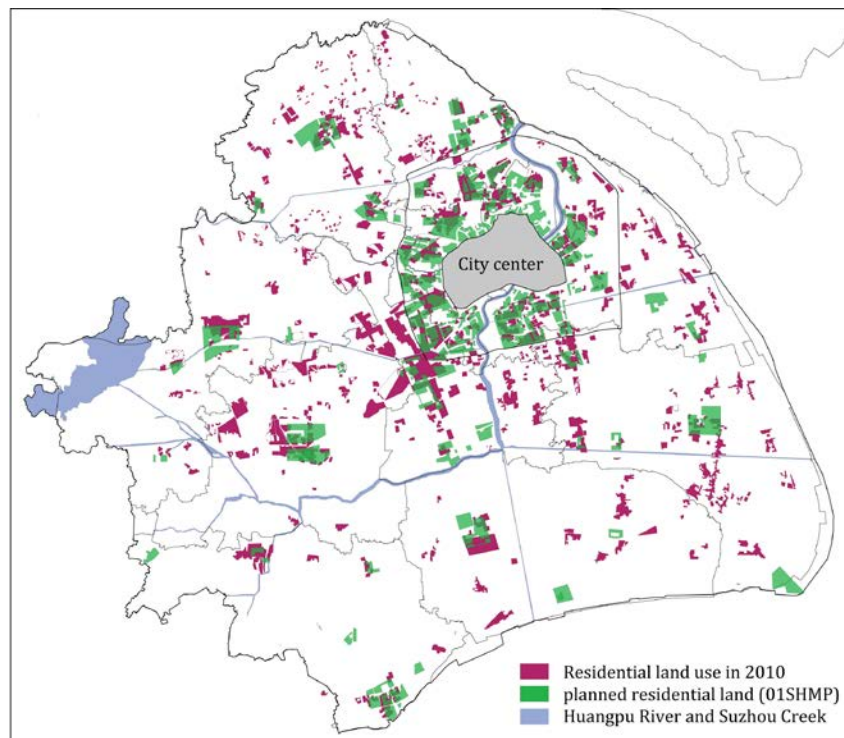


Figure 10 Residential land developments from 1997 to 2006 (unit: km²)

However, Housing Development Plan (part of the 01SHMP) has been only partly achieved. Residential development was not evenly distributed all over Shanghai periphery. The southern-west direction has been the main axis for new residential developments. Figure 11 (a) suggests that Minhang District attached to the city center and Songjiang New City have too much new residential development compared to other peripheral districts (more than 25km² of new developments). Pudong is also a popular place for residential development. In contrast, other remote new cities do not attract new housing developments as planned. Figure 11(b) further suggests that new residential developments along the southern-west corridors are unplanned. On contrary, new residential development in Pudong district basically follows the 01SHMP.



a) Residential development from 1997 to 2010



b) Planned residential development in the 01SHMP and actual residential development (2010)

Figure 11 Residential land developments

4.3 Industrial development

Industrial restructuring, which gives priority to tertiary industry in the future 20 years, is another core issue in the 01SHMP. It identified spatial distribution of different types of industry: tertiary industry in central city, secondary industries moving to the periphery. Following paragraphs discuss industrial structure and spatial distribution of secondary industry because tertiary land uses (including service in residential compounds, commercial, storing and infrastructure land uses) are too complex to analyze through mapping.

Industrial structure

Shanghai has been a national industrial center for decades. Big strategic factories such as Baoshan Steel Factory and Jinshan Chemistrial Factory have developed in peripheral Shanghai since 1970s and become significant to Shanghai's economic development. The 01SHMP gave priority to the development of modern service and advanced manufacturing; and started to change Shanghai's industrial structure. The outcome was that tertiary occupied half of the GDP for the first time in the year of 2000; and it kept parallel with the secondary industry in the following six years. It exceeded the secondary industry slightly in the year of 2006 [see Figure 12]. Above transformation kept consistent with the change of employment structure, and adhered to what was planned in the 01SHMP.

