

# GROWTH OF NEW ECONOMIC SECTORS IN SECOND-TIER EXTENDED CITIES IN THE CHANGJIANG RIVER DELTA

## —Case of Suzhou, Wuxi, Changzhou

CHEN Wen<sup>1</sup>, SUN Wei<sup>1,2</sup>, XIANG Jun-bo<sup>3</sup>

(1. *Nanjing Institute of Geography & Limnology, Chinese Academy of Sciences, Nanjing 210008, P. R. China*; 2. *Graduate School of Chinese Academy of Sciences, Beijing 100039, P. R. China*; 3. *Architecture College, Tsinghua University, Beijing 100084, P. R. China*)

**ABSTRACT:** The second-tier extended metropolises in the Changjiang (Yangtze) River Delta, including Suzhou, Wuxi and Changzhou near Shanghai, are becoming the most active and new innovative industrial agglomerating areas. Manufacturing industries in these second-tier cities have been in rapid growth due to increasing foreign investment. Nevertheless, the economic prospect of these cities is still constrained by a lack of local R&D capacity and production services, which are mainly dependent upon Shanghai. This paper analyses the impact of globalization on the new economic sectors in these cities, the change of industrial structure, the limitation of urban development and the problem of sustainability. Then, the paper analyses the conditions for the high-tech industry and production services in these areas. Also, it applies the industrial organization theory to these cities and examines how these cities can cooperate with each other in terms of horizontal linkages. Finally, the paper gives the future growth prospects in high-tech industry and production services.

**KEY WORDS:** second-tier extended cities; new economic sectors; diversity supply horizontal division

CLC number: F121.3

Document code: A

Article ID: 1002-0063(2004)04-0296-08

## 1 INTRODUCTION

Urban relationship as well as urban system has been the most important and lasting direction in the study of urban geography since CHRISTALLER (1933) put forward the central place theory. Along with the pace of globalization in the 1980s, some pioneer researches sensitively expounded a world city system, including world city, international city, national city, regional city and local city (FRIEDMAN, 1986). Lots of researches focused on the developing mechanism of the big cities and urban system network (GU, 2000; ZHOU, 1997; CUI, 1992; HU *et al.*, 2000). Besides, some economists have applied the scale economic uncompleted competition to the development relationship among cities from regional industrial division, trade relation, and regional competition (FUJITA *et al.*, 1999). Thus it is essential and possible to carry out the study between the primary metropolises and second-tier extended cities.

Anyway, the concept of second-tier extended cities was brought forward while the primary metropolises suffered the development problems such as traffic jam, high rent and deteriorating environment, and the second-

tier cities emerged in many countries (MARKUSEN and SEAN, 1999). It is said that the second-tier cities, which are just ranking after the primary metropolises in size, have grown up speedily as the most active and innovative new industrial agglomerating areas within the metropolitan region in the most countries such as the Silicon Valley of California in USA, etc.

Situated in the north Changjiang (Yangtze) River delta near Shanghai, the biggest metropolis in China, the region of Suzhou-Wuxi-Changzhou (Su-Xi-Chang for short) is one of the most developed regions in China with a population of  $13.65 \times 10^6$ , an area of  $17.513 \times 10^3$  km<sup>2</sup>, GDP of  $442.143 \times 10^9$  yuan (RMB), occupying the whole nation's 1.05%, 0.18% and 4.32% respectively in 2002 (Jiangsu Statistical Bureau, 2003) (Fig. 1). Suzhou, Wuxi, Changzhou, all with a population over one million, so they are called second-tier big cities. Since the 1990s, these cities have become the hot areas of foreign direct investment (FDI) and gradually become the big processing factory for the multinational enterprises in the global manufacturing chain. However, shortage of technique and service system may have affected the development sustainability of this region and

Received date: 2003-12-02

Foundation item: Under the auspices of the National Natural Science Foundation of China (No. 40371031)

Biography: CHEN Wen (1967–), female, a native of Ningde of Fujian Province, professor, specialized in urban economic and urban geography. E-mail: wchen@niglas.ac.cn

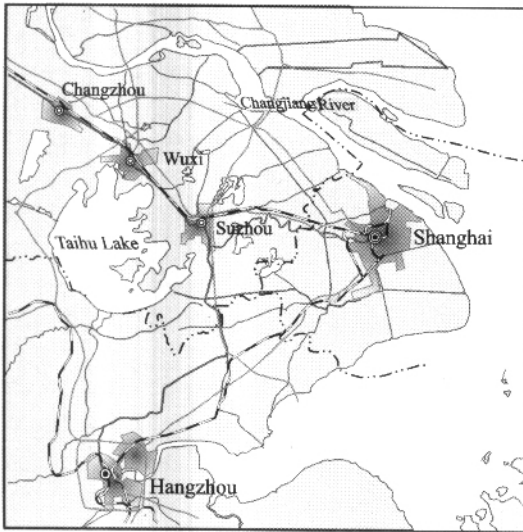


Fig. 1 Location of Su-Xi-Chang

the industrial prospects have been concerned.

