

## EVOLUTION OF URBAN SYSTEM IN NEW ECONOMIC CIRCUMSTANCES AND PLANNING COUNTERMEASURES

ZHANG Jing-xiang<sup>1</sup>, WU Qi-yan<sup>2</sup>, RUI Fu-hong<sup>1</sup>

(1. Department of Urban and Resources Science, Nanjing University, Nanjiang 210093, P. R. China;

2. Department of Architecture, Yunnan Polytechnic University, Kunming 650051, P. R. China)

**ABSTRACT:** Urban system is the spatial reflection of the inner-deep social economic movement. New economic circumstances not only make the evolution of urban system present one brand-new landscape, but also put forward a new subject for planning of urban system. This article analyzes the properties of the traditional economic process and its essential effect on urban system; it makes a complete survey on the properties of new economic circumstances and its effect on re-forming of urban system; the complicated influential process and result are concluded into the aspects, such as new growth motive force, new economic organization, new location factor and new spatial phenomenon, and its inner effect mechanism is shown as well. In this article, the change process of urban system space is explained in four aspects: (1) dissimulation in the process of spatial agglomeration and diffusion; (2) change of "center-periphery" effect; (3) acceleration growth of axial regions; (4) re-forming of the world and regional urban system. Based on the above theoretical analysis and the properties & requests of new economic circumstances, this article finally puts forward four philosophies emphasized by urban system planning, and forms the new frame for drawing-up of urban system planning.

**KEY WORD:** new economic circumstances; urban system; evolution; planning countermeasures

CLC number: F291.1 Document code: A Article ID: 1002-0063(2001)02-0129-08

As one kind of organizational relation of regional space, in essence, urban system is the spatial reflection of the deep social economic movement. (HERZOG, 1991). Since the 1980s, by means of the globalization of economy and high technology and the particular spatial effect, the evolution of urban system has taken on one brand-new landscape different from the traditional one, which also raise new concepts and requirements for urban system planning. Meanwhile, it's no doubt that active planning countermeasures will exert a positive supporting and inducing influence on the healthy growth of new economic factors. So, an overall review is made herein to the research of evolution of urban system and its coun-

termeasures, which has vigorously started at home and abroad.

### 1 CHARACTERISTICS OF URBAN SYSTEM IN THE INDUSTRIAL SOCIETY

Briefly speaking, in the industrial society, the influence of socio-economic factors on the evolution of urban system are mainly reflected in three aspects.

(1) The socio-economic development mode with the secondary industry as the mainstay depends much on the resources and labor force; the limit of spatial distance constrains the expansion of urban attraction

Received date: 1999-09-06

Foundation item: Under the auspices of the National Natural Science Foundation of China(No. 40001007).

Biography: ZHANG Jing-xiang(1973 - ), male, a native of Yancheng City of Jiangsu Province, Ph. D., associate professor. His main research interests include urban and regional research and planning.

and radiation force in a large scope. Meanwhile, the features of regional production organization inevitably make the administrative organization force play a key role in urban development (ZHANG, 2000). Therefore, the urban influence range is only confined to the division and filling of the limited region space, which has been described in the theories of center place theory by CHRISTALLER W *et al.* In such circumstances, the geometric center has an advantage of location. Primate cities are always the combination of geometric center and administrative center. So, the urban system inevitably presents the features with perpendicular and hierarchical relations as the mainstay.

(2) Manufacturing industry is the main content of socio-economic production and wealth creation, so forward, backward and horizontal relations through divisions of labor become the main motive force and basis for urban system organization. Hierarchical spatial organization of urban system inevitably emerges. The urban status and production scale are closely related each other, and the coupling relation also clearly exists between urban hierarchy and scale (ZHANG, 2000), which even becomes one of the fundamental thoughts of traditional urban system planning.

(3) The material production connection is a leading contact between cities, and the contagious and hierarchical diffusions are the main modes of spatial diffusion; the inner labor division of material production (mainly referring to manufacturing industry) has become the basic moving factor and decisive force. Under such conditions, it's believable that, with the spreading of production and deepening of division of force, the diffusion effect will undoubtedly appear and the evolution of urban system tends toward harmony from the polarization as well (YAN *et al.*, 1995; BOLTER, 1997).

