The Concept, Evaluation Index System and Construction of the National Innovative City in China: Innovation Capacity Building through a Regional Innovation System

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Abstract

This paper investigates the concept, characteristics and evaluation index system of the innovative city, and brings forward phase and policy recommendations for national innovative city construction. It defines an innovative city as one in which the regional innovation system is sound, the innovation elements are agglomerated, the infrastructures and social culture can support innovation, the innovation efficiency is high, the innovation activity can acquire better benefits than other method, the supporting and leading functions of innovation to economic and social development are strong, and the innovation radiation and demonstration functioning ranges are wide. The paper constructs an evaluation index system consisting of 41 indicators. The paper deems it necessary for the government to select cities with good foundations to experiment with innovations in institutions, infrastructure construction, knowledge, technology, industry, and social factors. Cities should also have innovation clusters and regional innovation capacity building. The paper also addresses the necessity of supporting indigenous innovation capacity building, to test policies such as tax deduction and government procurement, and to enhance their evaluation. Experimental point cities are also needed in order to improve innovation and an entrepreneurial environment, and to solidly transfer industrial structure optimization and upgrading to indigenous innovation.

Keywords: indigenous innovation; national innovative city; evaluation index system

1. Introduction

Cities are main areas of national economic and social activities, and their status of innovation and development directly determines a country's innovation capacity and international competitiveness. According to Chinese statistics from 2007, 287 cities had only 28% of the total population, but 63% of the total GDP, 98% of all universities and colleges and 96% of the country's undergraduate students. For China, building up innovative cities is an objective requirement for thoroughly practicing the scientific development concept, a strategic choice for promoting innovation-driven nation construction, an important measure for implementing the overall strategy for regional development, and an effective approach for strengthening the capacity of national indigenous innovation. In 2006, China promulgated the "National Plan for Medium and Long Term S&T Development (2006-2020)" (Outline). This required that regional innovation systems with characteristics and advantages be built up, and included a plan for fostering the

regional innovation system and innovation capacity by fully integrating characteristics and advantages of regional economic and social development. Up until now, more than 200 cities in China have already put forward ideas or plans to become innovative cities. In January 13, 2010, the National Development and Reform Commission of China principally approved 16 cities as the first batch of experimental point cities of the national innovative cities, and the Ministry of Science & Technology of China selected 20 cities and districts as the first batch of national innovative experimental point cities or districts.

2. Literature review

In recent years, the concept of the regional innovation system has garnered considerable attention for policy makers and academic researchers as an useful analytical framework for advancing understanding the innovation process in regional economies (Asheim B, Coenen L, Svensson-Henning M., 2003). Cooke et al. (1998) defined the regional innovation system as an interactive learning system in which a company and other organizations interact through a latent institutional environment. Bjørn T. Asheim and Lars Coenen (2005) defined the regional innovation system as institutional infrastructure supporting innovation within the production structure of a region. However, Doloreux (2003) argued that the regional innovation system should be understood to be a set of interacting private and public interests, formal institutions, and other organizations that function according to organizational and institutional arrangements and relationships conducive to the generation, utilization, and dissemination of knowledge. S. Chung (2002) stated that the Korean regional innovation system consists of three innovation actor groups: universities, public research institutes and industry, and classified the 16 Korean regional innovation systems into three categories: advanced RIS, developing RIS and less developed RIS from the dimensions of the metropolis and provinces. He also suggested that a central government was necessary in the formulation and implementation of RISs, and that regional governments should be important partners in

enhancing national innovation capabilities.