## 2 STATUS IN QUO OF INDUSTRIAL STRUCTURES IN SU-XI-CHANG

### 2.1 Rapid Growth in Manufacturing Sector

In the 1980s, the township or village enterprises (TVE) boomed up in the region of Su-Xi-Chang, which created the national and even international famous "South Jiangsu Model" and pushed the rapid growth of GDP (GDP per capita increased about 5 times from 1978 to 1990) (Table 1).

Table 1 GDP per capita of the cities of Suzhou, Wuxi and Changzhou (yuan RMB)

| City      | 1978 | 1984 | 1990 | 1996  | 1998  | 2000  | 2002  |
|-----------|------|------|------|-------|-------|-------|-------|
| Suzhou    | 634  | 1280 | 3617 | 17474 | 21733 | 26692 | 35733 |
| Wuxi      | 687  | 1526 | 3865 | 20232 | 24338 | 27653 | 36151 |
| Changzhou | 605  | 1272 | 2935 | 12847 | 14842 | 17635 | 22215 |

Sources: Suzhou Statistical Bureau, 2003; Wuxi Statistical Bureau, 2003; Changzhou Statistical Bureau, 2003

trial section, but the percentage of local industrial output has decreased gradually from the 1990s, whereas the electronic and electric machinery manufacturing industries have developed very fast with an increase in the proportion of their output value to the local industrial output from 4% in the beginning of the 1990s to 10% in the end of the 1990s. So does the chemical industry (Table 2).

### 2.2 Slow Growth in High-tech and Modern Service Sectors

Since there are so many manufacturing factories and development zones here, the discussion on whether this region is the "world factory" has been aroused. Whereas the proportion of the manufacturing industry is so high,

In the 1990s, along with the opening up and development of Pudong of Shanghai, lots of FDI swarmed into this region due to its close location to Shanghai metropolis as well as the advantage development situation and low manufacturing cost. FDI has made a great role in pushing the rapid growth and transfer of industrial structure in this region along with the economic globalization. Its FDI has increased from US\$ $1.2 \times 10^9$  in 1989 up to US\$ $7.1 \times 10^9$  in 2002, and the percentage in whole investment of fixed asset rose from 1.08% to 8.25% in the same period. Currently the FDI projects are mostly in manufacturing in South Jiangsu, especially in the course of processing. Most of imported technologies are conventional for manufacturing.

All of these have pushed up the quick industrialization in this region. Up to 2002 the added value proportion of the three economic sectors in GDP reached 4.47:56.78:38.75. The agricultural industrial proportion in GDP decreased about 15% from 1980 to 2002 and secondary industry dominated all the time with around 55%, some time over 60%. The added value of manufacturing sector had increased from  $25 \times 10^9$  yuan in 1980 up to  $6.5 \times 10^{12}$  yuan in 2001, getting 260 times growth. Thus, the contributing rate of the secondary industry to GDP has ranked first over that of tertiary and primary industries, although its contributing rates from 1995–1999 decreased a lot, which has resulted in fast increase of GDP per capita.

Analysis on the change of the industrial structure has shown that the textile industry still dominates the indus-

Table 2 Change of the proportion of sector output to local industrial output

|  | 1990  | 1995  | 1999  | 2001  |
|--|-------|-------|-------|-------|
| Textile                                    | 21.32 | 16.56 | 15.10 | 13.72 |
| Electronic and communication manufacturing | 4.35  | 3.24  | 9.90  | 11.32 |
| Chemical processing                        | 6.29  | 5.42  | 8.70  | 8.36  |
| General machinery                          | 10.16 | 5.09  | 7.30  | 7.16  |
| Electric machinery                         | 5.08  | 5.48  | 7.20  | 7.85  |
| Black metal smelting                       | 4.37  | 5.51  | 5.60  | 7.06  |
| Clothing and fibre                         | –     | 4.03  | 4.90  | 4.87  |
| Metal production                           | 2.65  | 3.21  | 4.10  | 3.88  |

Sources: Jiangsu Statistical Bureau, 2000, 2002; Suzhou Statistical Bureau, 2000, 2002; Wuxi Statistical Bureau, 2000, 2002; Changzhou Statistical Bureau, 2000, 2002

the product service system and the technique innova-

tion system are lagged behind the development (CHEN *et al.*, 2001).

