

Revisiting and Rethinking Regional Urbanization in Changjiang River Delta, China

YANG Shangguang^{1,2}, Mark Yaolin WANG², WANG Chunlan³

(1. Institute of Economic Development, East China University of Science and Technology, Shanghai 200237, China; 2. School of Land and Environment, the University of Melbourne, Melbourne 3010, Australia; 3. Research Center of Shanghai Population and Development, Shanghai 201100, China)

Abstract: China is entering a critical and accelerating phase of urbanization. As one of the most urbanized regions in China, the Changjiang (Yangtze) River Delta has experienced dramatic urbanization and urban transformation. However, in the recent years, many changes have taken place in this region and there is limited attention to the regional urbanization path evolution, its problems and the way to solve these problems. Therefore, we should revisit the urbanization process in the Changjiang River Delta again. In this paper, we revisited urbanization paths of the Changjiang River Delta by data analysis, influence factors of urbanization by the Gray Relational Analysis, and major challenges to urbanization of the Changjiang River Delta by theoretical considerations. We found that the urbanization of the Changjiang River Delta had experienced several stages of large-scale spatial and urban system restructuring. Within the Changjiang River Delta, Shanghai, Zhejiang and Jiangsu had experienced different urbanization path with local characteristics. But with their development model gradually converging, their urbanization model is also converging. We also found that the major influence factors affecting the Changjiang River Delta urbanization were dynamic change and urbanization was driven by different key factors in different socio-economic development stages. Meanwhile, the Changjiang River Delta urbanization is facing many problems such as existing institutional arrangements, including the *hukou* (household registration) system and others which can not meet the needs of current socio-economic development and urbanization. Therefore, it is imperative to promote institutional innovation and adopt a new urbanization development strategy for the sake of the orderly and sustainable urbanization development in the Changjiang River Delta.

Keywords: urbanization; local characteristics; influence factors; major challenges; Changjiang (Yangtze) River delta; China

Citation: Yang Shangguang, Wang Yaolin Mark, Wang Chunlan, 2012. Revisiting and rethinking regional urbanization in Changjiang River Delta, China. *Chinese Geographical Science*, 22(5): 617–625. doi: 10.1007/s11769-012-0565-6

1 Introduction

2001 Nobel Economics Prize winner and former vice president of the World Bank, Joseph Stiglitz once said that China's urbanization and America's high-tech were two key factors which had influenced human development throughout the 21st century (Wu *et al.*, 2003). It is true that urbanization has been a spectacular dimension of China's development in the past three decades and

one of the most significant events in recent human history. On 12 January 2012, National Bureau of Statistics of China announced that the Chinese urbanization level crossed the highly symbolic 50% threshold. Such rapid urbanization in the last three decades contrasts with the so-called 'de-urbanization' or 'counter-urbanization' that took place in the 1960s and early 1970s. The Chinese central government has promoted urbanization as one of its key national strategies since 2000. Cities and city

Received date: 2012-01-20; accepted date: 2012-04-27

Foundation item: Under the auspices of National Social Science Project (No. 08BJY048:11CRK005), Humanities and Social Sciences of Ministry of Education (No.11YJA630176)

Corresponding Author: Mark Yaolin WANG. E-Mail: myw@unimelb.edu.au

© Science Press, Northeast Institute of Geography and Agroecology, CAS and Springer-Verlag Berlin Heidelberg 2012

regions have been observed to be the engines of economic growth in the era of global urbanization and urban globalization.

Urbanization in China has attracted lots of research attention both domestically and internationally. It has been concluded that there has been at least three distinctive but interlocking driving forces of Chinese urbanization since 1978: 'floating population' (or peasant migrants) who provide cheap labors to export-oriented factories and cheap services to urban residents; massive investments and expansions of the urban infrastructure; and the establishment of development zones to attract foreign investments (McGee *et al.*, 2007). In other words, China's urbanization is a product of both domestic and international forces (Zhao and Zhou, 2002). On the one hand, domestic changes, such as industrial restructuring, development of rural industries and increasing population mobility have influenced urbanization in China. On the other hand, the international impact on urbanization in China is often presented in terms of globalization.

Empirical case studies and policy research conducted in China can be classified into three broad categories. The first group of research projects focuses on urbanization strategies, predominately 'size-oriented' debates. Fei's small town theory (Fei, 1984) has an enormous impact on China's overall urbanization policies and urban development (Song, 2000). This school argues that China should expand the numbers of small towns and limit the numbers of large cities. Other scholars argue that China should emphasize the development of large cities (Gu, 2011), medium-sized cities, or multiple urban structures (Chen and Chen, 2002). The second group views urbanization as a part of population migration and industrial restructuring (Henderson, 1998) or focuses on how to measure China's urbanization level (Zhuo and Sun, 2003). The third group focuses on the mechanism of urbanization in China, such as the relationships between capital flows/foreign investment and urban development, the relationships between industrialization and urbanization, including the role of industrial parks/clusters and their contribution to urban development (Wang, 2005). Some empirical studies led to the development of the so-called 'bottom-up' urbanization model (Shi *et al.*, 2002), while others led to a 'top-town' or 'multi-force co-promotion' model due to the strong impact of administrative power and system change on

urbanization (Jiang, 2007; Zhang *et al.*, 2007).