The concept of an innovative city originated from the creative city developed by Charles Landry (2000) in the late 1980s and since then has become a global movement reflecting a new planning paradigm for cities. Landry's model of a creative city focused on the following: innovative high-technology enterprises; spheres producing cultural goods and services; networks for exchanging information and knowledge; activity-based clusters, including creative ones; ties between business and institutions for producing and mediating knowledge (e.g. universities and research establishments); diversity of built environments, quality of public spaces; diversity of opportunities for leisure, entertainment and self-development; effective transport infrastructure; and general social cohesion. Gert Jan Hospers (2003) argued that the innovative city was a place to create an economy of knowledge that demanded the city to innovate, and should be a body with convergence, diversity, instability and good fame. James Simmie asserted that the innovative city included fives elements: companies, industries, scientists, knowledge and technologies and a degree of foreign communion. Chinese scholars (Han Jiangbo, 2008; Wang Renxiang and Deng Ping, 2008; Zhang Shiyun and Liu Hao, 2008; Hu Yu, 2008) have also studied the concept of the innovative city. Some scholars such as Charles Landry, Peter Hall, Ren Xinmin (2008), and He Li (2007) studied the elements and evaluation index system from different points of view. Xie Pan (2007)] investigated the components, the development stages and types of the innovative city, whereas Hu Yu (2008) proposed five paths to innovative city construction. In 2003, the Korean government initiated an ambitious plan of innovative city construction in the non-capital regions for reducing regional disparities between the capital and non-capital regions. If a city wins the title of "Innovation-driven City", several public offices will be moved there from Seoul. (Joon Kyo Seo, 2009). Similarly, many Chinese cities such as Ningbo, Qingdao, Jinan and Shenzhen have established their own innovative city evaluation index system.

The existing research papers studied the theory and methods of the innovative city construction from

different aspects and had an important significance as references. However, they did not reveal the connotation and characteristics of the innovative city deeply. The existing studies on evaluation index systems of the innovative city were imperfect; many of them were only evaluation index systems of regional innovation, or a city's innovation activities, or a city's innovation capacity, and some were even that of economic and social development, and did not reflect the actual innovation of the city itself. Existing studies on the innovative city construction stages and types have been relatively vague, and there is no road map of innovative city construction. This paper studies the concept and characteristics of the innovative city, investigates the basic principles of the evaluation index system, and offers an evaluation index system. The paper also analyzes the construction stages and development of the national innovative cities in China, and finally proposes policy recommendations for the construction of such cities.

3. The concept and characteristics of the innovative city

3.1 The concept of the innovative city

In order to study the concept of the innovative city, it is first necessary to consider the ideas of "innovation" and "city". Looking at "innovation", the innovative city concept should not only cover the entire process from input to output, but should also cover supporting and leading functions of innovation to economic and social development. It should not only reflect characteristics of the value chain of innovation, but should also reflect the properties of linkage and networks of innovation, and should emphasize indigenous innovation under an open environment. As for "city", on the one hand, the innovative city concept demands that all innovation activities be limited to the city's urban area, and on the other hand, from the point of view of the regional innovation system and regional economic development, the innovative city must demonstrate radiating and demonstrating functions to the surrounding areas.

Therefore, the innovative city refers to a city in

which the regional innovation system is sound, the innovation elements are agglomerated, the innovation environment and conditions are good, the innovation efficiency is high, the innovation benefit is large, the supporting and leading functions of innovation to economic and social development are strong, and the innovation radiation and demonstration functioning ranges are wide.

The innovative city should regard indigenous innovation as the strategic basic point, and its capacity-building as the motif for the city's economic and social development. In the innovative city, indigenous innovation should become the baseline for optimizing and upgrading the industrial structure, be the main driving force for sound and fast economic and social development, and be the dominant strategy for city's development. In addition, quality and efficiency of development should be significantly increased and the development pattern fundamentally changed.

3.2 Characteristics of the innovative city

1. A sound regional innovation system

This requires that innovation actors such as universities, enterprise and government in the regional innovation system be whole and their innovation capacities and innovation management capacities strong, and that the innovation efficiency of the regional innovation system be high. Therefore, there should be a good scientific and technological institution and mechanism supporting innovation, a strong government financial capability, strong original innovation capacities of universities and research institutes, a dominant position of enterprise in technological innovation, rapid development of innovation service organizations, and a regional innovation system with a high-circulation regional innovation ecosystem.