Firstly, although the three cities have set up the high-tech development zones respectively and made the quite successful progress, R&D input in tech-innovation was less than 0.45% of GDP (Jiangsu Institute of Science and Technology Information, 2000). In 1994–1999, the sales value of high-tech products and the new products in these three cities increased 26.9% and 21.3% respectively, lower than that in Shanghai (Table 3). Hence, it is doubtful that the shortage of the core industrial technique will cause the delay of innovation, decline of employment rate, environmental deterioration and then result in the stagnant upgrade of industrial structure, thus finally affect the improvement of regional competitive capacity.

Moreover, modern service under Shanghai's shadow has developed slowly and its added value per capita was about 4000 yuan, half of that of Shanghai in 2000 (Jiangsu Statistical Bureau, 2001; Shanghai Statistical Bureau, 2001). The retail trade and food service dominated in the tertiary industry. The proportion of added value of finance and insurance was 12% in the tertiary industry, even 2% lower than 1997, about 18% lower than that in Shanghai. Anyway, lagged productive service for industries may increase the manufacturing transaction cost directly and obstruct enterprise communicative network.

However, the negative effect has emerged in Su-Xi-Chang. The increase of employment has been blocked while many manufacturing has been withdrawn from the inner cities and the service section has not expanded

Table 3 Comparison of the high-tech industrial development

| Item                                | Su-Xi-Chang                   |                               |                           | Shanghai                      |                               |                           |
|-------------------------------------|-------------------------------|-------------------------------|---------------------------|-------------------------------|-------------------------------|---------------------------|
|                                     | 1994<br>( $\times 10^9$ yuan) | 1999<br>( $\times 10^9$ yuan) | Annual growth<br>rate (%) | 1994<br>( $\times 10^9$ yuan) | 1999<br>( $\times 10^9$ yuan) | Annual growth<br>rate (%) |
| Sales revenue of high-tech products | 18.180                        | 59.880                        | 26.9                      | 30.00                         | 126.10                        | 33.3                      |
| Expenditure for R&D                 | 5.564                         | 6.697                         | 3.8                       | 9.70                          | 13.40                         | 6.70                      |
| Sales revenue of new products       | 45.470                        | 119.360                       | 21.3                      | 33.91                         | 100.72                        | 24.3                      |

Sources: Jiangsu Institute of Science and Technology Information, 1995, 2000; Shanghai Committee of Science and Technology, 1995, 2000

swiftly to absorb the surplus labour force. Especially in 1995–1999 about  $150 \times 10^3$  labour turned back to agriculture due to the slow growth of TVE (Fig. 2). The employment proportion of agriculture was also at 20.71% while tertiary was still at 30.41% in 2002.

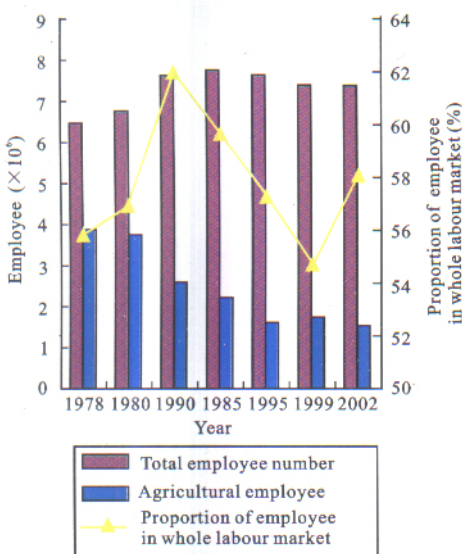


Fig. 2 Change of overall and agricultural employee

Furthermore, the scale of enterprise is difficult to enlarge fast due to the lack of the core technology, and

most of enterprises are just for the export oriented processing. The number of enterprises with annual output less than  $5 \times 10^6$  yuan has occupied 35% of total enterprises in Su-Xi-Chang while Shanghai just 11%.