The Changjiang River Delta has been one of the 'restless' development landscapes in China (Marton, 2000). Covering one percent of China's total land area, the Changjiang River Delta produces about a quarter of China's total industrial output. Both the Changjiang River Delta and the Zhujiang (Pearl) River Delta are the most urbanized core economic regions and growth engines of the nation. Hosting a large proportion of foreign investment, many 'Made-in-China' products are manufactured here. Therefore, we know many well-known Chinese scholars, such as Yao (1992), Zhu and Zhu (1994) who have investigated the urbanization process in the whole Changjiang River Delta. Ning and Li (2009) have investigated the mechanisms, models and strategies of the Pan-Changjiang River Delta's urbanization. Cao *et al.* (2011) has estimated the urbanization level of the Changjiang River Delta based on an index framework including the population, economic structure and land use. Overall, research on the Changjiang River Delta's urbanization has covered a diverse set of subjects, and some studies have been relatively sophisticated (Wu *et al.*, 2006).

However, in the recent year, many changes have taken place in this region and there is limited attention to the regional urbanization path evolution, its problems and the way to solve these problems. Therefore, we should revisit the urbanization process in the Changjiang River Delta again. In this paper, we will revisit urbanization paths of the Changjiang River Delta by data analysis, urbanization influence factors by the Gray Relational Analysis, and major challenges to the Changjiang River Delta urbanization by theoretical considerations.

2 Materials and Method

2.1 Study area

The Changjiang River Delta is one of the most developed areas in China. In general, people call 'two provinces one city', i.e. Shanghai City, Zhejiang Province and Jiangsu Province, as 'big' Changjiang River Delta or '16 cities', i.e. Shanghai City, Nanjing, Suzhou, Wuxi, Changzhou, Zhenjiang, Nantong, Yangzhou and Taizhou cities in Jiangsu Province, Hangzhou, Ningbo, Huzhou, Jiaxing, Shaoxing, Zhoushan and Taizhou cities in Zhejiang Province, as 'small' Changjiang River Delta

(Fig. 1). In this paper, the Changjiang River Delta referred to these 16 cities. In 2009, these 16 cities accounted for about 1% of Chinese total land area and 5.8% of population, but produced 18.7% of Chinese GDP and contributed 22% of national fiscal revenue and 28.4% of total national exports (Yang, 2011). The Changjiang River Delta has been one of the world economic growth engines.

2.2 Data and method

It is a complex question to comprehensively explain which factors have shaped urbanization processes in different parts of the Changjiang River Delta. In fact, urbanization process within the Changjiang River Delta has been driven by various key forces at different periods. In order to examine systematically and quantitatively what factors influence urbanization in the Changjiang River Delta in different periods of time, this paper chooses 22 indexes as influence factors of urbanization, which are available from Shanghai Statistic Yearbook (Shanghai Statistic Bureau, 1980–2011), Zhejiang Statistic Yearbook (Zhejiang Statistic Bureau, 1980–2011), Jiangsu Statistic Yearbook (Jiangsu Statistic Bureau, 1980–2011), Changjiang River Delta Statistic Yearbook (National Bureau of Statistics of China, 1980–2011). They could be broadly divided into four aspects: econ-

omy, resource endowment, society and technology.

The indexes are as follows: per capita acreage of crops (X_1); per capita food production (X_2); grain production output per hectare (X_3); population density (X_4); GDP per capita (X_5); added value per employee of agriculture (X_6); added value per employee of secondary industry (X_7); the proportion of industrial output in industrial and agricultural output as a whole (X_8); Hoffman coefficient (X_9); investment in fixed assets per capita (X_{10}); retail sales per capita (X_{11}); added-value of the tertiary industry per capita (X_{12}); the proportion of tertiary industry added-value in GDP (X_{13}); the proportion of state-owned units workers in the total number of employees (X_{14}); the proportion of urban workers in the total number of employees (X_{15}); the actual utilization of foreign investment (X_{16}); number of university students per ten thousands persons (X_{17}); number of doctors per thousand persons (X_{18}); number of phones per hundred persons (X_{19}); proportion of fiscal revenue in GDP (X_{20}); number of technologists per ten thousands persons (X_{21}); number of three-technology-patent applications per ten thousands persons (X_{22}).

