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# Synergistic Development in the Beijing-Tianjin-Hebei Region: An International Comparative Perspective

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# Synergistic Development in the Beijing-Tianjin-Hebei Region: An International Comparative Perspective

## 1. Abstract

City cluster is a manifestation of urban space in its mature stage of development, and is the spatial unit in which economies participate. The Beijing-Tianjin-Hebei (Jing-Jin-Ji) region accounts for 2% of China's land mass, 8% of its population and 10% of its total economy. As the nation's political and cultural center and a core region of economic development in Northern China, it bears great potential to develop into a world-class city cluster. Experience in developed countries shows that neighboring cities could achieve significant synergy through developing complementary industries, promoting the flow of diverse production factors. This would in turn lead to stronger regional competitiveness, propelling this city cluster into becoming a global engine of economic growth and technological innovation. Cities of different scale and spatial characteristics within the region have developed clear and distinctive strategic advantages. Primary core, and secondary core together with small and mid-sized cities form a cascading structure that function collectively and synergistically through a virtuous circle of factor formation and productivity enhancement thereby providing solid foundation for sustainable economic development.

In China, the degree to which neighboring cities develop in synergy trails significantly behind the country's stage and speed of economic development. Urban sprawl coupled with homogenized industry structures has resulted in severe resource depletion and over-capacity, and the rise of systematic risk within the economy. Poor coordination in the construction of infrastructure, lack of collaborative mechanisms among industry clusters, and restricted reciprocal flow of critical factors of production are hindering city clusters' ability to unleash their full potential. The Jing-Jin-Ji region is both unique and typical in China's economic context. A breakthrough in its synergistic development would on one hand invigorate the distinctive economic region around China's capital, and on the other hand provide paradigmatic reference for other emerging city clusters in China.

Based on systematic research, and comparative international benchmarking, this report explores the current situation and pressing challenges in achieving synergistic develop-

ment within the Jing-Jin-Ji region, and provides practical recommendations for optimization and improvement. Four aspects of development are being discussed in this report, namely infrastructure, industry development, social development, and supporting mechanisms. In terms of infrastructure, the Jing-Jin-Ji region has made notable achievements in advancing connectivity within the region, but still lags significantly behind leading city clusters around the world. Driven by the local interest motive, major defects exist in the intra-regional traffic networks, mismatching expectations of major public investments. In terms of industry development, while leading city clusters achieve synergy through differentiation between cities, excessive gaps in development conditions between cities within the Jing-Jin-Ji region hinders collaboration, restricting factors of production in Beijing and Tianjin from spilling over into neighboring cities and converting into productivity. In terms of social development, the severe inequality of public resources distribution and clear inadequate coordination are major contributing factors to poor flow of resources. As for supporting mechanisms, further refinement is required for fully functioning top-down design, while spontaneous market coordination mechanisms are yet to be formed.

In further promoting synergistic development in Beijing, Tianjin and Hebei Province the boundaries between cities and policy restrictions should be lowered, and further improvements are made on connectivity, to promote cross-regional cooperation in various forms and among multiple entities. In terms of public services, lessons should be drawn from domestic experience where administrative barriers are lifted to allow effective flow of factors of production. As for supporting mechanisms, the differentiated roles of the government and the market should be clearly defined. On the one hand, effective policies should be devised to provide impetus for change; and on the other hand, participation from the private sector should be encouraged to sustain momentum for transformational processes. Only such a comprehensive approach could lead to material, inclusive and continued breakthrough in fostering synergistic development within the Jing-Jin-Ji region.

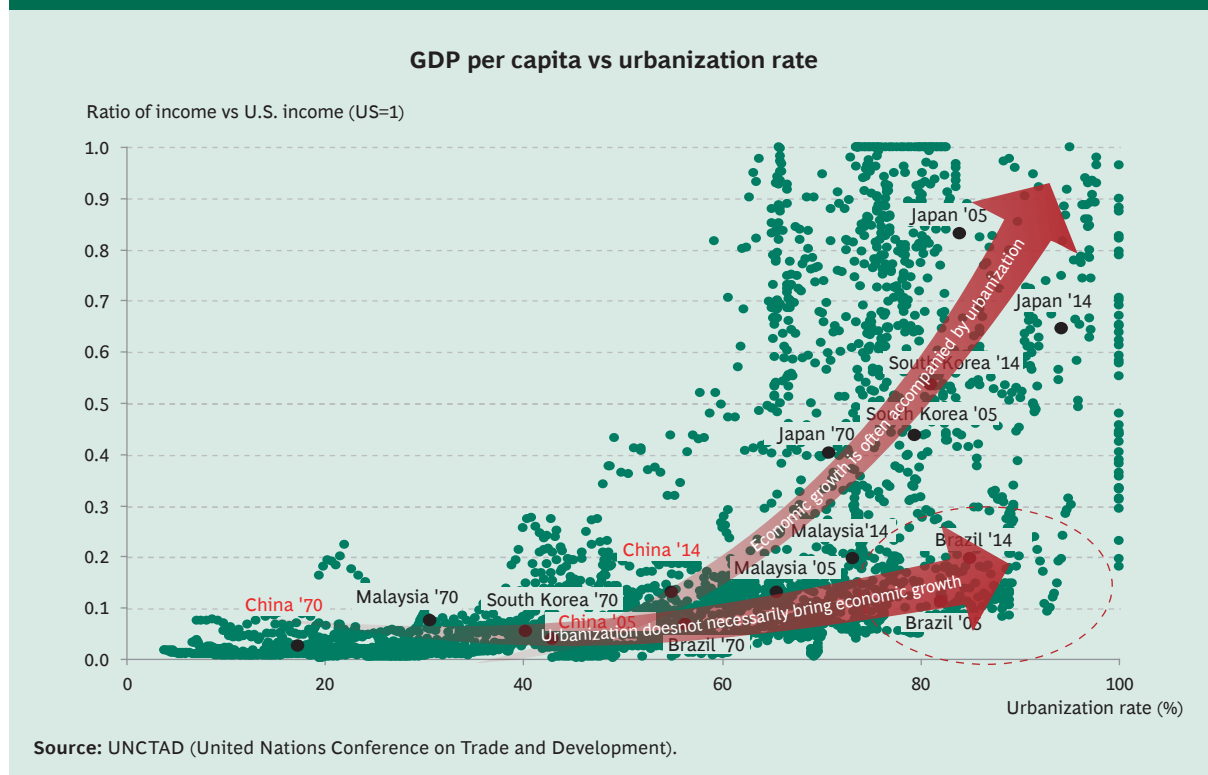
## 2. On Development of City Clusters

Since the reform and opening-up, China has been undergoing urbanization on a scale unprecedented in the history of the world. Only 20% of the Chinese population lived in cities in 1980, compared to 57.35% in 2016, with urbanization having grown at an annualized rate of over 1%. Such large-scale and rapid urbanization is believed to have been an important force in driving China's rapid economic growth in recent decades. Under the New Normal, with the global economy undergoing profound changes and the Chinese economy facing downward pressure, there are high expectations towards urbanization to continue to serve as an engine for growth.

However, global experience shows that while economic growth is often accompanied by rising levels of urbanization, urbanization does not necessarily bring economic growth. Historically, over the past three decades, economies such as Malaysia and Brazil have seen an increasing rate of urbanization with sluggish economic growth, with national income per capita stagnating closely to that of the United States. South Korea, Japan and China are on the other end of the spectrum and have seen rapid growth of gross domestic product (GDP) per capita relative to that of the United States as their rates of urbanization have continued to climb. (See Exhibit 1.) Hence, whether or not urbanization can serve as a strong impetus for economic growth is largely determined by local factors and developmental patterns.