2. Infrastructure and social culture support innovation

This can be shown as a close combination of education, science, technology and economy, a high quality of public science and technology, adequate intellectual property rights protection, a social culture in favor of innovation, high innovation performance

so that innovators can acquire economic returns and social status, and fewer negative interferences from governments to business innovation.

3. Agglomerated innovation elements

This requires not only that the city agglomerate talent, capital, technology and information in space, and can generate an agglomeration effect, but also that scientific and technological platforms and facilities or infrastructures of education, culture and health can generate a cluster effect. Therefore, there should be a large scale and a high intensity of R&D funds and manpower from government and businesses, an extensive number of world-class research institutes, universities, enterprises with strong innovation capacity, and a dense concentration of world-class leading talent and innovation teams.

4. High innovation efficiency

It is imperative that the city have a strong capability to utilize the innovation resources, and a high ratio of innovation output to input. This demands high efficiencies of S&T article output to R&D fund and talent input, high efficiencies of patent output to R&D fund and input, large quantity and high quality innovation talents who can meet needs of industry development, and high efficiencies of high-tech industry output to R&D fund input and talent input.

5. Innovation can acquire better benefits than other methods

This requires acquiring more profit through innovation than through other approaches. It also requires lower resource consumption and less environmental pollution for one unit of wealth creation, so that people can have a higher quality of life.

6. Strong supporting and leading functions of innovation

The city's economic and social development is mainly due to the contribution of innovation. The city can resolve its problems of economy, health, safety, resource conservation and environment protection mainly on the indigenous innovation and less on external technologies and investment. People's living standards can be markedly improved by the indigenous innovation. The contribution rate of scientific and technological progress to economic growth is high.

7. Wide ranges of innovation radiation and demonstration functions

The innovative city can have innovation radiating and demonstrating functions to the surrounding areas and even broader areas as a regional innovation center. This is mainly reflected by areas such as proliferation and application of new technologies and new products, talent cultivation, the demonstration of innovation institution and mechanisms, and development pattern shifts.

4. Evaluation index system of the national innovative city

4.1 Principles of the evaluation index system of the national innovative city

1. Systematic principle

The national innovative city is a complex system related to technology, economy, society, and culture. The evaluation index system of the national innovative city is needed not only to reflect technological innovation itself, but also to demonstrate innovations of ideas, institutions, management, and social undertaking. Nevertheless, it is necessary to regard technological innovation as a foundation.

2. Oriented principle

The evaluation index system is policy-oriented and should be conducive to guiding the city into taking an innovation and development road. To build a national innovative city, efforts must be made, but it is not impossible to achieve.

3. Operability principle

The evaluation index system should be able to arrive at a specific index or score, should have threshold indicators, and should reflect characteristics of construction phases of the national innovative city. Thus, it is propitious to find the city's deficiencies and help the city to achieve the goal of innovation and development.

4. Relative index-based principle

The evaluation index system of the national innovative city mainly shows the development level from innovation. Therefore, most of its indicators should be relative indicators. However, because big cities have better conditions for building up a national innovative city, it is also necessary to take some quantitative indicators into account.

5. Differentiation principle:

The evaluation index system must take as starting points the indigenous innovation and the indigenous innovation capacity building, while also taking into account different types of national innovative cities. While considering innovation of universities, research institutes, and other actors, the evaluation index system should focus mainly on innovation of enterprise and industry.

6. Indigenous innovation principle

Indigenous innovation capacity is under a national sovereignty, and should therefore embody the principle of independence or indigenousness. For innovation activities in the national innovative city, it is particularly crucial to hold the dominant right of economic and social development, and especially those of high-tech industries and strategic emerging industries. Therefore, the evaluation index system is necessary in order to emphasize indigenous innovation and intellectual property rights.

7. Openness and cooperation principle.

The regional innovation system is an open innovation system under background of globalization. Building up a national innovative city requires effectively attracting and utilizing global innovation resources, especially world-class talents, technologies, capital, and indigenous innovation infrastructures.