The Grey Relational Analysis provides a quantitative measure for a system development change trend, which is very suitable for the dynamic course analysis (Liu et al., 1999). It intends to seek a way to find the numerical

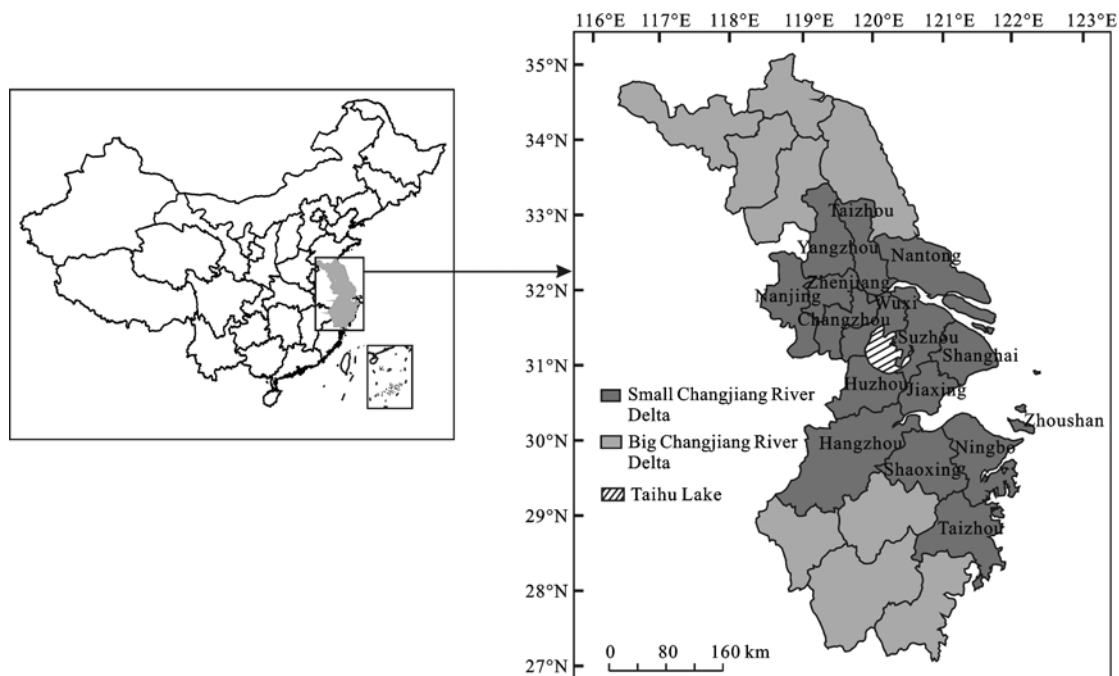


Fig. 1 Location of study area (small Changjiang River Delta)

relationship between the various subsystems (or factors). In short, in the system development process, if the change trend of two factors is consistent and their synchronous change is in a higher degree, the relevance degree of the two factors is higher, or it is opposite. In this paper, we will take the annual urbanization level of the Changjiang River Delta as the reference sequence and the influence factors value as the comparative sequence, and use Gray Relational Analysis (GRA) to sort and compare the gray correlation degree of each index in each year.

3 Results and Analyses

3.1 Urbanization Paths

Following over the last 30 years of rapid industrialization and development, the urbanization of the Changjiang River Delta has experienced huge changes. More and more people in the delta are living in urban areas. The Changjiang River Delta has become one of the most urbanized regions in China. According to Chenery's classification (Chenery, 1986), Shanghai has entered into the post-industrial stage, and the cities in Sunan (the southern Jiangsu Province) and Zhebei (the northern Zhejiang Province), the most developed regions of the two provinces, have entered the later stage of industrialization.

However, cities of various sizes in the region have expanded at different rates. In the early 1980s, large cities in the Changjiang River Delta grew much faster than medium and small cities. But in the 1990s, due to the emergence of China's two major rural industrialization models: Sunan model in Jiangsu and Wenzhou

model in Zhejiang, the population and economy grew faster in small and medium cities than in large cities. However, since 2000, large cities in the Changjiang River Delta such as Shanghai, Hangzhou, and Nanjing have once again grown rapidly and attracted more and more population. Meanwhile, small cities have also outperformed medium-sized cities (Table 1). For example, small cities and towns dominate the city rank-size system in the Jiangsu and Zhejiang provinces, where the numbers of small cities accounts for 76% and 70% respectively. In other words, the city hierarchical structure in the Changjiang River Delta is now polarized by large and small cities, at the expense of medium-sized cities (Jing, 2004).

Meanwhile, the difference in regional development models and associated policies in Jiangsu, Zhejiang and Shanghai have led to different urbanization process, which feature the local characteristics of the Changjiang River Delta urbanization.