## 2 INFLUENCE OF NEW ECONOMIC CIRCUMSTANCES AND EVOLUTION OF URBAN SYSTEM

### 2.1 Connotation of New Economic Growth Theory

The traditional theory of economic growth believes that economic growth mainly comes from the contribu-

tion of three factors, i. e., capital, land and labor while technical factor is "from outside" and "non-direct input". However, up till now, the relationship between scientific research and production is changing. Science and technology has become one of the factors that can't be ignored in economic growth, and even the first factor in some conditions. Seeing from the general course of world economic development, it has entered into technology-intellect-intensive era or called "knowledge economy" era after experiencing resources-intensive, labor-intensive, capital-intensive and capital-technology-intensive phases. Science and technology can not only form the increasing profits of its own, but also produce gradual increase and benefits of input in capita and labor etc. by means of knowledge accumulation, and further increase the benefits of the whole economic scale. The importance of science and technology factors to the economic growth is to change the benefits from the input in other factors, while the upgrade of input-output efficiency of production factor can not only make the economy grow more rapidly, but also promote the development of scientific and technical undertakings to form a good circle, in the process of which knowledge accumulation is continuously increased; and the increased ratio of it is the most important factor to raise the regional economic growth speed for the time being (DOUGALASS, 1995).

### 2.2 General Characteristics of New Economic Circumstances

Since the 1980s, new economic factors emerging in western developed countries have been infiltrating the global scope rapidly, and playing an increasingly important role. The obvious influence of new economic circumstances on the evolution of urban organizational system is mainly shown as follows:

#### 2.2.1 Motive force for new growth

As far as most developing countries are concerned, even though the traditional manufacturing industry is still the main motive force of economic growth, the modern knowledge industries, represented by finance, information, management and elastic integrated manufacturing industry are developing rapidly in developed

countries, and will become the long-term main mode of economic growth in these countries. The information industry will become the leading industry of economic development; the service economy (productive services) will gradually replace industrial economy. The influence of all these new growing motive forces is undoubtedly profound that will play an acceleration role like geometric multiplier. The American high-speed economic growth in recent years may be explained as the result of motive force of new economic growth. But, as for the southeast Asian areas where the economy ever grew rapidly, the American economist Prof. KRUGERMAN from Stanford University in 1994 pointed out that the high-speed economic growth in southeast Asia results from the output expansion by means of the input of capital and labor (instead of innovation). Only if the input is finished, the increase of output will stop. The 1997 economic crisis in East Asia proves the argument of KRUGERMAN and again shows the fundamental significance for the future long-term development in countries and regions.

### 2.2.2 *New economic organization*

Extensive transfer of manufacturing industry from developed countries to developing countries is the expression of global economic re-organization (GU *et al.*, 2000; DEBRA, 1995). Since the 1970s, transnational corporations have promoted the formation of the new division of labor in international territories, i. e., the matured industries are transferred to under-developed regions, while the developed regions put the focus on developing new industries to form the technical perpendicular division; in order to get used to the change of consumer market, the production management centers are dispersed to several places to form the productive horizontal division; and by means of overseas investment, the capital network is formed and continuously optimized (HERZOG, 1991; GU *et al.*, 2000). Through the authorities and influence of regional groups and global agreements, some international organizations have begun to replace the established international relation system. The transnational corporations are playing an increasing important control role in the development of national and regional social economy. The re-molding of urban system has become multi-level

motive process in which the main action bodies, such as national (regional) governments, enterprises (mainly referring to transnational corporations) and international organizations act alternately.

### 2.2.3 *New location factors*

The location research considers the urban and regional space not only as one kind of production cost, but also as one kind of proliferous production resources (ZHANG *et al.*, 2000a). The traditional theory of location greatly values the material spatial location in urban distribution. It believes that the disparity of natural resources is the core that the location enjoys the comparatively superiority. But at present, with the development of the world economic globalization and network, the determinative role that the traditional location elements, such as natural geographic location, geometric center location and administrative center location play in the urban position and developing prospect, becomes increasingly weak while door location for external contact, information location, aviation network location and the joint location of new economic network are playing an increasingly obvious role in the development of cities, and the evolution of group organization (YAN *et al.*, 1999), in the process of which the binding force of spatial distance gets smaller and smaller. But it is believed that it still has an important role within little scale regions (ZHANG *et al.*, 2000a).