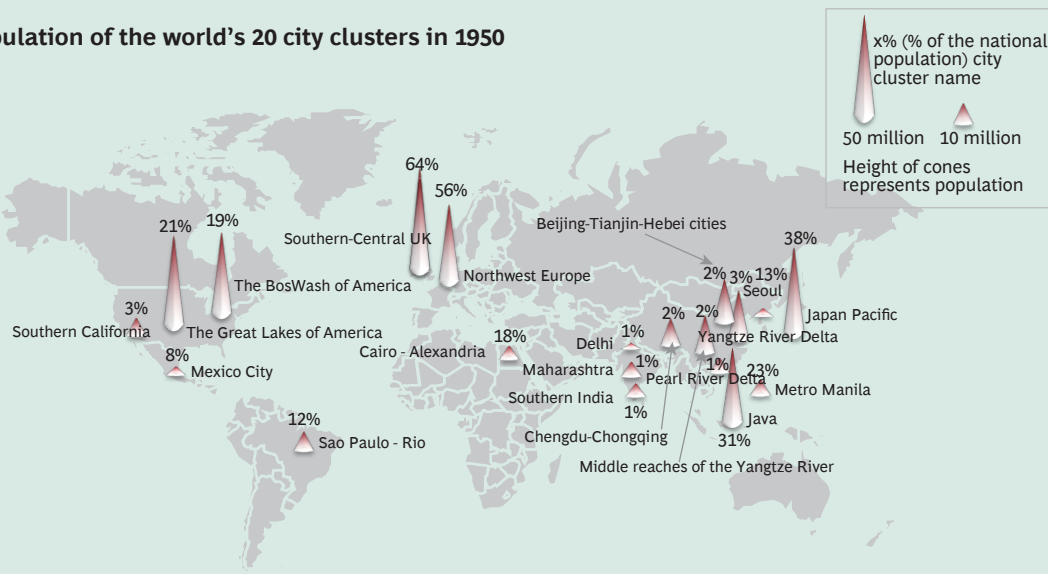
Over the past few decades, urbanization worldwide has shown a visible pattern of inequality across regions. The world is becoming less “flat” as population agglomerates around major city clusters. From 1950 to 2015, the number of cities increased from 300 to 1,700, while the population in the top 20 cities to total population increased from 11% to 18%. Development of city clusters far exceeds the global average. (See Exhibit 2.) In the United States, for example, it is becoming increasingly evident that employment and pop-

**Exhibit 1. Throughout History, While Economic Growth Is Often Accompanied by Urbanization, Urbanization Does Not Necessarily Bring Economic Growth**

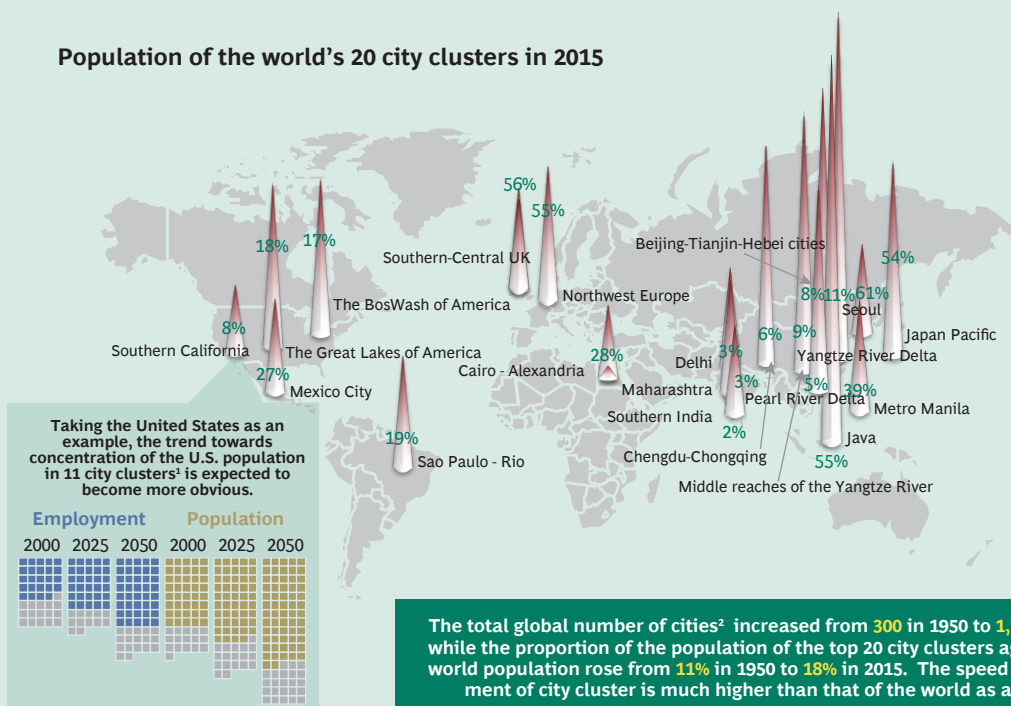


## Exhibit 2. Trend of Concentration of Population in City Clusters

Population of the world's 20 city clusters in 1950



Population of the world's 20 city clusters in 2015



**Sources:** The Population Division of the Department of Economic and Social Affairs of the United Nations; America 2050 prospectus; BCG analysis.

<sup>1</sup> The 11 US city cluster areas include: Arizona Sun Corridor, Cascadia, Florida, Front Range, Great Lakes, Gulf Coast, Northeast, Northern California, Piedmont Atlantic, Southern California, Texas Triangle.

<sup>2</sup> The size of population over 300,000.

ulation are moving to the 11 major city clusters. Economic output and technological innovation are also heading in the same direction. City clusters have become an important pillar of the global economy: some 40 city clusters worldwide, with 20% of the global population, account for nearly 50% of the global GDP. In the era of globalization, city clusters form economic communities with shared, overlapping goals and become the focal point of regional competitiveness. As the most dynamic and innovative areas in economies, they enjoy dividends from the agglomeration of factors of production and industry clusters, and have actually become the dominant spatial unit in which economies participate in global competition. (See the sidebar.)

Recognizing the importance of city clusters in modern economies and their standing in global competition, China, since the 3rd Plenum of the 18th National People's Congress, has expedited the development of city clusters. In the *National New-type Urbanization Plan (2014-2020)* released in March 2014, developing city clusters are taken as a vital means to optimize the spatial layout and form of cities. Later, as manifestos such as the *Outline of the Beijing-Tianjin-Hebei Coordinated Development Plan (2015)* and the 13<sup>th</sup> Five-year Plan

## Why City Clusters Are So Important

“Most of the world's people live in a relatively small number of big cities. The distribution of economic activity is even more skewed. The world gets spikier and spikier the farther you climb up the ladder of economic development, from producing basic goods to undertaking significant new innovations.”

“Today, mega-regions range in size from 5 to 100 million people, and they produce hundreds of billions — sometimes trillions — in economic output.”

—From *Who's Your City*, by Richard Florida, Director of Martin Prosperity Institute

“There is, in essence, no American (or Chinese or German or Brazilian) economy; rather, a national economy is a network of metropolitan economies.”

—From *The Metropolitan Revolution*, by Bruce Katz and Jennifer Bradley, Brookings Institute

“Our research on over 40 industry clusters in the United States shows that industry clusters strong in competitiveness are usually strong in innovation. Actually, the innovation capability of an industry cluster is a strong driving force for its competitiveness.”

—Scott Stern, Professor and Chair of the Technological Innovation, Entrepreneurship, and Strategic Management Group at the MIT



were unveiled, city clusters have been given even greater strategic prominence in China's urbanization and economic development.

The Jing-Jin-Ji region is the political and cultural center of China, and an important growth generator in Northern China. It accounts for 2% of China's land mass, 8% of the population and 10% of the national economy. Coordinated development of the Jing-Jin-Ji region has been a point of discussion since the 1980s, yet progress has been slow. From 2013, the government has picked up the pace with intensified efforts, and progress has been visible in the coordination of industries, transportation, and environmental protection and planning, among other things. However, compared with mature city clusters in developed countries, or along the Yangtze River Delta and the Pearl River Delta, the Jing-Jin-Ji region still lags in levels of coordination, and is not living up to its full potential in becoming a world-class city cluster.