As the biggest industrialized and commercial city in China, Shanghai municipal government has aimed to promote Shanghai as a global city. It defines itself as leading megalopolis for the Changjiang River Delta or even for China. Its urban expansion is associated with Shanghai's dream to becoming a global city. For example, its so-called '1 + 3 + 9' industrial zone plan is not simply the establishment of industrial parks to host a labor intensive sector, and it is also aimed at attracting high tech 'know-how' and even 'know-why' industrial sectors. Here, '1+3+9' means 1 district of Pudong New District, 3 technology and export processing zones of Caohejing New Technology Development Zone, Minhang Economic and Technology Development Zone,

Table 1 Changing urban system in Changjiang River Delta

| City size (10 ⁶ person) | Proportion of city numbers to total cities' numbers (%) | | | | Proportion of urban population to total cities' urban population (%) | | | |
|---------------------------------------|---|-------|-------|-------|--|-------|-------|-------|
| | 1985 | 1990 | 2000 | 2009 | 1985 | 1990 | 2000 | 2009 |
| >8 | 5.0 | 4.8 | 4.0 | 4.0 | 29.2 | 29.9 | 23.2 | 19.4 |
| 4-8 | 0.0 | 0.0 | 0.0 | 8.0 | 0 | 0.0 | 0.0 | 15.3 |
| 2-4 | 5.0 | 4.8 | 24.0 | 36.0 | 7.8 | 8.2 | 34.8 | 41.5 |
| 1-2 | 40.0 | 42.9 | 40.0 | 36.0 | 40.5 | 42.4 | 30.4 | 20.5 |
| 0.5-1 | 30.0 | 28.6 | 20.0 | 8.0 | 16.8 | 14.7 | 9.2 | 2.1 |
| 0.2-0.5 | 20.0 | 19.0 | 12.0 | 8.0 | 5.7 | 4.9 | 2.4 | 1.3 |
| <0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Notes: Samples are all prefecture-level city or above of Shanghai City, Zhejiang Province and Jiangsu Province

Sources: Shanghai Statistic Bureau (1986; 1991; 2001; 2010); Zhejiang Statistic Bureau (1986; 1991; 2001; 2010); Jiangsu Statistic Bureau (1986; 1991; 2001; 2010); National Bureau of Statistics of China (1986; 1991; 2001; 2010)

and Songjiang Export Processing Zone and 9 industrial parks in various parts of Shanghai. For Shanghai, urbanization is not to increase its urban population but to facilitate Shanghai's marketability, information-gathering abilities and industrialization. Meanwhile, Shanghai government put forwards many measures to promote the inner city's industries restructuring. The inner city restructuring and suburb development have resulted in people and some industries moving from the inner city to more remote areas. Consequently, Shanghai is becoming more multi-centered (Zuo, 2006).

Urban development and urbanization in Jiangsu, however, are more related to its industrialization process. The so-called 'Sunan model' was characterized by government promotion, market orientation and collective property ownership. In the 1990s, the urbanization process was driven mainly by the development of small cities and towns. When the Sunan model was at its peak, urbanization in Jiangsu typically involved township and village enterprises creating jobs to attract local peasants, resulting in the conversion from agricultural to non-agricultural employment. This has been labeled as rural urbanization or internal urbanization or localized urbanization (Shi, 2002). The Sunan model began to encounter multiple difficulties in the mid-1990s. Consequently, Jiangsu provincial government implemented the strategy of export-oriented economy, especially in the southern Jiangsu, by establishing various industrial parks to attract investment from domestic and abroad. This led to the export-oriented urbanization model, in which the local government was not the main promoter of urbanization: a big departure from its previous 'top-down' urbanization (Shi, 2002). Therefore, in recent years, economic development and the industrialization process in Jiangsu has moved towards an export-oriented economy. Now its urbanization is mainly driven by large cities. Here it should be pointed out that external forces are also important for Jiangsu's urbanization, such as the role of Singapore Park in Suzhou and Taiwan investment in Kunshan.

In contrast to Jiangsu's urbanization mechanism, Zhejiang's urban development was mainly been driven by the growth of small and specialized markets. The so-called 'Wenzhou model' represented the dominant mode of economic development in this province. It consisted of three key components: private economy, specialized market and industrial cluster (Shi, 2002). Private econ-

omy in small towns and rural areas attracted agricultural population. Privately owned enterprises and associated specialized markets converted market towns and small towns into urban areas. This represents a 'bottom-up' urbanization (Shi, 2002) whereby private enterprises and their associated specialized markets co-exist and promote each other, becoming a good case for marketization and industrialization. Recently, the Zhejiang government has attempted to increase the population size of medium and large cities and enhance the comprehensive functions of central cities. Therefore, we can see the co-existence of two types of urbanization: 'market-driven, bottom-up oriented' urbanization in small cities and 'government-driven, top-down oriented' urbanization in large cities.

The Changjiang River Delta has experienced rapid industrialization and urbanization since 1978. Shanghai, Jiangsu and Zhejiang have experienced different paths and models of urbanization. However, with the development models and policies in Jiangsu, Zhejiang and Shanghai gradually converging, the urbanization model with local characteristic within the Changjiang River Delta is also gradually converging. In fact, the recent developments of urbanization in both Jiangsu and Zhejiang provinces have shifted from different 'rural industrialization-driven' urbanization to 'industrial/development zone-driven' urbanization. All of these developments have weakened the spatial difference of urbanization in the Changjiang River Delta. Such convergence of urbanization calls for further academic attention to this new development.