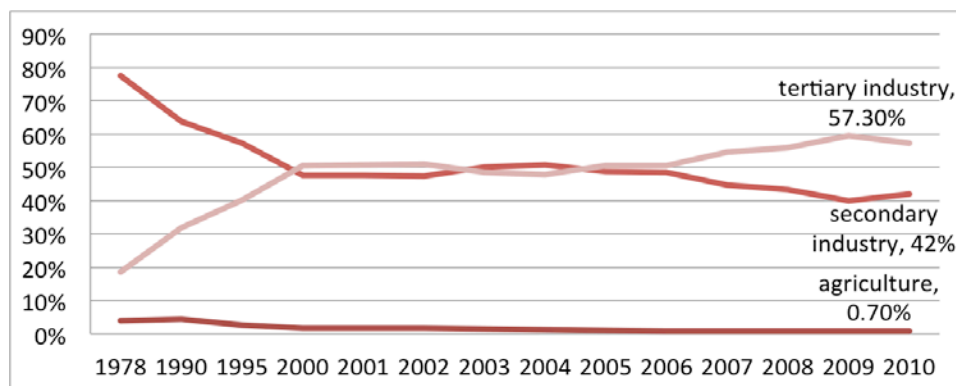


Figure 12 Transformation of industrial structure from 1978 to 2010

Source: Shanghai Statistical Yearbook (2011)

However, the industrial land development exceeded what was planned in the 01SHMP dramatically. Area of planned industrial and warehouse land was 283 km². It was modified to 470 km² in the 06IUCP. But actual development area for industrial uses in 2010, which was 716km², almost doubled the planned amount in the 01SHMP (Shanghai Statistical Bureau, 2011).

Spatial distribution of the secondary industry

The 01SHMP intended to relocate secondary industries to the periphery, and to replace the original ones by tertiary industries and infrastructure. In reality,

secondary land use in the central city decreased from 18.6 km² in 1997 to 5.4 km² in 2006 (with 71% decrease rate). Majority of them have been renewed to modern service such as infrastructure and commercial facilities. The secondary industries did move outward the central city as the 01SHMP planned [see Figure 13]. However, industrial land in the periphery had 534.2 km² in 2006, which doubled the planned amount (230 km²). Presently, 84.2% of Shanghai's industrial land is in the periphery (Yu, 2008c).

Industrial parks, which should play the role of integrating and organizing peripheral industrial development, do not perform well. Enormous industrial developments situate in nearby periphery beyond the boundary of planned industrial parks. Spontaneous industries in remote suburbs are also not integrated into industrial parks or even planned built up areas. In the process of embracing scattered industries, the boundaries of industrial parks extend dramatically and the number of industrial parks increases fast [see Figure 13].