4.2 Evaluation index system of the national innovative city

In accordance with the characteristics of the innovative city, the proposed evaluation index system of the national innovative city mainly includes the following seven second level indicators: 1) regional innovation system construction, 2) basic conditions for innovation, 3) agglomeration of innovation elements, 4) innovation efficiency, 5) innovation benefits, 6) supporting and leading functions of innovation, and 7) radiation and demonstration functions of innovation. Furthermore, these seven second-level indicators include 41 third-level indicators. The evaluation index system of the national innovative city is shown in figure 1.

4.3 Evaluation method of the national innovative city

The paper adopts a simple scoring method to evaluate national innovative cities. For each indicator, a value scope from 0 to 100 is provided according to expert judgment; the indicator's value is then converted into a score. For example, imagine the scope of the contribution rate of S&T progress to economic growth is 50-70%. If a city's contribution rate is 55%, the score is 71.5. A rate of 40% translates to a score of 57. Even if the rate is over 70%, the score will remain 100. The final scores for the national innovative cities are calculated in accordance with following formula:

$$C_i = \frac{\sum_{j=1}^{n} x_j}{n}$$

In this formula, "i" represents a city, "j" an indicator, and "n" the total number of the indicators; in this article, "n" equals 41.

In order to evaluate national innovative cities, it is also necessary to set up several threshold indicators for the experimental point cities of the national innovative city. One such indicator could be GDP, which should be above a certain level (e.g.: 250 billion RMB yuan). The proportion of education and R&D funds to GDP should be no less than 1.5% and 2% respectively. The contribution rate of science and technology to economic growth should be no less than 50%. The paper considers fourteen necessary threshold indicators. These indicators and their value scopes of the national
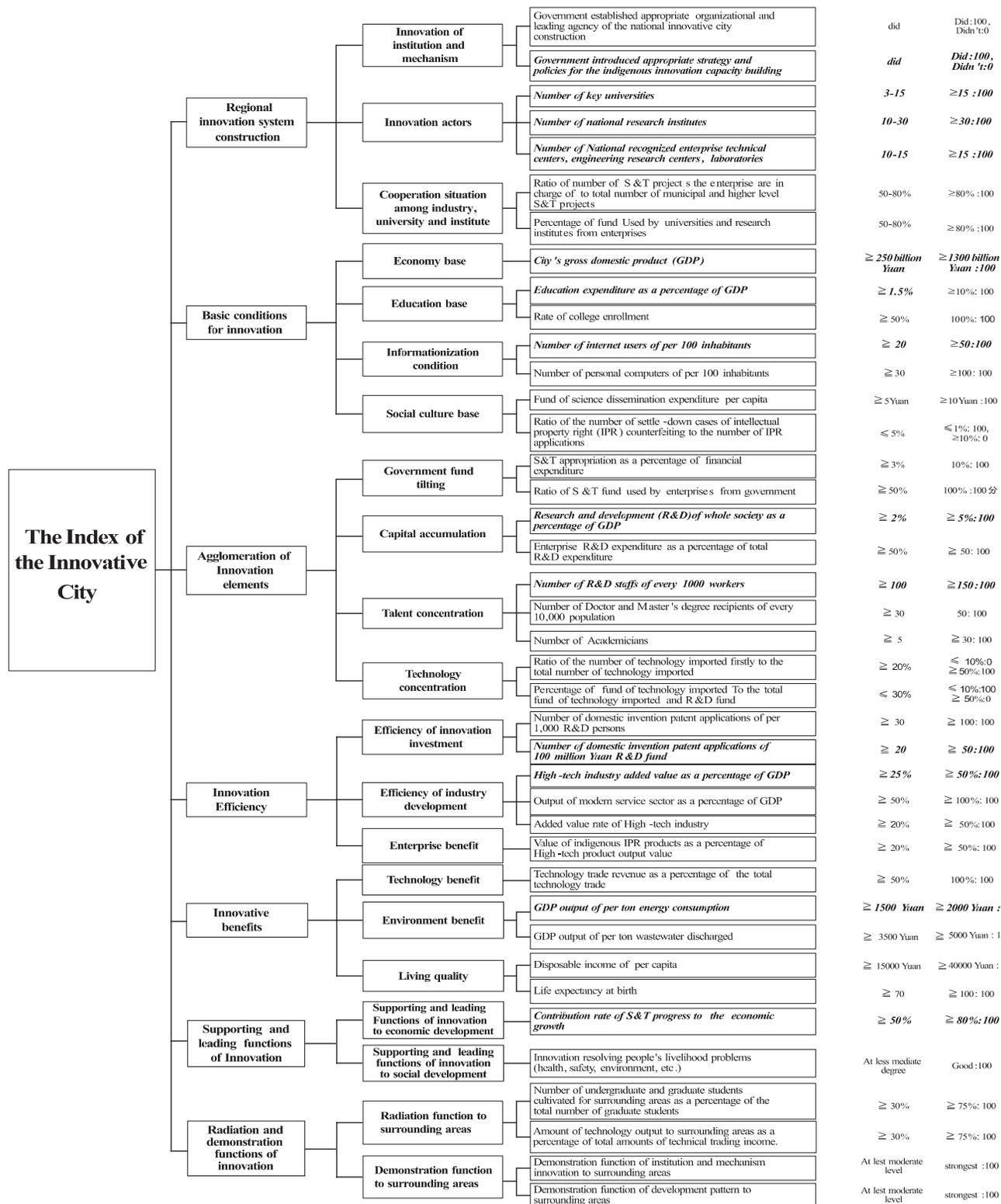
Regional innovation system construction	Innovation of institution and mechanism	Government established appropriate organizational and leading agency of the national innovative city construction	did	Did:100, Didn't:0
		Government introduced appropriate strategy and policies for the indigenous innovation capacity building	*did*	*Did:100, Didn't:0*
	Innovation actors	*Number of key universities*	*3-15*	*≥15:100*
		Number of national research institutes	*10-30*	*≥30:100*
		Number of National recognized enterprise technical centers, engineering research centers, laboratories	*10-15*	*≥15:100*
	Cooperation situation among industry, university and institute	Ratio of number of S&T projects the enterprise are in charge of to total number of municipal and higher level S&T projects	50-80%	≥80%:100
		Percentage of fund Used by universities and research institutes from enterprises	50-80%	≥80%:100
Basic conditions for innovation	Economy base	*City's gross domestic product (GDP)*	*≥250 billion Yuan*	*≥1300 billion Yuan:100*
	Education base	*Education expenditure as a percentage of GDP*	*≥1.5%*	*≥10%:100*
		Rate of college enrollment	≥50%	100%:100