Finally, the benefit of export or the quality of development is not coincident with the high level of GDP. The tertiary industry, which has the higher local revenue/GDP ratio than other industries, is smaller in Su-Xi-Chang in size than those in Shanghai, so the local expendable revenue from the tertiary industry was about  $31 \times 10^9$  yuan in Su-Xi-Chang, just 43.6% of that in Shanghai while the total value of GDP in Su-Xi-Chang was almost 82% of that in Shanghai. Also, the average income of labour was about  $15.5 \times 10^3$  yuan (Jiangsu Statistical Bureau, 2001; Shanghai Statistical Bureau, 2001), just 64% of that in Shanghai while GDP per capita was about 80% of that in Shanghai.

### 3 CONDITIONS FOR NEW ECONOMIC SECTORS IN SU-XI-CHANG

#### 3.1 Conditions for High-tech Industry Growth

Along with Pudong opening-up, Shanghai has become the agglomerative pole of high-tech industries as many MNCs have set up the R&D centres in Shanghai to take advantages of its information and intelligence. Howev-

er, the second-tier extended cities near Shanghai such as Su-Xi-Chang also have the possibilities to boom up high-tech industry to an extensive scale on the base of the international experiences and their own development conditions.

International experiences show that so many famous high-tech and new industrial agglomerating areas in the world such as San Jose (the Silicon Valley), Route 128 of Boston, the Delta of North Carolina, in the United States, Silicon Valley Institute of Scotland, Gongbo Science City in Japan, etc., emerged in recent decades. These technopolises are not always primary metropolises but located around or not far away from them. For instance, the Silicon Valley, located along the California Pacific Ocean, 100km away from San Francisco metropolis, and just one-hour ride distance to the international airport of San Francisco. High-tech companies enjoy the suitable environment, better living conditions and convenient transportation. Another important factor affecting the distribution of these companies is that they are close to high qualified universities especially the university with higher level physical science, just like Silicon Valley close to University of Stanford, Route 128 close to MIT (Massachusetts Institute of Technology) and so on. It is possible for them to maintain high-level research teams and keep updated technologies. Moreover, the perfect "outside contraction" industrial chain, risk investment, floating talent market, perfect social insurance system, the start-up entrepreneur group, efficient service are all contributing to the growth of the high-tech industry (BARNES *et al.*, 1999; SHARKSENING, 1999; ZHONG, 2001). Su-Xi-Chang is 60–150km far from Shanghai with the convenient expressway connection. Long historic culture, beautiful scenery, comfortable living conditions have provided suitable environment for the development of high-tech industry while the big scale of manufacturing led by TVE and booming foreign oriented economy have stimulated the strong demand on technology and the investment support to high-tech industry.

Furthermore, compared with Shanghai, the industrial development in Su-Xi-Chang would seldom meet severe competitive pressure like that in the primary metropolises where lot of investment compete in the limited market and space. Also, Su-Xi-Chang region has good foundation on high-tech industry development since they were designated as the National Torch Belt of High-tech Industry by the Ministry of Science and Technology.

However, with development of economic globalization, knowledge economy and entering into WTO, all

regions are facing the more and more severe competition. On the other hand, the tendency of technological modularity has provided the possibility to separate the R&D and technological manufacturing in different areas (BALDWIN and CLARK, 1997).

The development result of Japanese technopolises, which are lack of core technology, gave a lesson to Su-Xi-Chang. In order to distract the economy agglomeration from Tokyo, Japanese government set up several local technopolises in the 1970s. Oita and Kumamoto were founded and invested by some big electronic enterprises, such as SONY, NEC, MRC and so on, as new manufacturing bases. It facilitated the growth of relevant cities rapidly in the beginning of the 1980s. However, due to the shortage of R&D fund and innovative resources, these "technopolises without brains", are getting weakened in the upgrade of the manufacturing and blurred in future development.

Nevertheless, other technopolises like Toyama could be regarded as the successful example of transforming from traditional manufacturing to high-tech industry. Differing from above technopolises, the local government there paid more attention to the technical facilities and R&D funding as well as issued preferential policies on land price, loan, tax return, etc. These activities were helpful to the transformation of the industrial structure and accelerating the growth of localized high-tech enterprises, therefore strengthened its international competitive ability. Finally the employment rate has an increase of 2.6%, transportation 51.7% and GDP 43.7%. Fostering competition between adjacent regions and encouraging utilization of local resources by local government are helpful to establish a diverse and sustainable economy (FUNABA *et al.*, 1999; MARKUSEN and MASAYUKI, 1999).

The Japanese experience told Su-Xi-Chang that the development of high-tech industry should be encouraged and innovation impetus should be fostered so as to keep the advantage of sustainable development.