## 2.3 Result of New Economic Circumstances — New Spatial Phenomenon

### 2.3.1 *Dissimulation in the process of spatial agglomeration—diffusion*

Usually, spatial diffusion of geographic elements has three modes: contact diffusion, hierarchic diffusion and non-hierarchic diffusion, the former two of which are balanced diffusion and the latter is unbalanced diffusion. With the global extensive distribution of economic action of transnational corporations and the powerful support of modern transport and communications technology, the increasingly obvious characteristics of non-hierarchic diffusions (unbalanced diffusion) have emerged in geographic elements. Though the dif-

fusions of these elements still have some properties of large regional agglomeration, it is much more extensive and random, comparing with them in traditional economic circumstances. Urban influence space separates more largely from the material space; and the developed countries and regions have much more "new colonies", the new strategic places, such as world city, export processing area and offshore banking center are constantly formed. Therefore, the global growth regions and urban spatial distribution show the distinct leaping and discontinuous natures (FRIEDMANN, 1986; CASTELLS, 1989). It also provides opportunities of accelerating development in the under-developed areas.

Agglomeration and diffusion is the opposite and unitary process of economy and population in spatial distribution. In the early stage of urbanization, the social economic elements are generally expressed as diffusion of large regions and concentration of micro-regions (cities). While in late urbanization, the developed urban group space in economy show the concentration of large regions and the diffusion of small ones. When from a macro-view, industries are agglomerated to a few "points", they may be considered in a micro-view as the process that the industries surround the growth centers to diffuse peripherally. On the contrary, that industries diffuse to peripheral center cities from one agglomerated area is the agglomeration process of industries in middle and small cities. Any area simultaneously has the existence of two-way process of agglomeration and diffusion, but with different combination of elements. The agglomeration of resources, capital, labor and simple technical elements are the main content in backward areas; the main element of diffusion is simple products. In developed areas, the high-new technology and qualified personnel elements is the main content of agglomeration (e. g. in the 1990s, college graduates in the American urbanized areas account for 24.2%, but in non-urbanized areas, ratio is only 12.9%, which shows the agglomeration disparity of talented personnel); while the main elements of diffusion are population, capital and mature technology that give an impetus to the regional integral developing level and further drive outwards. It

may similarly be spread to different countries and regions in a global scope (ZHANG, 2000; ZHANG *et al.*, 2000a).

### 2.3.2 Change of "center-periphery" effect

(1) Continuous consolidation of "dual economy" Since the 1980s, after experiencing the "filtration" of traditional industries (not simple "diffusion"), developed countries have established the leading position in numerous new fields concerning the future development of the human society. The developing levels and standards of the fields (even speed) have far exceeded the backward areas, thus resulting in the further intensification of center-periphery effect (ZHANG, 2000). In 1960, the GDP per capita of 20% of the world richest countries was 30 times the figure in the poorest countries with the same population, and 30 years later the gap enlarged to 60 times. As for the 48 least developed countries in the world, their proportion in the world total trade volume decreased to 0.4% from 0.8% 20 years ago (World Bank 1996). In the recent 20 years, the developing tendency of the world urban system is obviously the primate city development instead of more balanced development (GU, 1997).

(2) Change of "center-periphery" territorial distribution of space "Center" and "Periphery" were initially interpreted by Friedmann as the phenomena of unbalanced polarized development within one region or among different regions of one country. However, with the constant strengthening of the extensiveness role that the transnational corporations play, "center-periphery" effect is being displayed in a new spatial level: within the regions of developed countries and areas, the integrated development is gradually being consolidated. Dual structure of center-periphery will evolve to "center region" with the integral superiority while the scope of "center-periphery" has expanded to between countries and regions. Wallerstein has further divided the world into core countries, semi-peripheral countries and peripheral countries, i. e., the concept of "core" as "point" further evolves to the concept of "surface" like regions and countries, and the center and its periphery also shows the spatial distribution pattern with non-closeness character (YAN, 1999).