	Informationization condition	*Number of internet users of per 100 inhabitants*	*≥20*	*≥50:100*
		Number of personal computers of per 100 inhabitants	≥30	≥100:100
	Social culture base	Fund of science dissemination expenditure per capita	≥5 Yuan	≥10 Yuan:100
		Ratio of the number of settle-down cases of intellectual property right (IPR) counterfeiting to the number of IPR applications	≤5%	≤1%:100, ≥10%:0
Agglomeration of Innovation elements	Government fund tilting	S&T appropriation as a percentage of financial expenditure	≥3%	10%:100
		Ratio of S&T fund used by enterprises from government	≥50%	100%:100分
	Capital accumulation	*Research and development (R&D) of whole society as a percentage of GDP*	*≥2%*	*≥5%:100*
		Enterprise R&D expenditure as a percentage of total R&D expenditure	≥50%	≥50:100
	Talent concentration	*Number of R&D staffs of every 1000 workers*	*≥100*	*≥150:100*
		Number of Doctor and Master's degree recipients of every 10,000 population	≥30	50:100
		Number of Academicians	≥5	≥30:100
	Technology concentration	Ratio of the number of technology imported firstly to the total number of technology imported	≥20%	≤10%:0 ≥50%:100
		Percentage of fund of technology imported To the total fund of technology imported and R&D fund	≤30%	≤10%:100 ≥50%:0
Innovation Efficiency	Efficiency of innovation investment	Number of domestic invention patent applications of per 1,000 R&D persons	≥30	≥100:100
		Number of domestic invention patent applications of 100 million Yuan R&D fund	*≥20*	*≥50:100*
	Efficiency of industry development	*High-tech industry added value as a percentage of GDP*	*≥25%*	*≥50%:100*
		Output of modern service sector as a percentage of GDP	≥50%	≥100%:100
		Added value rate of High-tech industry	≥20%	≥50%:100
	Enterprise benefit	Value of indigenous IPR products as a percentage of High-tech product output value	≥20%	≥50%:100
Innovative benefits	Technology benefit	Technology trade revenue as a percentage of the total technology trade	≥50%	100%:100
	Environment benefit	*GDP output of per ton energy consumption*	*≥1500 Yuan*	*≥2000 Yuan:*
		GDP output of per ton wastewater discharged	≥3500 Yuan	≥5000 Yuan:1
	Living quality	Disposable income of per capita	≥15000 Yuan	≥40000 Yuan:
		Life expectancy at birth	≥70	≥100:100
Supporting and leading functions of Innovation	Supporting and leading Functions of innovation to economic development	*Contribution rate of S&T progress to the economic growth*	*≥50%*	*≥80%:100*
	Supporting and leading functions of innovation to social development	Innovation resolving people's livelihood problems (health, safety, environment, etc.)	At less mediate degree	Good:100
Radiation and demonstration functions of innovation	Radiation function to surrounding areas	Number of undergraduate and graduate students cultivated for surrounding areas as a percentage of the total number of graduate students	≥30%	≥75%:100
		Amount of technology output to surrounding areas as a percentage of total amounts of technical trading income.	≥30%	≥75%:100
	Demonstration function to surrounding areas	Demonstration function of institution and mechanism innovation to surrounding areas	At lest moderate level	strongest:100
		Demonstration function of development pattern to surrounding areas	At lest moderate level	strongest:100