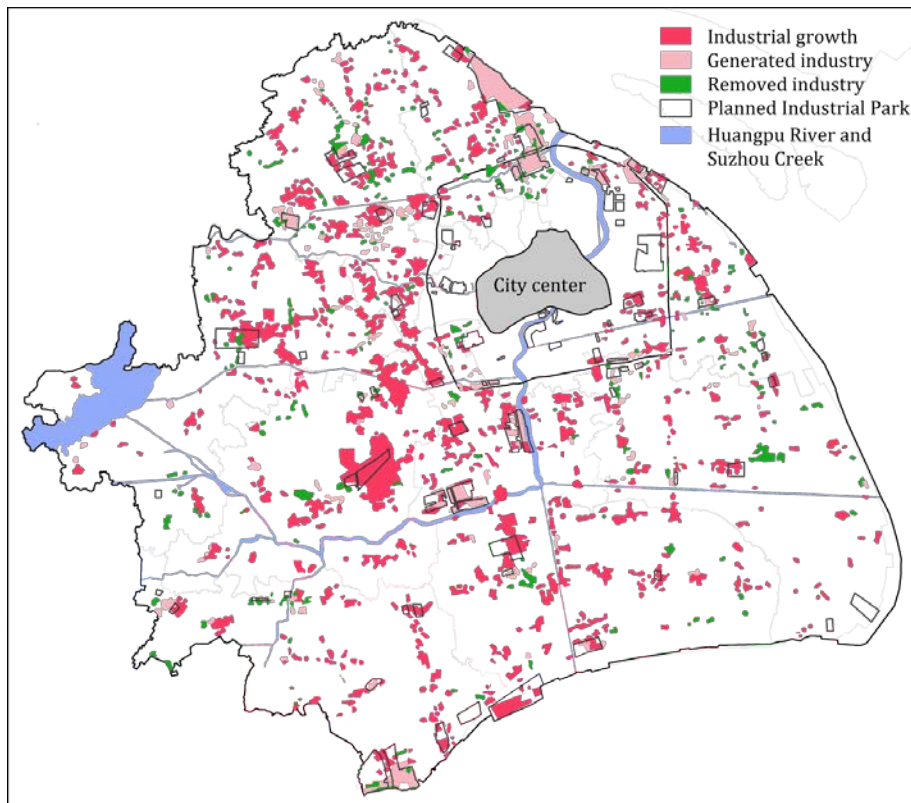


Figure 13 Industrial land development from 1999 to 2010 and planned Industrial parks

4.4 Infrastructures

Improvement of infrastructure became the most important strategy in the National Twelfth Five Year Plan at national level in order to improve living environment and enhance city competitiveness. Shanghai Municipal government

further upgraded the infrastructure development in the 06IUCP:

- To construct ports in Shanghai;
- To build hi-speed train station;
- To complete road system in the periphery;
- To develop public transportation, such as metro lines.

This section evaluates development of metro lines and road system in Shanghai. Airports, big ports and train stations are not evaluating targets because these big projects are planned, sponsored, determined and controlled by the state. Municipality only has authority to implement and construct them.

Length of planned roads in the 01SHMP was 2500km, within which 650km was used as highways. Density of the road system in the plan was 0.43km/km². In reality, constructed roads reach 18000km which breakthrough the plan dramatically. 14750km are beyond the outer ring road. Majority of planned highways have been built according to the plan [see Figure 14]. Unplanned newly built roads are slips in near suburbs.

Metro development has attracted much attention and fund from the municipal and the state. Planned rail transport lines consisted of three categories: 4 rapid rail lines, 8 metro lines, and 5 light rail lines. Total length of the rail lines was 810km in the plan. 330km was in the periphery. Two sectoral plans⁵ modified the length of the rail transport to 1040km, and added four more rail transport lines in adaption to new situations and big events such as 2010 Expo, Hongqiao Transport Hub, and enormous construction of social housing.

Shanghai has constructed 11 metro lines with more than 500km length until 2012. They could assume 8 million passengers daily, accounting for 43% of the carrying capacity from the public transportation in the city (Shanghai Shentong Metro Company, 2012). Actual development of metro lines basically adheres to the 01SHMP except several lines extending outward to remote periphery [see Figure 14]. Besides, rapid rail lines are decomposed into separated short branch lines and replaced by metro lines. Only two light rail lines instead of five are operated.

⁵ Deepen plan of Shanghai Rail Transportation System (2005) and Place Making Plan of Shanghai Rail Transportation (2006)