Against this backdrop, this report draws on the experience of leading global and domestic city clusters, adopts a quantitative evaluation using City Cluster Coordinated Development Metrics, analyzes factors that inhibit synergistic development within the Jing-Jin-Ji region, and provides targeted recommendations.

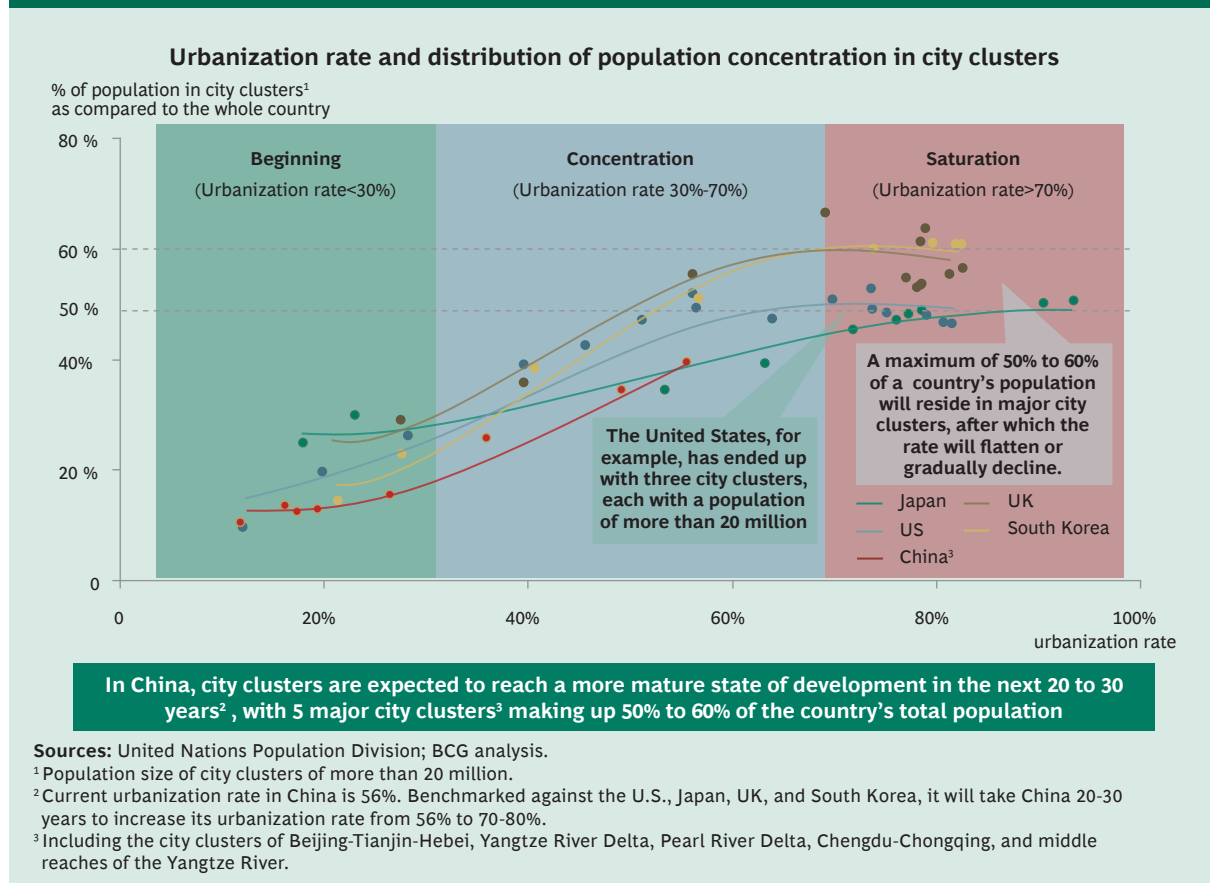
### 3. Coordination Within Leading Domestic and International City Clusters

Drawing upon experience from developed countries, the formation process of a city cluster can be divided into three stages: initiation, agglomeration, and saturation. At the final stage, 50% to 60% of a country's population dwells in major city clusters. In the initiation stage, the urbanization rate is lower than 30%. When the urbanization rate reaches between 30% and 70%, there's an accelerated migration of population towards city clusters. When the urbanization rate reaches more than 70%, the speed of urbanization plateaus and some countries even experience de-urbanization. In this final stage, a maximum of 50% to 60% of a country's population will reside in major city clusters, after which the rate will flatten or gradually decline. In the United States, for example, three city clusters, each with populations of more than 20 million, emerged during the final stage of urbanization. (See Exhibit 3.) In China, the urbanization process will stabilize in the next 20 to 30 years, while city clusters are expected to reach a more mature state of development. The five major city clusters will make up 50% to 60% of the country's total population<sup>1</sup>.

City clusters are spatial structures that emerge as neighboring cities reach a relatively mature stage of development. Coordination and synergy among cities within the region are central to such structures. In the early stages of a city cluster's formation, a number



## Exhibit 3. Urbanization Stages and Population Concentration in City Clusters



of cities would emerge, some in the form of “primary core + secondary core”, such as the New York-Boston-Washington-Philadelphia regional cluster; Others are a collection of “mid-sized cores”, such as the Cologne-Düsseldorf-Essen-Dortmund-Duisburg cluster. During this phase, there is limited synergy among regional cities. As the urbanization process deepens, the main core and secondary core cities continue to grow and boundaries expand, with numerous urban centers large and small forming around the core cities. This is the phase where synergistic interplay among different, burgeoning urban centers creates a two-way street where on the one hand there is growth spillover from major metropolis into surrounding areas, while on the other hand smaller towns and cities help address the so-called “big city disease”. As level of urbanization rises further, the expansion of urban boundaries lead to a continuum of space that connect different cities, forming a city cluster. Diversity among cities within the cluster helps create a 1+1>2 effect, where significant synergy is realized through greater coordination. In city clusters where a high level of synergistic development is achieved, cities demonstrate a clear distinction in positioning and coverage, while infrastructure, economic activities, living environment, resource endowment and

endemic culture and historical heritage are shared collectively. (Mark Pisano, 2015.)

In a fully fledged city cluster, synergy among cities is maximized through development of complimentary industries and the flow of key factors of production. Cities perform differentiated roles in advancing the core industry (or industries) within the cluster, while each nurtures its own specialty industry (or industries), forming a polycentric economic system that fosters both individual and collective competitiveness, and prevents damage from homogenization. Urban centers are efficiently connected through a high-density transportation network, allowing commuting time between major destinations to be no more than 2-4 hours. Talent, capital, technology and other factors of production flow freely within the city cluster, achieving a high level of “sharedness”. Every resident within the cluster is afforded the right to benefit equally from education, social security and other basic public services. Different areas within the cluster contribute to different factors of production – in some cases land, and in other cases technical work – according to their individual positioning and endowment.

Mature city clusters in developed countries typically have a complete urban ecosystem built on the polycentric structure of a main core, a secondary core, and medium and small-sized cities. Typically, there are one to two main core cities with a population of more than 5 million. These are the centers for the allocation of key production factors and resource, and they influence the entire city cluster. Financial services, corporate headquarters, and high-end services are highly concentrated in these cities. There are also typically 3-5 secondary core cities with a population of between 500,000 to 5 million people within a city cluster. These secondary core cities take on the role of absorbing industries transferred out of the main core cities. They in-turn exert influence over surrounding smaller cities. They are located some distance away from main core cities, and mainly specialize in high-end manufacturing, logistics, and technological development. A typical city cluster will also have 10-30 small and medium-sized cities with populations of less than 500,000. These cities serve as both hinterlands and binding agents for the cluster, supplying key production factors to core cities. As the feeding end of the production value chain, they focus on industry sectors such as parts manufacturing and precision machining.