The Index of the Innovative City

Figure 1 The evaluation index system, threshold indicators and the value scopes of the national innovative city

innovative city as experimental points are shown in Figure 1 in italic boldface with black.

5. Blueprints to build a national innovative city

To create an experimental point city or a national innovative city, familiarity with innovation and the development phase of a city is required. According to the evaluation index system and methods shown above, the following development stages should be considered.

1. Germination stage

In this stage, the score is less than 30 points. This shows that the innovation fund scale is small, innovation infrastructure is imperfect, and innovation efficiency is low. However, the government has the intention of building a national innovative city.

2. Quick growth stage

In this stage, the score is between 30 to 50 points. The local government has set out a plan to build up a national innovative city. There is rapid growth of innovation investment, fast improvement in infrastructure, and a quick increase of innovation efficiency; innovation is beginning to play a role in the city's economic and social development.

3. Experimentation and development stage

When it reaches a score of 55 points, or there-abouts, the city can be approved as an experimental point city, on the road to transforming itself into national innovative city in a period of about five years. In this stage, innovation funds reach a certain scale, innovation infrastructure begins to perfect itself, innovation efficiency attains a high level, innovation plays an evident role in supporting the city's economic and social development, innovation-driven economic development patterns begin to form, high-level talents begin to gather, and innovation begins to show radiation and demonstration functions to the surrounding areas. In this phase, the government should support indigenous innovation capacity building with financial policies.

4. Stable development stage

After three to five years, a city with a score above 60 points that passes inspection can be formally approved as a national innovative city. In this stage, innovation investment achieves a larger scale, innovation efficiency increases and the speed of innovation improvement is higher than ever. Innovation plays very important supporting and leading roles to economic and social development although the speed of development of these areas is not as high as before. The government should support such a city's innovation and development through taxation deduction and government procurement policies.