### 2.3.3 Acceleration growth of axial regions

In new socio-economic circumstances, no matter where it is in developed countries or developing countries, the spatial axis of economic geography is acceleratingly growing. As far as the developed countries are concerned, these axial regions are considered as the “hatchers” of innovation and “accelerators” in economic development; their superior position in the whole national economy, even in the world’s economy has further been established and becomes the “agglomerated regions” in a larger spatial scope and even in a global scope. As for the developing countries, the areas with developed economy and superior location historically (always referring to urban concentrated areas) are becoming the areas where the input of domestic and foreign capital is concentrated and their axial position is also continuously strengthened. In 1991 – 1995, the average growth rate of GDP in Chinese coastal provinces and cities reached 16.1%, 4.5% higher than the national level. The economic growth rate of the coastal economic core areas with urban concentration in the 1990s is higher than the average rate of their provinces. Also, compared with that in 1991 – 1995, the average growth rate of GDP in the Zhujiang River delta area that grew rapidly achieved 23.4%, 4.3% higher than that of Guangdong Province. And for middle and south Liaoning province that grew most slowly among large core areas, the rate was 12%, 2.6% higher than the level of Liaoning province and 1.2% higher than the national average level. Within every economic core area, the economy and population are highly agglomerated in the core-axis area that consists of main core cities and main developing axes. The metropolitan interlocking region is the result of spatial re-organization of industries, and a new kind of urban territorial spatial organization. It is also one urbanization phenomenon of territories with the characteristics of agglomeration and diffusion that emerge when urbanization develops into a high stage. It occupies the core location of regions that develop globally (LU, 1994). Therefore, in this sense, it may be said that, the formation of the megalopolis is not only the change of “living form of people”, more important-

ly, it represents one new kind of distribution of productive forces (ZHANG *et al.*, 2000a; ZHANG *et al.*, 2000b).

### 2.3.4 Re-forming of the world and regional urban system

The re-division and re-organization of labor in the global territory and the transport and the rapid development of information network are making the world urban system re-form and grow to be a real “integrated urban system” in a global scope. A. P. PHILBRICK (1975) ever used the “theory of center functions” to divide the urban functions into 7 grades, which nowadays are expanding to the global urban system. Friedmann raised the hypothesis of the world’s urban system in the 1980s, and put forward the judging standards of world cities are as follows: 1) the type and position of urban combination with the world economic system; 2) spatial control capability of capital that cities have. KERN ever used the “index of transnational corporations” and “index of transnational banks” to judge the standards of world cities. The world urban system is evolving from the traditional center mode with strict grades to the network mode. In the network-type urban system still exists a perpendicular relationship, which are increasingly becoming a reflection of vertical division of production organizations of transnational corporations; while the network-type relation is shown as the socio-economic relation formed by it and the operation of the facilities of transport and information (ZHANG, 2000; DOWGALASS, 1995). Each city forms a multi-direction dynamic intersecting hierarchic relationship in the network. It is not necessary for the urban joint position in the network, the scale and the productive comprehensive degree to relate with one another, which are traditional factors of location; but more depend on the environment of innovation and the grasp of development opportunities. The spatial polarization and specialization of urban functions will further be consolidated. The above developing mechanism provides larger openness and uncertainty for the organization of the world urban system and regional urban system.

### 3 PLANNING COUNTERMEASURES OF URBAN SYSTEM

Starting in the late 1970s and early 1980s, the Chinese research and planning of urban system fit the planned economic system of the state at that time, which therefore, at one time, became the important means of balanced allocation of capital and layout of productive forces and played an important role in national economic development, and also formed the comparatively formal drawing-up system. Since the 1990s, with the tremendous transformation of the international and domestic socio-economic backgrounds, the traditional theories of thinking of urban system planning and drawing-up system have exposed the extreme unsuitableness nature. While rapidly updating the theories, we should make positive countermeasures concerning the planning of urban system in new economic circumstances.