Synergy within a city cluster essentially arises from free flow and coordination of production factors. Only such free flow and coordination can create a multitude of productive forces among different cities that help enhance overall competitiveness of the city cluster. This means that the talent, technology, information, capital and market players must be allowed to break through administrative boundaries. There are many different possible methods of coordination based on free flow. Cloud-structured synergy can enhance cohesion and promote a multiplier effect; this is often evident in talent and innovation inten-

sive industries such as R&D, software, and high-end services where resource development among core cities must be tightly coordinated. Chain-structured synergy can create a diffusion effect and maximize production forces; this is often evident in industries where the effects of economies of scale are significant and require the depth of city cluster to stretch the value chain, such as automobile, electronics and machinery manufacturing. There are three ways in which regions can improve its overall competitiveness: first, by maximizing the concentration of high-end key factors of production to enhance cluster strength; second, by fully utilizing the depth of hinterlands to allow rational distribution of industries and population; third, by expanding holding capacity of the region to relieve core cities of “big city disease”, and promote development in surrounding small and medium-sized cities. In addition, the differentiated positioning of different metropolitan areas strengthens the ability to allay risk for the entire region.

The Boston-Washington (BosWash) city cluster in the United States is a good example of synergy in action. This city cluster is located along the lowland coast of the Atlantic Ocean. Historically, it has served as the political and economic center of the United States. The BosWash cluster includes one city with a population above ten million, twelve cities with populations above one million, and more than 30 small and medium-sized cities. The city cluster covers just two percent of the total land mass of the United States, but is home to 17 percent of the country’s population and accounts for 20 percent of the country’s GDP. The portion of the region’s population with college-or-above education is more than eight percentage points higher than the national average (29 percent). Diversity and synergies are key to the competitive strength of this city cluster. A number of main core and secondary core cities within the city cluster have developed differentiated and complementary positioning: New York is a global financial center, with its leading industries including finance, commerce and headquarters-related services; Philadelphia is a center for manufacturing, with main industries include chemicals, electronics, and healthcare; and Washington D.C. is a political center, with public management and tourism among its leading industries. Of course, the BosWash cluster was not built overnight, but rather, was the result of a relatively long evolutionary process. Before the 1930s, there was no obvious synergy between cities in the city cluster. From the 1930s to the 1950s, as core cities extended their boundaries and as urban areas formed in the hinterlands, R&D and manufacturing developed in a complementary manner between different urban areas. After 1950, as the rate of urbanization continued to climb, the trend toward diversified development within the city cluster became more pronounced, with each urban area having its own characteristics making it complementary to the others. (See Exhibit 4.) High value-added factors aggregated in regions such as New York and Boston to create cloud-structured synergies, while Philadelphia leveraged its large swaths of surrounding hinterlands to complement with New York and create chain-structured synergies.

### Exhibit 4. Evolution of the Boston-Washington (BosWash) City Cluster

Before the 1930s, urbanization rate was <55%: cities competed freely against each other **with no obvious synergy**

- New York, relying on the port's advantages (an ice-free and deep water port) and the Erie Canal to connect to the Great Lakes region, gradually developed into a financial and trade center with clothing, printing, leather and other manufacturing industries
- Boston, challenged by New York, turned to developing labor-intensive and capital-intensive manufacturing industries, including textiles, leather, and clothing
- Philadelphia, the former financial center, focused on the development of machinery manufacturing, refining, etc., and became the industrial center of the United States

From the 1930s to the 1950s, urbanization rate was 55%-65%: as core cities extended their boundaries and as urban areas formed in the hinterlands, R&D and manufacturing developed in a **complementary manner** between different urban areas.

- Affected by **land use, cost** and other factors, manufacturing industries in New York, Boston and other core cities **extended and transferred to** surrounding areas
- Based on its solid **industrial foundations**, Philadelphia coordinated with New York's R&D to create a **chain-structured synergy**, with adjacent hinterlands formed an industrial gradient layout
- Driven by World War II and the Cold War, **Washington's military orders flowed into Boston** — a city full of higher education colleges and universities, which boosted **technology aggregation, spread to surrounding areas** and formed a belt of electronic and other high-tech industries

After the 1950s, urbanization rate was >65%: the trend toward **diversified development** within the city cluster became more pronounced, with each urban area having its own characteristics making it **complementary to the others, enabling "1+1>2"**

- The city clusters showed a **differentiated positioning**: New York focusing on finance and trade, Boston on high tech, Philadelphia on manufacturing, and Washington on politics
- **Boston has a concentration of numerous local technologies and attracted venture capital** locally and from New York, to form a cloud-structured synergy and catalyzes high-tech industries
- **New York attracted high-end talents, technologies, capital and information** from Boston and other regions to form a cloud-structured synergy and create a world-class financial and economic center

*"I chose to work in New York because there are more job opportunities here, especially in law, banking and government."*

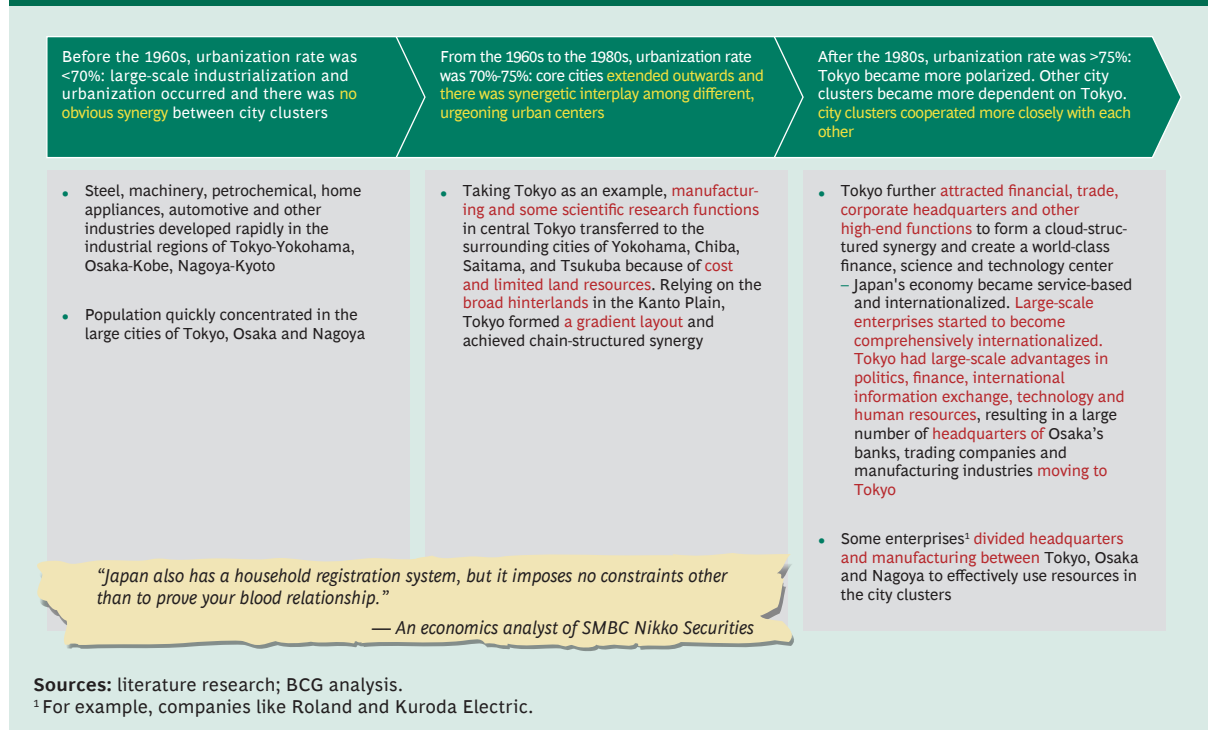
*—A graduate from a university in the Boston area*

**The barriers to move between different cities are relatively low. For example, there is no household registration system in the United States, thereby eliminating employment, schooling and medical care problems caused by household registration, thus accelerating population movement.**

Sources: Investigative Study; BCG analysis.