5. Development with characteristics stage

In this stage, when the city scores above 70 points, the national innovative city construction attains stability, with distinctive regional characteristics. High-level talents gather in a large scale, high-tech industries and modern service industries dominate, innovation is the key driving force to economic and social development, and the city becomes a mature national innovative city.

6. Development with radiation and demonstration functions stage

In this stage, once the city scores above 75 points, the national innovative city becomes a regional innovation center. It will play radiation and demonstration functions of talent cultivation, technology introduction, and information provision to the surroundings areas, and even to the entire country.

6. Deployment of the characteristic national innovative city

After a period of development, experimental point cities are likely to differentiate into cities with certain characteristics. Therefore, they should emphasize these characteristics throughout development. The creation of national innovative cities as experimental point cities or their construction in China with certain characteristics should be in line with characteristics of innovation chains and the needs of regional development.

1. Cities with institutional innovation

Cities such as Shenzhen, Guangzhou have better public management, organic cooperation with economics, bases in S&T institutions and education. They possess market mechanisms that stimulate more innovation than other cities. By supporting their construction as national innovative cities, information about S&T institution reform, government management and improvements in innovation dynamic mechanisms can be gleaned. These cities can demonstrate institution and mechanism innovation for other cities.

2. Cities with innovation infrastructure construction

Innovation infrastructure is a necessary material and technical base for protecting and promoting an entire society's innovation activities, cultivating high-level talent, and building an innovation-driven nation. Cities such as Beijing and Hefei have the advantages of the highest concentration of regional S&T and education resources and strong original innovation capacity. By supporting their experiments and construction as national innovative cities, expertise in research and experiment systems, public S&T support systems, industrial technological development systems, enterprise technology innovation systems, and innovation service systems can be handed over to other cities.

3. Cities with knowledge innovation

Cities such as Beijing, Tianjin, Shanghai, Chongqing, and Wuhan have the advantage of the highest concentration of regional S&T and education resources, and have an important radiation function to the surrounding areas. It is necessary to support their exploration of the innovation capacity building of colleges and S&T institutes.

4. Cities technological innovation

A large number of cities such as Nanjing and Jinan possess a strong technological innovation capacity. They have a large number of internationally influential leading enterprises and SMEs with a strong capacity for innovation. They have robust capabilities of integrated innovation and import- digestion-absorption improvement innovation. It is necessary to support them as they experiment with R&D capacity as well as innovation efficiency.

5. Cities with innovation for industrial structure optimization and upgrading

At present, many cities such as Shenyang, Changchun, and Dalian have been transformed from a planned economy to a market economy. Because there is a big gap between these economies in terms of industrial innovation, there is an urgent need to explore new models and methods of industrial innovation and development after transformation. These cities can provide demonstration experiences for cities that have exhausted natural resources or are in the process of transformation.

6. Cities with social development innovation

Innovation performance not only refers to economic revenue from innovation, but also to the positive functions of innovation to social development, including science and technology, education, culture, health, public safety and resource-saving and environment-friendly social development. Cities such as Hangzhou and Chengdu have become modern cities with full urban functions, a prosperous economy and a beautiful environment. They should be supported in their exploration of innovation promoting social development.

7. Cities with innovation and development for an open economy

A number of cities such as Qingdao, Xiamen, and Suzhou are located in coastal areas and have the advantage of a high degree of internationalization. They boast conditions conducive to using international innovation resources and changing them into indigenous innovation capacity and competitiveness. These cities should be supported in their exploration of a new model promoting indigenous innovation through open innovation.

8. Cities with innovation in coordinated regional development

The development of middle and western regions of China is an indispensable component in building an innovation-driven nation. Cities such as Zhengzhou,

Xian, and Lanzhou are important regional S&T, higher education and industry centers, and have a strong capacity to disseminate innovation to less-developed regions and to lead coordinated regional development. Supporting their experiments and construction as national innovative cities could open up new roads to innovation by coordinating development for middle and western regions.