There are some obstacles restraining the development of high-tech industry in Su-Xi-Chang. The first is lack of innovation, which includes the knowledge and technological innovation, knowledge spreading and knowledge application system. In Su-Xi-Chang region the colleges and universities usually focus on knowledge education but not technology innovation. Also, the manufacturing enterprises prefer to their processing instead of innovation. The second obstacle is the policy environment that favoured large foreign enterprises but did not specify the preference of integrating venture capital and innovative drive to facilitate the establishment of



high innovative firm. Thus, many small enterprises are stuck in general manufacturing with low entrance threshold.

### 3.2 Conditions for Modern Service Growth

Modern service is the new industry using the new information technology based on the information producing, processing, and distributing. Most of them, such as finance, information, logistic, etc., serve for the manufacturing efficiently. Modern service may stimulate the technological and institutional innovation by spill-over effect and external economy which are the important conditions not only for the increase of production returning, but also for sustainable development of the urban growth (HONG and CHEN, 2000).

The new tendency such as the development of information network, diversified demand of modern market, the flexible production, the industrial subdivision, have created a close relationship between modern service and the manufacturing section on industrial and spatial interaction. While local and timely service demand shapes the regional network distribution, it provides the possibility of investment in modern services in the second-tier extended cities such as Su-Xi-Chang due to information cost and individual demand.

Modern services are undergoing subdividing, for example, finance is being divided into several separated functions. Besides traditional deposit, loan and other financial services, there are many new derivative services, which could be distributed in different cities based on the functional subdivision. So the horizontal division of diversity supply of regional services gradually happens in the function connections of primary and second-tier cities. For example, within the northeast metropolitan area along the east coast of the United States, New York is an international financial centre, while Philadelphia and Boston are the same as financial centre with outstanding performance in the derivative and secondary finance (BALDWIN and CLARK, 1997). Thus in the metropolitan area there has been the diversity supply horizontal division, the optimised industrial structure, the innovative economy and then formed a strong and efficient global capital management/control base.

Development of modern service is needed in Su-Xi-Chang realistically. Firstly, they are all million-population cities with  $1.41 \times 10^6$ ,  $1.56 \times 10^6$  and  $1.05 \times 10^6$  urban residents respectively in 2002 (Jiangsu Statistical Bureau, 2003). Since the manufacturing cost will increase along with the urban expansion, it is necessary for these cities to adjust their industrial structures and

avoid the development of manufacturing solely. Hence, "withdrawing secondary industry, forwarding tertiary industry" is the similar policy in urban spatial adjustment in China. Also, the development of the manufacturing has not only magnified the demand for modern services, but also created the outlet of surplus capital while the marginal profit of manufacturing is continuous declining (CHEN, 1999).

Furthermore, with the subdivision trend of the service market, the development of finance and trade in Shanghai is more and more inclined to the international market especially the services for multinational and national huge enterprises. The goal of Shanghai is to be the international finance and trade centre in the Far East. While the second-tier cities such as the cities of Suzhou, Wuxi, Changzhou, may focus on the local finance, logistic, information service for local middle and small enterprises, Shanghai, the primary tier city in the Changjiang River Delta aims at modern services and their subdivisions so as to facilitate the agglomeration of modern service system and modern manufacturing system in this metropolitan region and to foster the scale economy. From this viewpoint, the second-tier cities may have the market potentials in some of modern service sections.

Some security sale departments in Su-Xi-Chang have good performance due to the abundant local capital and scarce local stockjobbing institutions, and the profit of single sale department in Wuxi may reach  $30 \times 10^6$  yuan, far higher than that of Shanghai. However the financial services in Su-Xi-Chang actually develop slowly with small added value and low level. Why modern services could not grow fast in this region? The most important reason is the historical background. Since P. R. China was established in 1949, the central government required all cities to transfer "from consuming city to productive city" so as to improve the manufacturing productivity. By now the local governments prefer to invest in manufacturing rather in the service system. Moreover, the shadow of monopolized market of Shanghai's modern service actually has affected the service growth in second-tier cities in the Changjiang River Delta. Finally lack of proper atmosphere and the intelligence support are also the reasons of lagged service system.

## 4 COOPERATION WITH SHANGHAI IN TWO FIELDS

For a long history, Su-Xi-Chang region has the very close economic and social connection with Shanghai, the primary metropolis in the Changjiang River Delta.