Japan's Pacific Coast city cluster covers an area of 35,000 square kilometers and is home to approximately 68 million people. The area contributes three trillion USD to Japan's GDP. That is, this city cluster hosts 53 percent of Japan's population, generates 60 percent of the country's GDP, and only occupies 9 percent of its land. (See Exhibit 5.) The city cluster is Tokyo-centered and is connected by land-based corridors with such infrastructure as the Shinkansen. It is a world-class city cluster that relies on export-oriented high-end manufacturing. The cities within the Pacific Coast cluster have adopted differentiated positioning and achieved strong synergies among each other. Tokyo is Japan's political, economic, cultural, and financial center. Its core industries include finance, insurance, headquarters-related services, printing, electronics, machinery and equipment. Nagoya is an industrial city; its main industries include automotives, machinery, steel, and petrochemicals. Osaka is a regional economic center that also focuses on emerging and high tech industries such as electro-mechanical and pharmaceuticals. In 2013, the per capita GDP in the region reached USD 44,000, which is USD 5,000 higher than the rest of the country. The portion of the region's population with college or above education is four percentage points higher than the national average. Among the population in Tokyo the differential is

## Exhibit 5. Japan's Pacific Coastal City Cluster

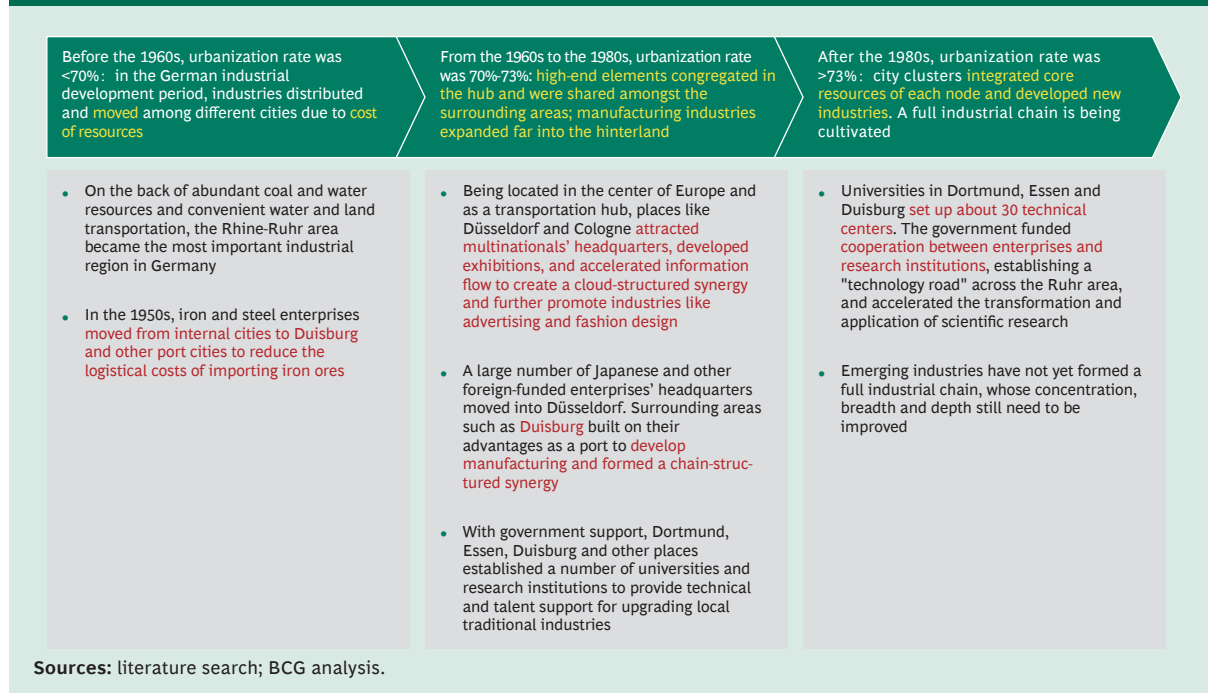


6 percentage points. After a long period of development, Tokyo aggregated various types of high value-added factors of production and created a cloud-structured synergistic environment, providing world-class R&D, headquarters-related services, and talent support for the manufacturing industries in Nagoya and Osaka. Nagoya and Osaka in turn coordinated with Tokyo to form chain-structured synergy.

Germany's Rhine-Ruhr city cluster is spread over an area of 70,000 square kilometers. In 2013, the area was home to more than ten million people and total GDP in the region reached USD 500 billion. The city cluster includes one city with a population of over a million and approximately 30 small and medium-sized cities. The city cluster covers two percent of Germany's total land area to house twelve percent of the country's total population and contributes 15 percent of total GDP. (See Exhibit 6.) Within this city cluster, Cologne is the base for corporate headquarters, and mainstay industries include insurance, media, conferences and exhibitions, and headquarters-related services. Neighboring Düsseldorf is sometimes called "the office desk of the Ruhr," and its main industries include telecoms, advertising, finance, conferences and exhibitions, and headquarters-related services. Duisburg is a port city. Its mainstay industries include logistics and heavy industries such as steel and petrochemicals. Dortmund is a center for emerging technologies, and its main industries include electronics/information technology and biopharmaceuticals. In



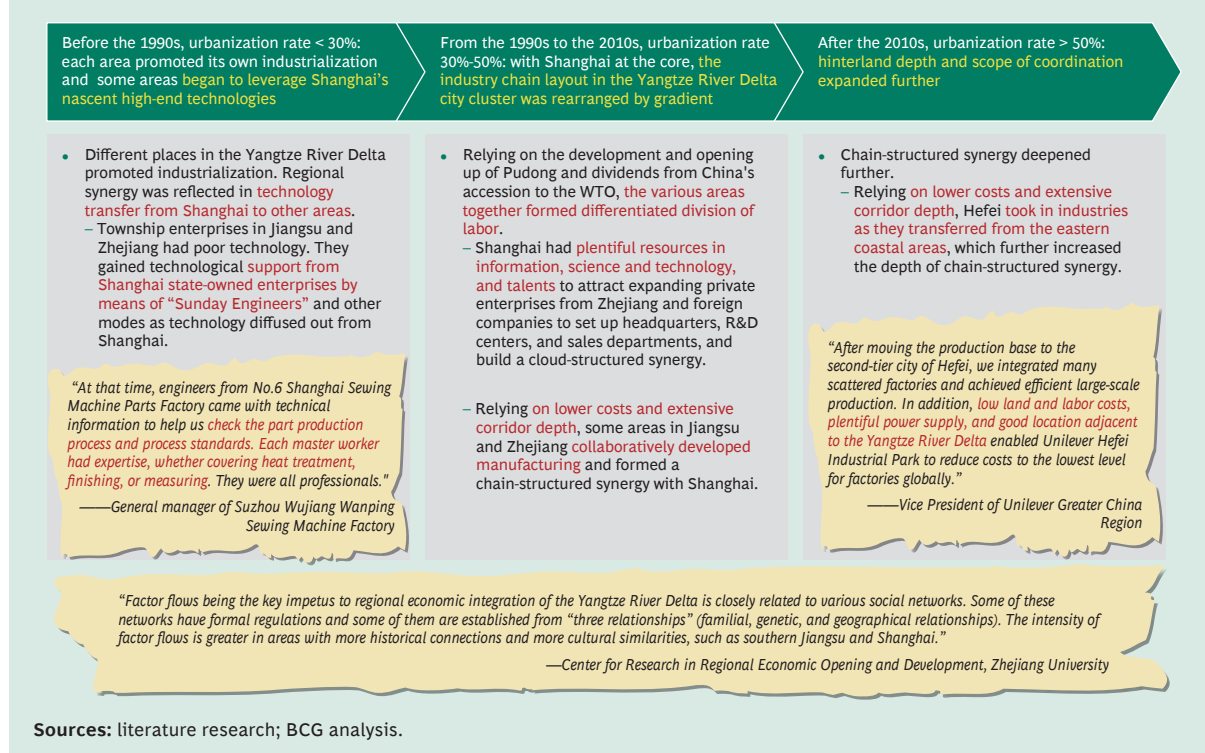
## Exhibit 6. Evolution of Germany's Rhine-Ruhr City Cluster



the Rhine-Ruhr city cluster, information, talent, and other key factors have aggregated to form cloud-structured synergies between cities such as Düsseldorf and Cologne, promoting synergistic development of service and hi-tech industries within the city cluster.