3.2 Influence factors on urbanization

First, the gray correlations of almost all these indexes in the study periods were mostly over 0.5 (Table 2), which was a moderate level of relevance. This concluded that most of these indexes collectively contributed to the urbanization process in the Changjiang River Delta. These factors were not only related to the level of economic development, but also closely related to the social and technological development. Three of these indexes, i.e. GDP per capita (X_5), added value per employee of secondary industry (X_7), and retail sales per capita (X_{11}) became 'common factors', and the gray correlation values of these three indexes were above average each year, which reflected the regional economic development level, manufacturing industrial development and con-

sumption capacity, respectively, and affected regional urbanization development.

Second, in different periods, the key factors always varied. In 1990, the top ten indexes were GDP per capita (X_5), number of technologists per ten thousand population (X_{21}), added value per employee of secondary industry (X_7), investment in fixed assets per capita (X_{10}), fiscal revenue in GDP (X_{20}), number of doctors per thousand population (X_{18}), population density (X_4), added value of the tertiary industry per capita (X_{12}), retail sales per capita (X_{11}), the proportion of industrial output in industrial and agricultural output as a whole (X_8). During this period, the important industrial factors that affected the regional differences in urbanization level were tertiary industry, investment, GDP per capita and others which were the economic indexes. This was because in the 1990s, with the development and opening of the Pudong New Area in Shanghai, the government's mega investment projects in key areas gradually shifted from the Zhujiang River Delta to the Changjiang River Delta. So the rapid development of the economy became a dominant force that promoted urbanization in the Changjiang River Delta.

In 1995, the top ten indexes were added value of the tertiary industry per capita (X_{12}), added value per employee of agriculture (X_6), retail sales per capita (X_{11}), the number of telephone per hundred persons (X_{19}), GDP per capita (X_5), the number of technologist per ten thousand (X_{21}), added-value per employee of secondary industry (X_7), number of doctors per thousand persons (X_{18}), the proportion of tertiary industry added-value in GDP (X_{13}), number of three-technology-patent applications per ten thousand persons (X_{22}). Compared with 1990, private economy, including trade, services and professional market, developed more rapidly in the Zhejiang and Jiangsu provinces due to restructuring of both state-owned enterprises (SOEs) and township/village enterprises (TVEs). Many SOEs were merged or taken over by other owners and many TVEs were acquired to be privatized. This led to slow growth of SOEs and TVEs. But with the tertiary sector rapid growth, this led to number of employees whereby the tertiary sector to be an important influence factor affecting Jiangsu and Zhejiang provinces' urbanization. Meanwhile, with the government's attention focused on science and technology, the development level of regional science and technology also became important influence factors.

In 2000, the top ten indexes were added value per employee of secondary industry (X_7), the proportion of tertiary industry added-value in GDP (X_{13}), GDP per capita (X_5), retail sales per capita (X_{11}), number of phones per hundred persons (X_{19}), number of doctors per thousand persons (X_{18}), investment in fixed assets per capita (X_{10}), number of technologist per ten thousands (X_{21}), the proportion of industrial output in industrial and agricultural output as a whole (X_8), proportion of fiscal revenue in GDP (X_{20}). Compared with 1995, Jiangsu and Zhejiang became the most dynamic economic regions in China with rapid economic growth rates. This was because of the industrial restructuring of SOEs and TVEs in the previous periods. The level of industrial development and quality of environment for investment became the main factors affecting the regional urbanization level difference.

In 2003, the top ten indexes were the proportion of industrial output in industrial and agricultural output as a whole (X_8), added value per employee of agriculture (X_6), investment in fixed assets per capita (X_{10}), number of telephone per hundred persons (X_{19}), grain production output per hectare (X_3), GDP per capita (X_5), numbers of technologist per ten thousands persons (X_{21}), added value per employee of secondary industry (X_7), retail sales per capita (X_{11}), proportion of the tertiary industry added value in GDP (X_{13}). Compared with the year 2000, indexes related to economic development were still the most important factors affecting regional urbanization. In addition, agricultural development and population carrying capacity became the bottlenecks of regional urbanization.

In 2006, the top ten indexes were added value per employee of secondary industry (X_7), number of doctors per thousand persons (X_{18}), proportion of fiscal revenue in GDP (X_{20}), number of university students per ten thousands persons (X_{17}), number of phones per hundred persons (X_{19}), added-value of the tertiary industry per capita (X_{12}), population density (X_4), the actual utilization of foreign investment (X_{16}), GDP per capita (X_5), the proportion of tertiary industry added-value in GDP (X_{13}). In comparison to 2003, apart from the level of economic development, the factors which stood for the society development became the main factors affecting the level of urban development. This meant that the urbanization process in the Changjiang River Delta entered a stage related to quality of life and innovative

capacity, and its urbanization was on the way to mature development.