At the beginning of last century when modern industry began, most people in this region went for Shanghai to look for sale market and investment fund for the local industrial development. Up to the 1980s the development of TVE was mainly dependent on the trickle effect of Shanghai industry and intelligent help of Shanghai "Sunday engineering", etc. In the 1990s the booming up of FDI and growing of manufacturing bases of multinational company here mostly resulted from this region taking full of advantages of spill-over effect of Shanghai which has strong metropolitan power to attract international investment. Therefore it is always said "No Shanghai, no developed cities of Suzhou, Wuxi, Changzhou today". Corresponding Shanghai's swift growth also depends on the prosperity of Su-Xi-Chang.

While the cities of Suzhou, Wuxi and Changzhou are expanding quickly and becoming one-million-population cities, the question is aroused: do they need to promote the technological R&D and facilitate the expansion of service market, or just keep as the manufacturing base? Traditional viewpoint is that Shanghai is a regional, national even international financial and service centre, and Su-Xi-Chang, are the modern manufacturing bases. There are vertical division chains between Shanghai and Su-Xi-Chang. Therefore encouraging R&D and the development of modern service in Su-Xi-Chang would break the established pattern of regional division and bring with the diversified-supply horizontal division with Shanghai. As the industrial development of Su-Xi-Chang should be assessed in the framework of whole industrial system of Shanghai metropolitan area, the development of the R&D and modern services in Su-Xi-Chang should be discussed in the context of the development of Shanghai metropolitan area.

Processing manufacturing, high-tech industry and modern service link the industrial value chain. If the vertical chain has been applied in the global urban system along with the economic globalization and integration, each city is characterized by its position in the value chain globally distributed, and those at the top of the vertical chain are the global metropolises where the headquarters of the multinational companies and the central business districts located, having the capacity of managing and controlling the activity of whole region and even the world. Those in the middle of the chain are the second-tier extended cities mostly clustered by the multinational manufacturing bases. Then those at the bottom are large quantity cities whose economic destinies are dependent upon and controlled by the upper central metropolises and foreign capital.

Suppose that a city just likes a big enterprise, industrial organization theory would be applied to analyse the welfare of the vertical and horizontal division of cities.

According to the vertical division theory on traditional comparable advantage, Shanghai has obviously comparative advantage of service and other top functions within the metropolitan region of the Changjiang River Delta and its perimeter region should be the processing factories behind the Shanghai front market, and these factories are at the bottom of the vertical division of the industrial chain. This may weaken the development returns and motives in Su-Xi-Chang, and hinder the agglomeration of high quality productive elements in the perimeter regions even these second-tier cities. Thus in the final picture there would be only one winner, Shanghai, left, and others lost.

However, according to the new tendency of international trade, vertical division is gradually replaced by the diversified horizontal division. The vertical division is the one dominated by comparative advantage formed by the regionally natural gift. The division among primary products and finished products, low-tech intensity products and high tech products, generally occurred between developed countries (areas) and developing countries (areas). However the horizontal division is the differential diversified division between the internal parts of production and the technique processes. That means the fractionized product among regions could win with scale economy in the same industrial sectors. This has been defined by the new trade theory. The more similar development structure and level are, the closer the inter-regional connections are. Thus the horizontal division may stimulate scale production and product diversification, then give more market choice and competition, optimise the structure, and increase innovation and market performance (JIN, 1999).

Furthermore, the new trade theory model may be applied to explaining urban horizontal industrial division. On the assumption that a new economic sector just concentrates on the primary city, the city is regarded as a monopolization of the product supply, the demand function is  $q=D(p)$ , its adverse demand function is  $p=P(q)$ ,  $C(q)$  is the production cost of the product, then the decision-making condition of the city is:

$$\max_p [pD(p) - C(D(p))] \quad (1)$$

where the primary differential coefficient condition (TI-ROLE, 1997):

$$p^m - C'(D(p^m)) = -\frac{D(p^m)}{D'(p^m)} \quad \text{or} \quad \frac{p^m - C'}{p^m} = \frac{1}{e} \quad (2)$$

In the function,  $e$  represents the demand flexibility at

the monopolization price ( $p^m$ ). According to the analysis above, with single monopolization, the demand flexibility ( $e$ ) is very small and the price of monopolization product is high, the supply generally is not enough. So it turns out that the primary city gains superior monopolized profit while the consumer's expenditure is very high and the welfare level is low. Regional trade between several sectors results in the vertical division among cities. In this market situation, the superior profit may tempt more new cities entering the sector to break the single monopolization to competition or oligarch monopolization. In such a case, the demand flexibility ( $e$ ) will be increased while facing more oligarchies, the price decline and the consumer's surplus increase. Obviously the welfare is better than the former situation: diversification competition and horizontal market division provide differential and specialized product, as well as prevent the regional growth risk.