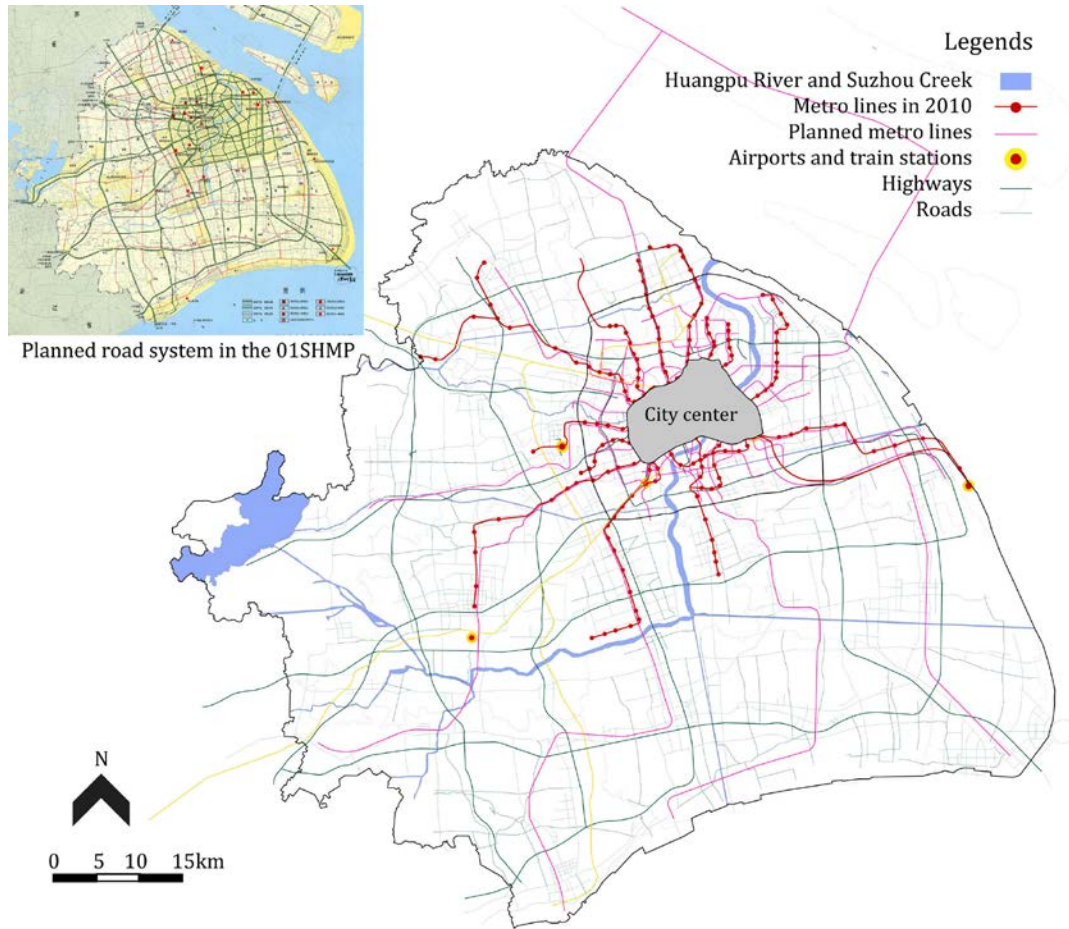


Figure 14 Developments of road system and metro lines

4.5 Green space

Green space plays a significant role to prevent urban sprawl, improve urban environment, and store enough space for future development. Six kinds of strategic green space were defined: green ring, sensitive areas for construction, sensitive areas for ecology, forests, vegetable protected areas and green wedges. Evaluating the implementation of green space development strongly indicates the control of urban sprawl.

Total area of green space

The 01SHMP had several strategies of preserving green spaces: 1) to develop small public green space in the central city and forests in suburbs; 2) the ratio of green space in Shanghai should reach 35% (about 2219.18km²); 3) each resident should have at least 12 m² public green space till 2020.

As a result, construction of green spaces accomplished the plan in advance. Public green space per capita reached 12 m² in the year of 2010. Ratio of the green space in Shanghai was 44.7% in 2010. However, development of forests in

the periphery is far away from reaching the targets. Forests should occupy 30% of Shanghai territory in the plan. However, the actual development of forests was only 11.6% of the whole Shanghai territory until 2006 (Yu, 2008b).