In 2010, the top ten indexes were the proportion of industrial output in industrial and agricultural output as a whole (X_8), population density (X_4), number of university students per ten thousands persons (X_{17}), the proportion of tertiary industry added-value in GDP (X_{13}), proportion of fiscal revenue in GDP (X_{20}), added value per employee of secondary industry (X_7), number of doctors per thousand persons (X_{18}), the actual utilization of foreign investment (X_{16}), the proportion of urban workers in the total number of employees (X_{15}), GDP per capita (X_5). In comparison to 2006, the data of 2010 continued to show that the urbanization process in the Changjiang River Delta was on the way to mature development because in 2010 the major influence factors affecting the urbanization were mainly related to quality of life and innovative capacity.

According to the above analysis, it was evident that the whole urbanization process of the Changjiang River Delta was related to macro socio-economic development and its urbanization in different social-economic development stage was affected by different key factors. It is expected that the Changjiang River Delta is becoming more globalizing and its economy is becoming more integrated with the international economic system. Factors such as international trade, the changing role of the delta in the international labor division, the level of 'know-how', the changing population structure and labor market, and region development policy are likely to play more important roles in the future path of urbanization

in the Changjiang River Delta.

3.3 Problems and solutions

As one of China's core economic regions and growth engines, the Changjiang River Delta itself and its urbanization process are critical for China to reach its modernity. But some problems in this region are becoming obstacles for its healthy and sustainable urbanization.

First, the problem associated with rural-urban migration. No doubt, at the national level, 'rural to urban' migration is a long-term phenomena and China's urbanization is mainly driven by such migration. But in many areas of the Changjiang River Delta, the natural growth rate of the population has been very low or even negative. This means that the further increase in urban population and demand for new labor in this region would be mainly dependent on migrants from other parts of China. Such changes have a few policy implications for this region because China is approaching the 'Lewis turning point' whereby the labor market in China is moving to a stage of unlimited supply to limited supply. The problem of skilled workers' shortage, or even a shortage of ordinary workers, will be a long-term bottleneck to local economic development, especially to these regions dominated by labor-intense sectors. In order to attract labor into these areas, local government has to give these migration labors more social welfare. But if these local governments provide social welfare to migrant workers, they would carry an enormous financial burden. This thus presents a dilemma in policy options. On the

Table 2 Gray correlation values of actual urbanization level (Y) and influence factors (X_i) in Changjiang River Delta

| Index | 1990 | 1995 | 2000 | 2003 | 2006 | 2010 | Index | 1990 | 1995 | 2000 | 2003 | 2006 | 2010 |
|----------|------|------|------|------|------|------|---------------|------|------|------|------|------|------|
| X_1 | 0.59 | 0.62 | – | 0.61 | 0.62 | 0.59 | X_{13} | 0.69 | 0.67 | 0.73 | 0.64 | 0.77 | 0.82 |
| X_2 | 0.64 | 0.58 | 0.62 | 0.60 | 0.63 | 0.67 | X_{14} | 0.61 | 0.59 | – | 0.57 | 0.70 | 0.66 |
| X_3 | 0.61 | 0.54 | 0.63 | 0.67 | 0.66 | 0.70 | X_{15} | 0.70 | 0.49 | – | 0.60 | 0.68 | 0.77 |
| X_4 | 0.73 | 0.64 | 0.63 | 0.55 | 0.79 | 0.83 | X_{16} | 0.57 | 0.54 | 0.55 | 0.53 | 0.78 | 0.77 |
| X_5 | 0.83 | 0.73 | 0.73 | 0.66 | 0.78 | 0.76 | X_{17} | 0.65 | 0.59 | 0.56 | 0.51 | 0.79 | 0.82 |
| X_6 | 0.68 | 0.75 | 0.58 | 0.70 | 0.76 | 0.70 | X_{18} | 0.75 | 0.68 | 0.68 | 0.57 | 0.82 | 0.77 |
| X_7 | 0.78 | 0.69 | 0.75 | 0.64 | 0.85 | 0.80 | X_{19} | – | 0.73 | 0.70 | 0.68 | 0.79 | 0.74 |
| X_8 | 0.71 | 0.63 | 0.64 | 0.73 | 0.71 | 0.94 | X_{20} | 0.76 | – | 0.64 | 0.52 | 0.81 | 0.82 |
| X_9 | 0.57 | 0.53 | – | 0.60 | 0.59 | 0.55 | X_{21} | 0.80 | 0.70 | 0.65 | 0.64 | 0.72 | 0.67 |
| X_{10} | 0.77 | 0.57 | 0.67 | 0.70 | 0.77 | 0.65 | X_{22} | 0.70 | 0.65 | 0.60 | 0.49 | 0.68 | 0.75 |
| X_{11} | 0.72 | 0.74 | 0.70 | 0.64 | 0.77 | 0.69 | Average value | 0.70 | 0.64 | 0.65 | 0.62 | 0.74 | 0.74 |
| X_{12} | 0.73 | 0.79 | 0.64 | 0.64 | 0.79 | 0.75 | | | | | | | |

Sources: Shanghai Statistic Bureau (1991–2011); Zhejiang Statistic Bureau (1991–2011); Jiangsu Statistic Bureau (1991–2011); National Bureau of Statistics of China (1991–2011)

one hand, the local government welcomes migrant workers to sustain its economic growth because the labor-intensive economy requires cheap labors. On the other hand, the local government refuses to take full responsibility for migrant workers' welfare. Thus, it is necessary to discuss and resolve the issue of how to reform the social welfare system in the national level in order to encourage easier migration.