China has also formed three relatively mature city clusters through rapid and large-scale urbanization: the Yangtze River Delta, Pearl River Delta, and the Jing-Jin-Ji region city clusters. The Yangtze River Delta leads in both population and total economic output. There is a high level of synergy between the various cities in the cluster, setting the standard for the country in that respect. (See Exhibit 7.) The Yangtze River Delta currently includes one city with a population over ten million, 14 cities with population of over a million, and approximately 50 small and medium-sized cities. The city cluster spans 210,000 square kilometers, two percent of China's total land mass. In 2014, the region was home to 150 million people, eleven percent of the country's total population, and contributed 20 percent (USD 2.1 trillion) of the country's total GDP. Cities within the Yangtze River Delta have relatively clear positioning, and a mechanism for inter-city collaboration emerged in its early stages. Shanghai is the core of the Yangtze River Delta. It is the center of international economics, finance, trade, shipping, and technological innovation, and its core industries include finance, headquarters-related services, electronics, and automobiles. Hangzhou has been a pilot zone for the country's innovative economic transition, upgrad-

## Exhibit 7. Evolution of the Yangtze River Delta City Cluster



ing, and reform. Its main industries include information services, cultural and creative industries, and machinery. Nanjing is a regional pioneer in innovative entrepreneurship and a center for financial and commercial services. Its key industries include electronics, petrochemicals, automobiles, and finance. Ningbo is a center for international shipping, trade, and logistics. Its main industries include logistics, chemicals, textiles, and machinery. The Suzhou-Wuxi-Changzhou area harbors advanced manufacturing and modern services. Its mainstay industries include electronics, pharmaceuticals, and industrial equipment. Hefei is a demonstration area for receiving industrial transfer, with household appliances, machinery, electronics, automobile, and food being its main industries. In the Yangtze River Delta city cluster, Shanghai provides R&D headquarters and marketing support for the manufacturing industry. Nanjing and Hangzhou provide talent for Shanghai's high-end service industries, while hinterlands like Anhui provide cost-effective labor for manufacturing in the region, and provide space for industry transfer.

Although China's city clusters have made remarkable progress, overall, the level of synergistic development in China's city clusters lags behind economic development. There is thus significant room for improvement. There are several reasons why development of



synergy has lagged: First, economic development has been mostly government-led, and the market-oriented development model is yet to mature. The main considerations for industrial development and infrastructure investment have revolved around reaching economic targets with insufficient thought given to synergistic development. A lack of mature market-based economics system and inadequate flow of key production factors have led to an overwhelming gap in the level of development between different cities. Second, there are entrenched administrative barriers. Each local government seeks to advance its own agenda, and lacks motivation to collaborate with one another. The various local governments are incentivized primarily toward GDP growth for their respective administrative regions, which has led to severe homogenization. This holds true even for the Yangtze River Delta where the level of coordination is higher. There are no sound mechanisms in place for benefit sharing and compensation between different cities, which slows natural transfer of industries. Third, mechanisms for synergistic social development within city clusters are inadequate. Education, healthcare, and other public service resources concentrate in large cities, creating a source for inequality and sustained developmental gap. In addition, governance mechanisms geared toward environmental protection are still in their infancy.

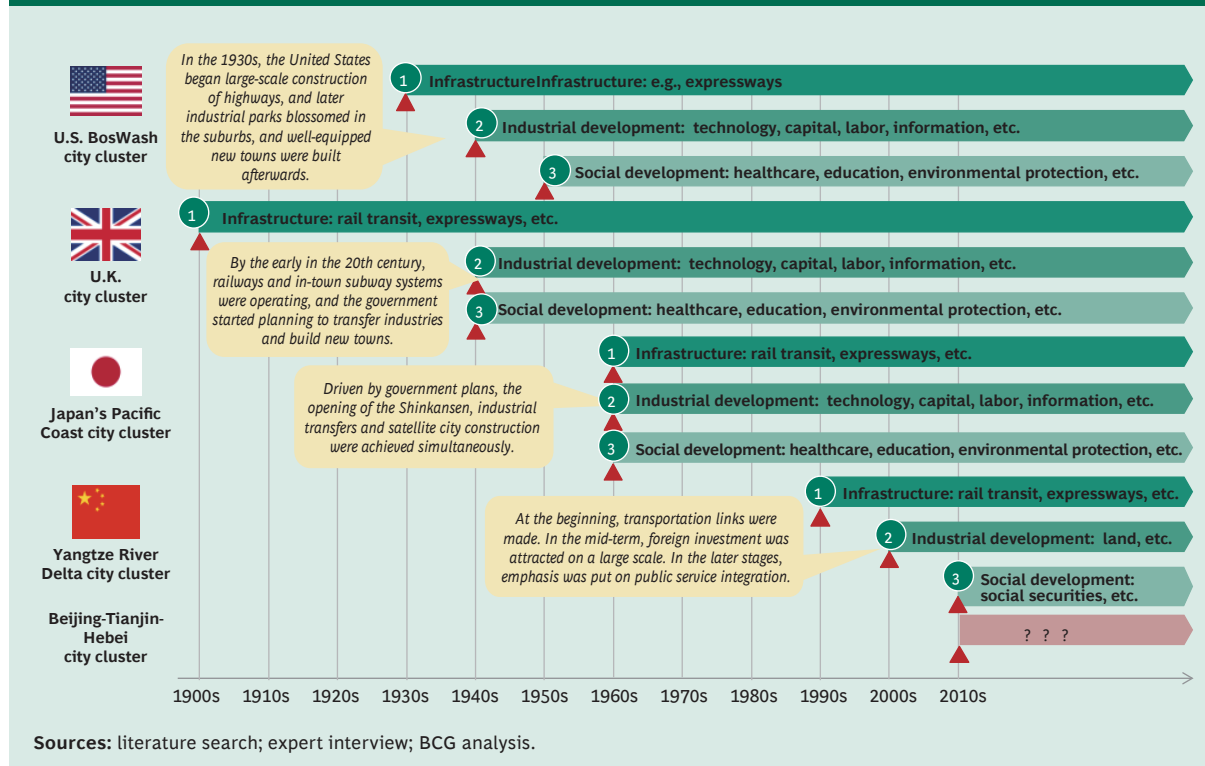
## 4. Development Approaches in Leading City Clusters and Comparison with the Jing-Jin-Ji Region

Internationally, leading city clusters promote coordinated development through infrastructure development, industrial development and social development, accompanied by enhancement in collaboration mechanisms. Chronologically speaking, regional integration usually started with infrastructure-building before advancing into industrial and societal development. (See Exhibit 8.) Take the BosWash cluster as an example. In the 1930s, the United States began large-scale construction of highways. Later, in the 1940s, industrial parks blossomed in the suburbs, followed by emergence of well-equipped new towns in the 1950s. The London city cluster started out even earlier. By the early 20th century, railways and city-wide underground system were readily constructed, and the government started to plan for transfer of industries and development of new towns in the 1940s. The Pacific city cluster in Japan and the Yangtze River city cluster in China have both followed a similar path.