Meanwhile, modern industry such as high-tech industry or modern service attributes the scale economy of incomplete competition (KRUGMAN, 1997). Due to threshold and demand of the scale economy and monopolization profit, it is impossible for these sectors to expand illimitably. The vast preliminary input cost (capital) and the entering threshold would limit the number of the cities (oligarch) to supply these industrial products. Hence the market construction of this special industrial distribution is similar to the oligarch's monopolization competition.

According to the above conclusion, if Shanghai and other second-tier cities (a few oligarchies) within the Changjiang Delta metropolitan are encouraged to engage in high-tech and modern service production wholly, they will develop the strong innovative management and service system for whole economy. Furthermore, the regional relation could be improved and the entire development level promoted. Moreover, the practice has demonstrated high welfares of horizontal division such as the manufacturing distributed in Shanghai and other cities in the Changjiang Delta, forming the horizontal division, especially in electronic industry, machinery, chemical engineering, and has been getting strong competitive advantages in domestic and the world market (CHEN, 2000).

According to the theoretical analysis and the development evidence, it is essential to stimulate the horizontal division of the manufacturing as well as the high-tech and modern service industry among the primary and second-tier big cities, so as to maintain the sustainable development and advantages with competition and cooperation. There are not only vertical division of indus-

trial development between Shanghai and Su-Xi-Chang region, but diversified-supply horizontal division, so that the second-tier cities might be upgraded from the manufacturing/secondary level to management and control level.

## 5 FUTURE GROWTH PROSPECT IN INDUSTRIES OF SECOND-TIER CITIES

Since the 1980s, the cities of Suzhou, Wuxi, and Changzhou have ignored the construction of the region's technological innovation and service market system in the speedy development of the manufacturing industry. Many enterprises, particularly the TVE's have mostly depended on the supply of Shanghai in R&D and the service system for production and trading. This created great economic unsustainability for the kind of cities including other second-tier cities such as Hangzhou, Ningbo, located to south of Shanghai. Hence, it is essential for these second-tier cities to make new development strategies of diversified competition and horizontal division with Shanghai in the future technological innovative and service development so as to stimulate the high-tech industry and modern service vigorously. Not only individual cities, but also the entire Changjiang River Delta could be facilitated in comprehensive competence ability and cooperation level.

The development of high-tech industry is a rational orientation of industrial upgrading and sustainable development. National and regional policies and measures including law, tax, venture capital as well as investment environment advantage should be mapped out to accelerate the industrial development inside and outside of high-tech development zones. These second-tier cities should dedicate to creating the innovative research base, to developing the internal innovation network, to improving the start-up of environment with governmental service and living conditions, and to establishing the investment system of small enterprises, etc.

The development of modern service in these second-tier cities is aiming to set up the modern service system for local people and enterprises covering certain region so as to sustain or enhance the innovation and agglomeration. The development approaches may be considered as follows: 1) market service: serving the middle and small enterprises, branches of the multinational enterprises and the local residents; 2) developing modern service: loan and derivative finance and insurance, regional logistic, R&D service, university and vocational education; 3) fostering organizations: medium- and small-sized service agents or foreign invested com-

pany and localized branch of big MNCs; 4) institutional reform: encouraging the development of medium- and small-sized enterprises, opening up local culture and innovating system, promoting the human capital cumulating system and so on. These approaches will interact, restrain and promote with each other, breed the market, which serve for the economic development of the second-tier extended cities.