Second, the problem associated with small cities and towns development model. The rural industry in the Changjiang River Delta has created two important models in the international development field: 'Sunan model' and 'Wenzhou model'. The TVEs and other rural Industrial clusters as well as specialized markets have contributed greatly to urbanization in the Changjiang River Delta. Currently, many economically prosperous towns in this region have much larger population, higher levels of economic development, and better infrastructure than many medium-sized or large cities in the inland China. However, these small cities and towns' GDP is still dominated by manufacturing (typically accounting for over half of the local GDP). The tertiary sector has lagged far behind. The public management system is still in its early stages of a rural style. It is critical for these towns and small cities to transform their development strategy from 'manufacturing-driven' way to 'service/commerce-driven' way, to convert their 'rural-style' community management system to urban community governance system. With the change of urbanization development condition, the traditional small cities and towns urbanization development model should be adjusted.

Third, the problem associated with incomplete or semi-urbanization. In a sense, urbanization is a 'way of life', real urbanization generally involves the rural population physically moving to the urban area, changing occupation from agricultural to non-agricultural, adopting the urban lifestyle, and enjoying the same rights as official urban citizens. Physically moving to an urban area or officially being classified as urban residents does not necessarily render them as fully urbanized. At present, the pace of urbanization is very quick in the Changjiang River Delta, but there is a severe problem of semi-urbanization. A large proportion of new urban residents are either rural-to-urban migrants who have worked and resided in the urban area for years but do not have full access to urban welfare, or local peasants who lost their farmland and were subsequently resettled in urban areas and given urban *hukou* (household

registration) without much change to their occupation or lifestyle. It is a long process to change people's lifestyle or way of life such as production mode, lifestyle, social and cultural characteristics, and so on. It is a long-term task to fully realize real urbanization and convert peasants into real urban citizens, which it requires not only urbanization hardware (including finding them employment, housing and education) but also urbanization software (lifestyle and equal access to resources).

4 Conclusions

After 30 years rapid development, the Changjiang River Delta has become one of the most urbanized regions in China. In the last 30 years, industrialization-development-stimulated urbanization has contributed to an urbanization legacy in the Changjiang River Delta. The whole process of urbanization in this region is related to its socio-economic development. The urbanization path within this region is from divergent to convergent. According to the above analysis, we can know that its urbanization path is driven by multiple forces and affected by different key factors in different socio-economic development stages. Meanwhile, paths of urbanization in Shanghai, Zhejiang and Jiangsu have experienced different local characteristics.

In the Changjiang River Delta, we can see the co-existence of divergence and convergence of its urbanization. Divergent urbanization can be clearly identified. In the Changjiang River Delta, different local economic development/industrialization models and approaches have led to various urbanization outcomes. For example, Shanghai, Jiangsu and Zhejiang have established various types of development zones, industrial parks or high-tech zones and attracted many migrant workers. All these have led to their different urbanization paths. However, convergent urbanization can be also observed inside the Changjiang River Delta. Such divergent paths have converged in three sub-regions of the Changjiang River Delta because of the merging of its development model and policy. Maybe, it is difficult to discuss the trend of this region, but the discussion of convergence and divergence provides an excellent case for urbanization study.

According to the above analysis, we can know that there are different major factors affecting the Changjiang River Delta urbanization in its different development stages. With Changjiang River Delta more glo-

balized and its economy more integrated into the world economic system, factors such as international trade, international labor division are likely to play more important roles in the future urbanization path in the Changjiang River Delta. In addition to such factors, Chinese changing population structure, labor market and region development policy are all likely to affect the future urbanization path of the Changjiang River Delta. Meanwhile, the Changjiang River Delta urbanization is facing many problems. Many existing institutional arrangements, including the *hukou* system and others, established in the early stage of China's reform era (during the 1980s and even 1990s) can not meet the needs of current socio-economic development and urbanization. Therefore, it is imperative to think about how to promote institutional innovation and adopt a new urbanization development strategy for the sake of the orderly and sustainable urbanization development in the Changjiang River Delta in the future.