### 4.1 Infrastructures and Connectivity

Drawing from international experience, city clusters cannot develop without highways or inter-city railway networks. In the United States, inter-city connectivity is realized mainly

## Exhibit 8. Paths Toward City Cluster Synergy



via highway networks. The BosWash cluster, for example, has 0.13 km of highway per km<sup>2</sup> (km/km<sup>2</sup>), compared to 0.04 km/km<sup>2</sup> in the Jing-Jin-Ji region (less than one-third). Cities on the Pacific Rim in Japan rely on an advanced inter-city railway network, with rail transport of 0.17 km/km<sup>2</sup> (four times that of the Jing-Jin-Ji region). Connecting-rail density for longer distances is more than twice that of the Jing-Jin-Ji region, while commuter-rail density for shorter distances is 24 times that of the Jing-Jin-Ji region; such high-density transportation networks help maximize the positive spillover effects of central cities.

Over recent years, the Jing-Jin-Ji region has made notable achievements in transportation integration. More than 1,000 kilometers of “dead-end highways” were connected, the Beijing-Tianjin inter-city railway was extended to the Central Business District of Binhai New District in Tianjin, and the Tianjin-Baoding (a city in Hebei) railway started operation. A new airport is also under construction in Beijing. However, transportation remains imbalanced within the Jing-Jin-Ji region. Beijing has not formed a polycentric traffic network with surrounding cities; inter-city rail transit for shorter distances is insufficient; highways between the three sub-regions are subject to toll gates and checkpoints resulting in bottlenecks; and many cities within Hebei are not connected with convenient modes of

transportation. The lack of coordination in transportation development is due to unequal political and economic status of surrounding municipalities with Beijing at the very center, compounded by lack of mechanisms for expressing this concern and an imbalanced decision-making apparatus. Also, administrative boundaries are far from being completely removed, and a shared vision for mutual development and collective interest has not yet been practically adopted.

The Jing-Jin-Ji region is also lagging behind with regards to its information communication infrastructure. In the United States, guided by federal-level strategic directive, New York State government has established dedicated agencies to implement its IT strategies. The New New York Broadband Program is planning to invest a billion USD to make high-speed internet access available to everyone in New York State by 2019. Such measures have significantly improved virtual connectivity across the entire region. From 2011 to 2015, the average internet connection speed in New York State tripled from 5Mbps to 15Mbps. Although long-distance roaming fees have been removed in the Jing-Jin-Ji region, and efforts are being made to improve telecommunications within the region, the communication infrastructure and internet speeds of the three still present large disparities.

## 4.2 Coordinated Industry Development

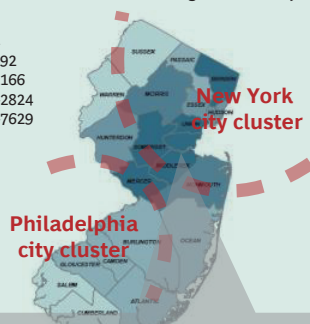
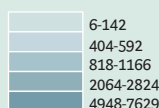
Differentiation among core cities within a city cluster is critical to diversified and sound interaction within the region. Core cities, with different resources and factor endowment, can develop differentiated industries, which vitalizes the economy of the wider city cluster and keep it from falling into destructive competition and resource wastage. Take the BosWash cluster as an example. The Greater New York Area, which effectively includes a portion of New Jersey, leverages its leading universities and financial industries in developing biotechnology and pharmaceuticals; the University of Princeton, Rutgers University, and others provide outstanding human resources to bio-tech R&D forming a densely populated pool of biotech talent surrounding New York. As a financial center, New York provides abundant financial resources that can easily satisfy the financing needs of pharmaceuticals and biotechnology companies. Philadelphia, as an industrial city, has a sound manufacturing base which supports the production of medical equipment. Such resource-based differentiated positioning has helped the New York and Philadelphia form a complementary relationship. (See Exhibit 9.)

In the Jing-Jin-Ji region, sharp industrial disparities hinder the potential coordination of industrial development. Benefiting from its advantageous position as the nation's capital, and rich R&D resources, Beijing focuses on hi-tech and modern service industries. Tianjin, with a more complete industrial system, is developing advanced manufacturing such

## Exhibit 9. Industrial Positioning and Synergy of the BosWash City Cluster

**The New York city cluster has leveraged colleges, universities and financial resources to develop biotechnology and pharmaceutical manufacturing**

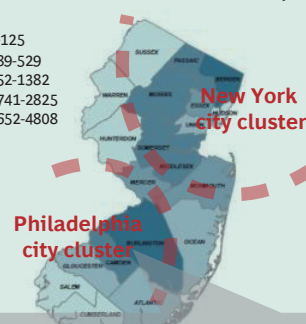
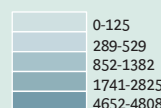
Employee distribution in the biotechnological industry in 2011



- The University of Princeton, Rutgers University and others provide outstanding human resources to bio-tech R&D.
- As a financial center, New York provides abundant financial resources that can easily satisfy the financing needs of pharmaceuticals and biotechnology companies.

**The Philadelphia city cluster has a sound manufacturing base which can help develop medical devices industry.**

Employee distribution in the medical devices industry in 2011



- As an industrial center, Philadelphia has a sound manufacturing base which supports the production of medical devices.

**Differentiation among core cities within a city cluster is critical to diversified and sound interaction within the region**

Sources: literature research; US Bureau of Labor Statistics; BCG analysis.

as electronics, aerospace and new materials. Hebei, in contrast, lags significantly behind in its level of industrialization, and is not well equipped to collaborate effectively with the two core cities. This slow progress toward industrial coordination has multiple causes. First, administrative interventions in the past hindered the development of spontaneous collaboration within the Jing-Jin-Ji region. Unlike the Yangtze River Delta or the Pearl River Delta, development in Jing-Jin-Ji region had historically been policy-driven. As a result, the highly concentrated financial institutions and headquarters of state-owned enterprises (SOE) in Beijing have limited interactions with the heavy industries in Hebei. Second, industrial development within the Jing-Jin-Ji region is hugely imbalanced by an “economic cliff” separating Beijing and Tianjin from the rest. The ability of Hebei to benefit from the spillover of advanced industries from Beijing and Tianjin is limited, while transfer of low-tech industries to Hebei does not help with its industrial transformation. Take the automotive industry as an example, despite Beijing being a center of car manufacturing, the value chain is so underdeveloped in the region 200 kilometers outside Beijing or Tianjin, carmakers in Beijing purchase parts from the Yangtze River Delta. Third, the acceleration and unidirectional aggregation of high-quality factors of production in Beijing has compounded stratification of industries resulting in fragmented development, with factors being “excessive in Beijing, lacking in Tianjin and unavailable to Hebei.”

In terms of industrial coordination, a prominent issue for the Jing-Jin-Ji region is that quality production factors do not spill over to Hebei and contribute to its productivity. Hebei is unable to tap the resources of universities and talents in Beijing and Tianjin for its own industrial development, mainly due to a lack of appropriate industries or good public services. Hebei has also failed to boost its technology-driven industries through adequate development of vocational education. As vocational education is poised to shrink in Beijing, Hebei should work with Beijing on strengthening its own vocational training industry. When it comes to investment in innovation, constrained by the “economic cliff”, investment in Beijing is unable to spill over to Hebei, while resources are siphoned from Hebei to Beijing, leading to further disparity.

The Jing-Jin-Ji region has made some breakthroughs by co-building industrial parks, pioneering the introduction of different cooperation models. Typical examples include: (1) Incubation. High-tech parks, universities and research institutes are starting to build incubators in Hebei. For example, Zhongguancun and Qinhuangdao Economic and Technological Development Zone built Qinhuangdao Park, a branch of Zhongguancun Haidian High-tech Park in Beijing; (2) Duplication. High-tech parks in Beijing, with their successful experience and ample resources, take a copy-paste approach to create new parks in Hebei, e.g., Beijing Yizhuang-Hebei Yongqing High-tech Park; and (3) Enclaves. Beijing-based companies that move to Hebei enjoy the same policy treatment as counterparts incorporated in Beijing in terms of development support funding, and preferential treatment regarding regulations. An example is the Beijing-Cangzhou Biomedical Park jointly built by Beijing Municipal Commission of Economy and Information Technology, Beijing Municipal Food and Drug Administration and the Cangzhou municipal government in Hebei.