Strategic green space

The 01SHMP identified different types of strategic green space such as green rings along outer ring road, green wedges within outer ring road, green corridors, ecologic-sensitive areas (forests) in remote suburbs, and parks all over the city. Such green space is theoretically prohibited for urban construction. Only some of them allow limited density of urban development. Following paragraphs evaluate the implementation of above-mentioned three types of the strategic green space: green ring, green wedges, and ecologic-sensitive areas in remote suburbs.

62.08 km² of green ring as a strategic tool to prevent urban sprawl was planned along the outer ring road in the 01SHMP. 35.5% of land at most could be used for urban construction including infrastructure and facilities. Until 2010, built-up land reached 29.12 km², which was 46.9% of the whole area. 1160km² land in the southern-west Shanghai was planned for ecologic-sensitive area in the 01SHMP. Only 315km² (27% of the planned area) was planned for urban construction. In reality, 233.3 km² (20%) were used for urban construction in 2006, which has been well controlled. Moreover, 69.22km² on the edge of central city within outer ring road was planned for eight green wedges to improve urban environment. Only 20% land within the wedges was permitted for residential uses. Unfortunately, real green space area within green wedges occupied only 7.64% of the total area. Unplanned development (25.24% of the total land) was converted from agricultural land.

By comparing planning implementation of above three types of the strategic green space, only ecologic-sensitive area is well implemented. The other two types of the strategic green space near to the central city meet more difficulties to follow the plans.

5 Discussion

After analyzing implementation of the 01SHMP in terms of the five variables, we need further discussion between relative variables and explore potential factors that influence planning implementation.

Different degrees of implementation success between variables

Above analysis indicates that the implementation of infrastructure and green space is more successful than that of population development, land development and industrial restructuring. More government funds and monitoring on the

implementation of open space and public facilities are potential reasons of the success (Tian & Ma, 2009).

Developments with more market intervention such as residential, commercial and office areas are operated with more uncertainty and less monitoring from public authorities. Changes are always allowed through required procedures. It is easy that the residential areas might be changed for industrial uses; the office areas may be converted to residential compounds.

Different sectoral developments influence each other interactively. Planned central towns lose attractiveness when competing with the near suburbs probably due to insufficient accessibility. Those central towns without planned public transports deemed failure. Thus population and real estates are not attracted there.

Further, less implemented issues also differentiate. For instance, 93.9% growth of the land development is much faster than the population growth (57.9%). This gap represents that urban development in Shanghai experiences extensive growth unlike what has been planned in the 01SHMP. Similar situation happens between the industrial land development and industrial population.

Quantitative objectives vs. spatial distribution

Quantitative objectives seem easier to be achieved comparing to the target of spatial distribution. Take the population development for example; quantitative objectives such as employment restructuring and growth of registered population have been accomplished although growth of residents exceeded the target. But spatial distribution of the population in the periphery was not as planned in the 01SHMP. The implementation gap between the quantitative objectives and spatial distribution challenges current master plans.

Different degrees of implementation success between locations

Nearby suburbs become the most sensitive locations full of implementation failures and conflicts. Planned open space on the urban fringes has been eroded by urban constructions quite often. The situation that planned functions have been transformed to another type of land use with high cost-efficiency usually happens on urban fringes. Huge expansion densely situate on the western fringe of the city center. Industrial parks and some public infrastructure around Xinzhuang have been replaced by commercial centers and housing projects [see Figure 16]. Urban fringes instead of new cities or central towns become main hubs to absorb population and investment from either inner city or outside.

Such uneven spatial distribution in the periphery and unplanned urban development do not reflect intentions of the plan. Instead, market becomes an

essential factor to bring nearby suburbs with more dynamics (Tian & Shen, 2011; Wu, 2002). Thus plan-making process in the future should take market influences into account to guide future urban development.

Lack of realistic forecast

Rapid urbanization in Shanghai leads to unplanned population growth and land development. Actual population growth (59.9%) is more than two times of what has been planned. Thus land development and industrial development breakthrough the plan successively. Albeit construction of transport facilities has accomplished the plan, however, it is still not enough to satisfy real need of increasing population (Yu, 2008g). Successive breakthrough from the plan and contradiction between actual uses and the plan indicate lack of realistic forecast on future urban scale in the 01SHMP.