## REFERENCES

- BALDWIN Carliss, CLARK Kim B, 1997. The management of modularity [J]. *Harvard Business Review*, 1997, 9/10: 84–93.
- BARNES, TREVOR J, GERTLER Meric S , 1999. *The New Industrial Geography* [M]. New York: Routledge Press, 33–37.
- Changzhou Statistical Bureau, 2000, 2001, 2002, 2003. The Statistical Yearbooks of Changzhou[R]. Beijing: China Statistics Press. (in Chinese)
- CHEN Jian-jun, 2000. *Economic Development in Highspeedy Growing Region: Study on the Model of Jiangsu and Zhejiang* [M]. Shanghai: Shanghai People's Press, 43–53. (in Chinese)
- CHEN Wen, 1996. An approach to several problems of China's urbanization development [J]. *Journal of Chinese Geography*, 6(2): 35–41.
- CHEN Wen, ZHOU Cheng-jun, WANG Jin-song *et al.*, 2001. The industrial choice and the spatial organization [J]. *Economic Geography*, 21(6), 679–683. (in Chinese)
- CHRISTALLER W, 1933. The IGU symposium in urban geography [J]. Translator: YAN Chong-min, 1964. *Geographical Translation Fascicle*, 4: 37–45. (in Chinese)
- CUI Gong-hao, 1992. *Study on the Development of Chinese Cities* [M]. Beijing: Chinese Architecture and Building Publishing Press. (in Chinese)
- FRIEDMAN, 1986. The world city hypothesis: development and change [J]. *Urban Studies*, 17: 69–83.
- FUJITA Masahisa, KRUGMAN Paul, VENABLES Abthony J, 1999. *The Spatial Economy, Cities, Regions and International Trade* [M]. Massachusetts: The MIT Press, 128–132.
- FUNABA Masatomi, MASAYUKI Sasaki, LEE Yong-Sook *et al.*, 1999. Japanese technopolis policy: view from four cities [A]. In: MARKYSEN Ann R, LEE Yong-Sook, SEAN DiGiovanna (eds.). *Second-tier Cities, Rapid Growth Beyond the Metropolis* [C]. Minneapolis: University of Minnesota Press, 239–243.
- GU Chao-lin, 2000. *Globalization and the Development of the Cities in China* [M]. Beijing: Commercial Press. (in Chinese)
- HONG Yin-xing, CHEN Wen, 2000. The new development of the urbanization mode [J]. *Economic Research*, 12: 66–71. (in Chinese)
- HU Xu-wei, ZHOU Yi-xing, GU Chao-lin, 2000. *Studies on the Spatial Agglomeration and Dispersion in China's Coastal City and Town Concentrated Areas* [M]. Beijing: Science Press. (in Chinese)
- Jiangsu Institute of Science and Technology Information, 1995, 2000. *Jiangsu Science and Technology Yearbook* [R]. Beijing: Science and Technology Reference Publishing House. (in Chinese)
- Jiangsu Statistical Bureau, 2000, 2001, 2002, 2003. *The Statistical Yearbook of Jiangsu* [R]. Beijing: China Statistics Press. (in Chinese)
- JIN Pei, 1999. *Economy of Industrial Organization* [M]. Beijing: Economic Management Publishing House, 152–154. (in Chinese)
- KRUGMAN Paul, 1997. *Development, Geography and Economic Theory* [M]. Massachusetts: MIT Press, 17–20.
- MARKUSEN Ann R, MASAYUKI Sasaki, 1999. Oita and Kumamoto, technopolises without brains [A]. In: MARKYSEN Ann R, LEE Yong-Sook, SEAN DiGiovanna (eds.). *Second-tier Cities, Rapid Growth Beyond the Metropolis* [C]. Minneapolis: University of Minnesota Press, 223–238.
- MARKUSEN Ann R, SEAN DiGiovanna , 1999. Comprehending Fast-growing Regions [A]. In: MARKYSEN Ann R, LEE Yong-Sook, SEAN DiGiovanna (eds.). *Second-tier Cities, Rapid Growth Beyond the Metropolis* [C]. Minneapolis: University of Minnesota Press, 3–19.
- Shanghai Committee of Science and Technology, 1995, 2000. *Shanghai Science and Technology Yearbook* [R]. Shanghai: Science Popularization Publishing House. (in Chinese)
- Shanghai Statistical Bureau, 2001. *The Statistical Yearbook of Shanghai* [R]. Beijing: China Statistics Press. (in Chinese)
- SHARKSENING Annaly, 1999. *Region Advantage—the Culture and Competition Between Silicon Valley and Route 128* [M]. Shanghai: Far East Publishing House.
- Suzhou Statistical Bureau, 2000, 2001, 2002, 2003. *The Statistical Yearbook of Suzhou* [R]. Beijing: China Statistics Press . (in Chinese)
- TIROLE Jean, 1997. *The Theory of Industrial Organization* [M]. Beijing: China Renmin University Press, 82–284.
- Wuxi Statistical Bureau, 2000, 2001, 2002, 2003. *The Statistical Yearbook of Wuxi* [R]. Beijing: China Statistics Press. (in Chinese)
- ZHONG Jian, 2001. *Analysis of the System of Global Silicon Valley Mode* [M]. Beijing: Chinese Social Science Publishing House, 94–108. (in Chinese)
- ZHOU Yi-xing, 1997. *Urban Geography* [M]. Beijing: High Education Press. (in Chinese)