References

- Cao Guangzhong, Bian Xue, Liu Tao, 2011. Comprehensive evaluation of the urbanization level in Changjiang River Delta Region: An index framework based on the population, economic structure and land use. *Geographical Research*, 30(12): 2139–2149. (in Chinese)
- Chenery H B, 1986. *Comparative Study on Industrialization and Economic Growth*. Oxford: Oxford University Press.
- Chen Yongjun, Chen Aimin, 2002. *An Analysis of Urbanization in China*. Xiamen: Xiamen University Press. (in Chinese)
- Fei Xiaotong, 1984. Small Town, Big Question. In: Jiangsu Province Small Town Research Group. *Research Papers of Small Towns in Jiangsu Province*. Nanjing: Jiangsu People Press, 1–21. (in Chinese)
- Gu Chaolin, 2011. Study on Urban Agglomeration Progress and Prospects. *Geography Research*, 30(5): 771–784. (in Chinese)
- Henderson J V, 1998. *Urban Development: Theory, Fact, and Illusion*. New York: Oxford University Press.
- Jiang Manyuan, 2007. Study on logic model of interactive mechanism and its problems between economic structure evolution and urbanization. *Qiushi*, (3): 56–62. (in Chinese)
- Jiangsu Statistical Bureau, 1980–2011. *Jiangsu Statistic Yearbook (1980–2011)*. Beijing: China Statistics Press. (in Chinese)
- Jing Xueqing, 2004. *Urbanization and Urban System of Changjiang River Delta*. Shanghai: Wenhui Press. (in Chinese)
- Liu Shifeng, Guo Tinbang, Dang Yaoguo, 1999. *Gray System Theory and Its Application*. Beijing: Science Press. (in Chinese)
- Marton A M, 2000. *China's Spatial Economic Development: Restless Landscapes in the Lower Yangzi Delta*. London: Routledge Press.
- McGee T G, Lin C G, Wang M Y et al., 2007. *China's Urban Space: Development under Market Socialism*. London: Routledge Press.
- National Bureau of Statistics of China, 1980–2011. *Changjiang River Delta Statistic Yearbook (1980–2011)*. Beijing: China Statistical Press. (in Chinese)
- Ning Yuemin, Li Jing, 2009. Mechanisms, models and strategies of the Pan-Changjiang River Delta's urbanization. *Nanjing Social Science*, (5): 8–14. (in Chinese)
- Yang Shangguang, 2011. *Evolution of Yangtze River Delta Economic Spatial Organization*. Shanghai: Shanghai People Press. (in Chinese)
- Shanghai Statistical Bureau, 1980–2011. *Shanghai Statistic Yearbook (1980–2011)*. Beijing: China Statistics Press. (in Chinese)
- Shi Yishao, 2002. Divergence characteristic and regional economic integration of Shanghai, Jiangsu, Zhejiang economic development. *China Industrial Economy*, (9): 25–30. (in Chinese)
- Shi, Jinchuan, Jin Xiangrong, Zhao Wei et al., 2002. *Institutional Change and Economic Development: Study on the Wenzhou Model*. Hanzhou: Zhejiang University Press. (in Chinese)
- Song Linfei, 2000. Methods and theory of Fei Xiaotong's small town research. *Journal of Nanjing University*, (5): 20–26. (in Chinese)
- Wang Xinpin, 2005. *Chinese Cities New Industrial Space: Development Mechanism and Spatial Organization*. Beijing: Science Press. (in Chinese)
- Wu Baijun, Qian Shichao Shen Hanyao et al, 2006. *Study on Regional Development Under the Leading of the Government*. Shanghai: East China University of Technology Press. (in Chinese)
- Wu Liangyong, Wu Wei, Wu Tinghai, 2003. From the world urbanization trends to see China's urbanization development. *Science News*, 2003-09-19(3). (in Chinese)
- Yao Shimo, 1992. *China's Urban Regions*. Hefei: China Science and Technology University Press. (in Chinese)
- Zhang Jingxiang, Luo Zhendong, He Jianyi, 2007. *Institutional Transformation and Reconstruction of China's Urban Space*. Nanjing: Southeast University Press. (in Chinese)
- Zhao Xinping, Zhou Yixing, 2002. Study on Chinese urbanization path and theory since the reform and opening up. *Chinese Journal of Social Sciences*, (2): 37–45. (in Chinese)
- Zhejiang Statistical Bureau, 1980–2011. *Zhejiang Statistic Yearbook (1980–2011)*. Beijing: China Statistical Press. (in Chinese)
- Zhuo Yongliang, Sun Yuzeng, 2003. Building effective cooperation mechanism based on the competition—Study on cooperative trend under competitive base of Changjiang River Delta. *Zhejiang Social Science*, (3): 25–32. (in Chinese)
- Zhu Tonghua, Sun Bin, 1994. *Study on Development of 'Sunan Mode'*. Nanjing: Nanjing University Press. (in Chinese)
- Zuo Xuejin, 2006. *Study on the City Group Development of Changjiang River Delta*. Shanghai: Xuelin Press. (in Chinese)