The 01SHMP was made by local design institute, which is dominated by architect-planners. Plan making process shows strongly interest on specific spatial organization instead of concern about the economic or social consequences. The question “does the plan need more flexibility or should the plan leave more space to market” is worthy further discussing.

Consistency between plans

Intensive conflicts between the 01SHMP and actual urban development suggest plan failure to some degree. For instance, Shanghai was planned to have 1500km² area developed in 2020. The population size was controlled around 16 million. But in reality, its population in 2010 reached 23 million, which exceed the planned number dramatically. Land development also breakthrough the planned boundary extensively.

However, the gap seems not so huge if we compare the actual development with the 06IUCP and the 06RSP, which are modified editions of the 01SHMP. The 06IUCP specified 2160km² of developed land till 2010, which increased by 66% comparing to the size of the 01SHMP. The population size in the 06IUCP was 1.27 times of what has been planned in the 01SHMP. The area of industrial land in the 06IUCP was 470 km², which had 187 km² more than the planned 283 km² in the 01SHMP. The gap between the 01SHMP and the 06IUCP is huge. The 06RSP made the difference even huger. When construction activities that deviated the 01SHMP occurred, local authorities had to modify their local plans reluctantly in order to adjust to the changing situation. Thus the 06RSP fills the gap between plans and actual urban development in a passive way.

In addition, different sectoral plans are always not in consistency. National industrial parks have their own management company, which initiate different aspects of development within the industrial parks. They made their own plans,

which always conflict to the 01SHMP. Interactive cooperation between different sectoral plans and consistency between different editions of plans are essential of guiding future urban development.

6 Conclusions

This study evaluates planning implementation through comparing the 01SHMP and actual spatial development based on conformance-based approach. Mapping results suggest that the 01SHMP has been strategically successful in guiding urban restructuring and peripheral development. Multi-axis, multi-center and multi-level urban structure has been formed basically. Development of new cities and peripheral industrial parks are on the right track as planned. Nevertheless, enormous breakthroughs such as extra land development, urban expansion on the edge of the central city, extensive population growth has occurred. Degree of planning implementation also varied between measuring variables, locations and indicators.

Both external and internal indicators have influenced the implementation process of the 01SHMP:

- Extremely rapid urbanization gives uncertainty to the implementation process. Intervention of market also makes planning implementation more complex and difficult.
- Attributes of plan making process and the plan itself are also determinates of planning implementation. Too long approval time of a city master plan always makes it always inadaptable to current situation. Physical-oriented and top-down nature of the 01SHMP deters the plan from coordinating with market activities.
- In addition, managerial ability influences success degree of planning implementation. Lack of coordination between sectors and shortage of phasing monitoring lead the urban development to unplanned direction.

This paper fills the gap of utilizing implementation theories and the framework to a real case: evaluating the implementation of the 01SHMP. It suggests that evaluating only one aspect, land use for example, within the master plan is one-sided. Evaluation between multi-variables, which have been emphasized within the master plan, is necessary. However, conformity between the plan and actual spatial developments is only the first step of identifying success of planning implementation (Faludi, 2000). Analysis on how the ideas and visions of the complex master plan have been delivered needs further research.

A regional perspective!

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别人也找了一下原因，见下面的说明：

<http://faculty.kfupm.edu.sa/CRP/habibms/docs/crp-502/CRP-502-Problem-Implementation-Plans.pdf>



- Ineffective policies guiding urban development plans implementation
- Unsuitable urban physical planning methodology:
- Excessive delays in approving urban physical development plans
- Weak institutional structure of urban physical development agencies
- Urban planning regulations places much emphasis on control rather than on guidance of urban development
- Urban political instability and interference in implementing urban physical development plans proposals
- Weak legal machinery for urban physical plan implementation
- Inadequate awareness of planning activities and public participation