#### 3.1 Basic Philosophies of Urban System Planning in New Economic Circumstances

##### 3.1.1 *Philosophy of system openness*

The original research of urban system always considers it as a comparatively closed self-operation system, focusing on the exploration of balanced allocation and good operation of factors within the system. But today, the urban development shows the traditional concept that the original research of urban system always took countries (or specially designated administrative territories) as units should be broken; and the increasingly obvious economic globalization particularly makes it more necessary. As far as the current situations in China are concerned, the research focus can be placed to reveal how the national urban system is reorganized through the process of globalization, and how to decrease the negative effect, etc.

##### 3.1.2 *Philosophy of integral planning*

This philosophy includes the following meanings:

(1) The previous planning of urban system is used to regarding dot-type factors to imitate the organizational structure of groups. It only lays stress on the mobility of materials and information among urban groups. With

increasing blend of urban and regional development, the research of urban system making up of dot-type factors ignores its conformity with the research of other space. The philosophy of integral planning requires to strengthen the mobility of production factors and the analysis and research of other factors' effect to the development of urban and regional space.

(2) The original research of urban system and planning practice usually pursues the clear rules of levels of various factors in the system, describing a branch-type hierarchical pedigree. But at present, the development of urban groups has increasingly presented the complicated network relationship. It is not certain that the future of urban development, the levels and the absolute scale relate to one another. The research must be made from new angles (such as particular idea and contact idea) to the prospect of urban development and its concrete position in a spatial system.

(3) The defects of the traditional planning of urban system also lies in its limiting of the research field of vision to the economic production sphere and ignoring the more essential social, cultural and biological demands of cities as human inhabiting places. It mis-regards the means of human development as its focus, and overlooks the fundamental objectives of human development. In the new globally competitive network, the international conflicts of the future are mainly based on the cultural disparities formed by different groups of social people (ZHANG, 1999); and the grasp of the disparities and the superiority of the whole social and biological environment will be the key to decide the position in urban network.

##### 3.1.3 *Philosophy of dynamic elasticity*

As the society of information and globalization is also a changeable and uncertain one, urban system planning should reflect the elastic characteristics by multi-objective and multi-scheme and in the process of globalization make the system have bigger emergence character to avoid different risks.

##### 3.1.4 *Philosophy of economic growth — spatial mutual movement*

One of the big defects in the original planning of urban system is that it ignores the mutual moving relationship between the economic growth and evolution of

regional space. The initiative effect of economic growth to the spatial evolution is obvious, but as planning work, we should further realize the guidance, adjustment and control and promotion role that the initiative spatial planning plays in the economic growth. From the international experience, it can be seen that “regional space planning (spatial permit and spatial governance)” in the market economic conditions is one of the basic adjusting and controlling means by the government to

the society, economy and environment development.

### 3.2 Re-forming of drawing-up system of urban system planning

Based on the above planning philosophies, this article herein puts forward the concept mode of urban system planning re-forming(Fig. 1).