9. Cities with regional innovation capacity building

Regional innovation capacity is an important means for the regional innovation system and national innovation capacity building. Cities such as Changsha, Zhengzhou, Nanchang are regional centers of S&T, education, business, finance, traffic and communication, and have the responsibility to drive regional innovation and development. It is necessary to support their experiments with regional innovation capacity building.

10. Cities with service industry innovation

The innovation of modern service industries such as S&T, education, finance, communication, software, and exhibitions has garnered intense interest in recent years. Some cities such as Changsha and Guangzhou have well-developed modern logistics, business services, and community service industries, and the modern service industry is currently becoming the leading sector. It is necessary to support the efforts of these cities to utilize innovative approaches to areas such as modern logistics, modern finance, next-generation communications and the Internet.

11. Cities with innovative talent introduction and cultivation

Innovation talent is the most dynamic element for innovative nation building. In recent years, some cities such as Tianjin and Suzhou have employed a series of innovative policies to obtain and cultivate talent, especially world-class innovation leading talents. These cities can explore the model and policies of innovative talent introduction and cultivation and play an exemplary role for other cities.

12. Cities with an industrial innovation cluster

Since opening up and undergoing reform, a number of cities such as Ningbo and Fuzhou have attained a well-developed market economy, rapidly developing private enterprises, and a significant number of enterprises with characteristic and strong competitiveness. Their economies are becoming more internationalized and industry clusters are turning into innovation clusters. Therefore, it is necessary to support their exploration of development models and paths from innovation clusters.

7. Conclusions and recommendations

The national innovative city has sound innovations in regional aspects and social culture support. It has agglomerated innovation elements and infrastructures, high innovation efficiency, a large innovation benefit, strong supporting and leading functions of innovation to economic and social development, and a wide range of innovation radiation and demonstration functioning to the surrounding areas. The construction of a national innovative city is not only an issue of technical innovation itself, but is also a great change to the city's entire economy and society.

To boost innovation-driven nation building and the development of regional innovation systems, China should establish a group responsible for coordinating and resolving major issues and matters related to national innovative city development and construction. The government of an experimental point city should establish an appropriate organization or a leading agency for national innovative city construction, should introduce appropriate strategy and policies for indigenous innovation capacity building, and should support national innovative city construction all around. At the same time, the central government needs to set up an expert advisory committee of the national innovative city to guide planning, development, evaluation and policy suggestions.

To promote national innovative city construction, some appropriate policies should be adopted. First of all, innovative facility and infrastructure construction for the experimental point cities or the national innovative cities should be supported. The deployment of the State Key Laboratories, the National Engineering Laboratories, the National

Certified Enterprise's Technical Centers, and the State Engineering (Technology) Research Centers should be tilted towards such developments. The industrial leading enterprises should be supported in order to establish cutting-edge technology research institutes or central academies to attract high-level innovation talents and innovative teams.

Secondly, industrial structure optimizing and upgrading should be vigorously promoted. Projects such as the National S&T Plan, the National High-tech Industrialization Base, the Industry Investment Guidance Fund, the Venture Capital Investment Guidance Fund, the Patent Industrialization Fund, and the S&T Innovation Fund for SMEs can give priority to innovative infrastructure construction. Programs of Industrial Structure Adjustment, Recycling Economy and the Energy Conservation and even projects of education, culture and personality can also be attributed to these cities.

Thirdly, it is essential to give such cities preferential policies such as one to guarantee the legal increase of financial S&T funds, a preferential tax policy of indigenous innovation product consumption, a policy of enterprise profit divided to service inventors, R&D investment compensation for non-service inventors, and financial policies of innovation and investment for SMEs.

Fourthly, the progress of national innovative city construction should be monitored and assessed according to the evaluation index system.

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