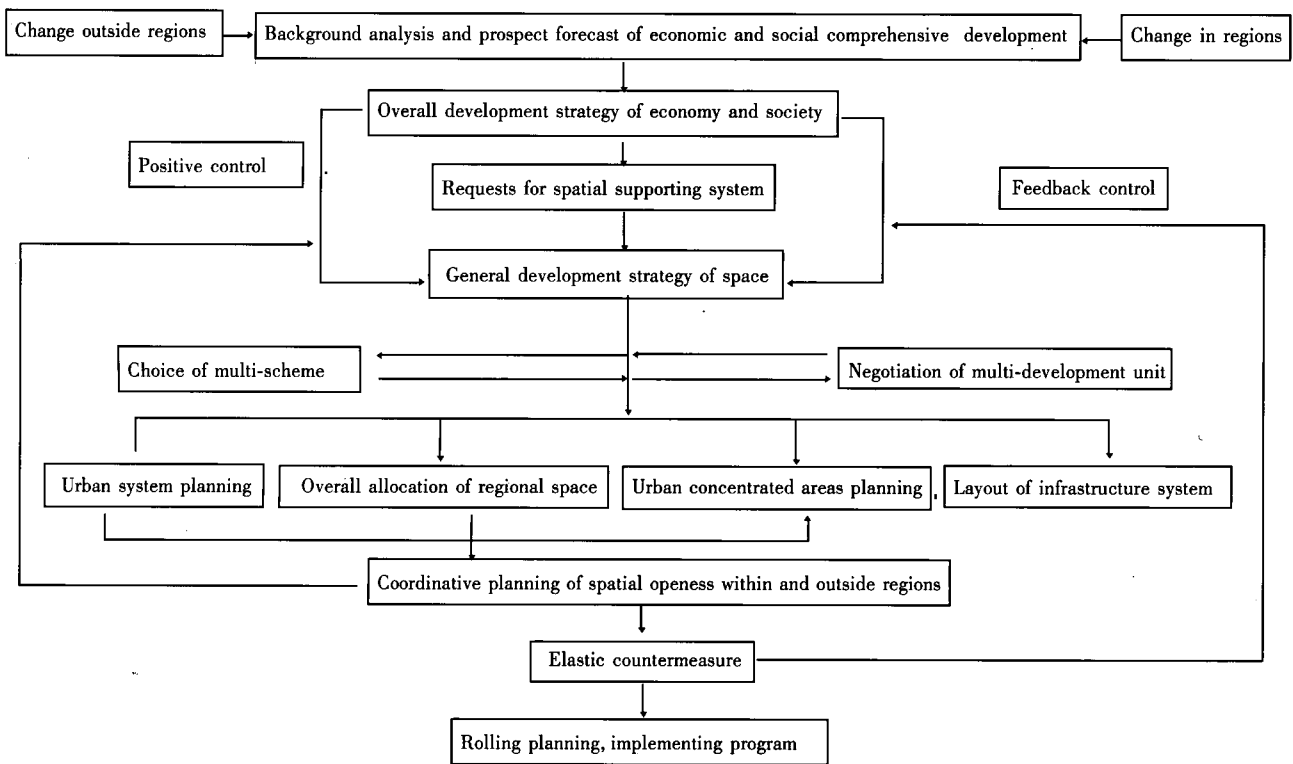


Fig. 1 Concept mode of urban system planning re-forming

#### REFERENCES

BOLTER M. 1997. *Competitive Superiority*[M]. Beijing: Huaxia Press, 93 - 95. (in Chinese)  
 CASTELLS M, 1989. *International City*[M]. Blackwell, Oxford, 134 - 142.  
 DEBRA Stanssfoye, 1995. World-system: toward a heuristic and pedagogic conceptual tool[J]. *Urban Studies*, 32(2): 34 -

41.  
 DOUGALASS M, 1995. *Global Interdependence & Urbanization* [M]. Vancouve: UBC Press, 79 - 94.  
 FRIEDMANN, 1986.: The world city hypothesis[J]. *Development & Change*, 17: 76 - 84.  
 GU Chao-lin, 1997. Theory and methods of urban system planning in new periods[J]. *Journal of Urban Planning*. 2: 14 - 26. (in Chinese)

- GU Chao-lin *et al.*, 2000. *Economic Globalization and China's Urban Development*[M]. Beijing: Commercial Press, 27 – 44. (in Chinese).
- HERZOG L A, 1991. Cross-national urban structure in the era of global cities[J]. *Urban Studies*, 28(4): 44 – 52. (in Chinese)
- LU Da-dao, 1994. *Regional Development and Its Spatial Structure* [M]. Beijing: Science Press, 94 – 132. (in Chinese)
- YAN Xiao-pei, 1999. *Information Industry and Urban Development*[M]. Beijing: Science Press, 17 – 28. (in Chinese)
- ZHANG Jing-xiang, 1999. On regional /urban governance of urban group development areas in China[J]. *Urban Problems*, 5: 44 – 47. (in Chinese)
- ZHANG Jing-xiang, 2000. *Combination of Urban Group Space* [M]. Nanjing: Southeast University Press, 84 – 101. (in Chinese)
- ZHANG Jing-xiang *et al.*, 2000a. *Agglomeration and Diffusion: New Theory of Urban Spatial Structure*[M]. Nanjing: Southeast University Press, 44 – 71. (in Chinese)
- ZHANG Jing-xiang *et al.*, 2000b. Reconsideration of the western metropolitan development and the reference[J]. *Economic Geography*, 3: 53 – 58. (in Chinese)