Despite progress, the issue of “weak market and insubstantial cooperation” is yet to be solved. Few industrial/high-tech parks have been built in the Jing-Jin-Ji region, due partly to lack of market-driven co-construction and cooperation enablers. Compared to the Yangtze River Delta, the Jing-Jin-Ji region has fallen significantly behind in private sector development and participation, with only one-third and one-fourth the number of private enterprises and co-built parks, respectively, compared with the Yangtze River Delta. The slow progress in co-building industrial parks also reflects the fact that a fiscal and taxation mechanism that encourages the sharing of benefits and risks within the Jing-Jin-Ji region is still missing.

### 4.3 Social Development Coordination

For effective social development coordination, administrative boundaries on each level



should be relaxed, enabling connectivity of soft infrastructure for such things as health-care, education, environmental protection, and elderly care. In healthcare, it is necessary to make health insurance coverage extend equally between different cities and applicable across provinces. The Yangtze River Delta has formulated plans to implement inter-city and inter-provincial use of health insurance, which brings a multitude of benefits including reducing the financial burden and streamlining claim reimbursement procedures for patients. It also helps optimize the allocation of medical resources within the healthcare system, and coordination of service management in relevant cities. In the Jing-Jin-Ji region, health insurance integration has been planned and overall progress towards these goals is being accelerated.

For better allocation of education and healthcare resources, the Jing-Jin-Ji region has concluded a series of agreements and letters of intent on education cooperation, and is experimenting with pilot programs where doctors can have inter-provincial practices in multiple hospitals, and inter-provincial settlement of medical expenses covered under a new-type of rural cooperative health insurance scheme. However, education and healthcare resources are still severely imbalanced within the Jing-Jin-Ji region. There are 5,500 college students enrolled per 100,000 residents in Beijing and 4,300 per 100,000 in Tianjin, but less than 2,100 in Hebei. Beijing has double the healthcare resources of Hebei, and the disparity is growing rapidly. As resources are allocated based on household registration and administrative locations, public services are increasingly imbalanced, placing further constraints on the flow of quality educational resources. While solutions to institutional problems such as inter-provincial practice of doctors, health insurance coverage of medical expenses, and medical disputes remain far off, and a stable mechanism for resource-sharing and cooperation is not yet in place, the role of the market is not sufficiently reflected in allocating education and medical resources.

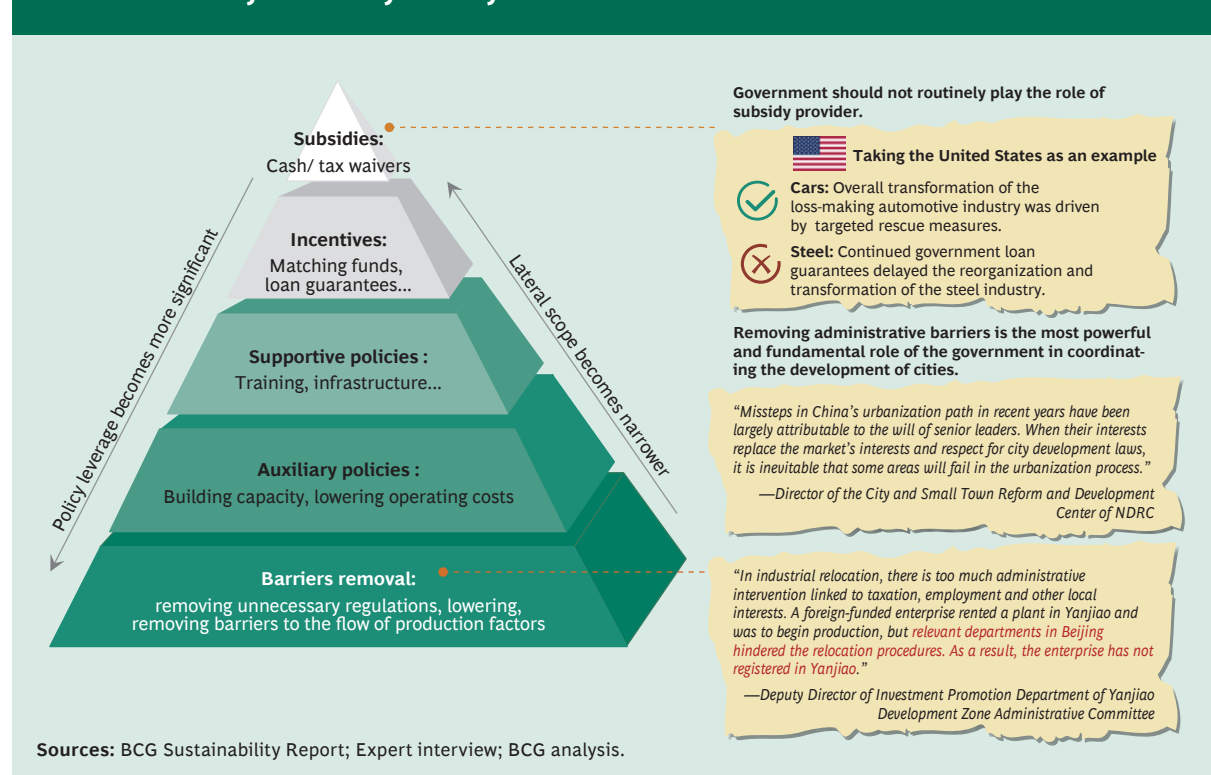
Regarding environmental protection, the Jing-Jin-Ji region has made initial progress in joint pollution control and prevention. *The Jing-Jin-Ji Agreement on Joint Prevention of Water Pollution Emergencies*, *The Jing-Jin-Ji Agreement on a Coordinated Forest Pest Prevention and Control Framework* and other documents have been signed, and efforts to combat air pollution have also shown some satisfying results. In 2015, PM2.5 concentration in the Jing-Jin-Ji region was down 10.4% year-on-year; a number of cement factories and thermal power plants in Beijing suburbs and Hebei were closed; and a pilot Jing-Jin-Ji cross-regional carbon emissions trading scheme was launched. However, many issues remain to be solved regarding environmental protection cooperation. Without a win-win pollution abatement and cooperation system in place, the long-term sustainability of current results will be challenged. Before industrial transformation is completed in Hebei, pollution cannot be eradicated completely simply by closing polluting factories. While controlling pollution

today still depends on administrative orders with clear limitations, market-based trading mechanisms would provide long-term sustainability and should be perfected.

## 4.4 Supporting Mechanisms: Defining the Roles for Government and the Market

In coordinating the development of a city cluster, the roles of government intervention can be expressed as a pyramid-like hierarchy. From the strength of leverage and scope of applicability, policies that remove barriers are at the bottom of the pyramid, having the most significant leverage and widest lateral scope. These policies include removing unnecessary regulations, lowering or removing barriers to the flow of production factors, etc. Higher up on the pyramid are auxiliary policies (e.g., those aimed at building capacity and lowering operating costs), supportive policies (e.g., for training and infrastructure), incentive policies (e.g., providing matching funds and loan guarantees), and subsidies (via cash, tax waivers, etc.). Among all the policies, subsidies have the least leverage and narrowest scope, and they should be used prudently instead of frequently or regularly. (See Exhibit 10.) Consider the following United States example. While targeted rescue measures pro-

**Exhibit 10. Policy Hierarchy for City Clusters**





moted the automobile industry's overall transformation and return to profitability, continuous government guarantees for loans dragged out the restructuring and transformation of the steel industry. Hence, for government to coordinate the development of different cities, removing administrative barriers is the most powerful and fundamental force.

Drawing from the experience of the Yangtze River Delta, spontaneous market behavior can provide a more effective form of coordination, and cover all industries and even public services. In the Yangtze River Delta, enterprises voluntarily coordinate with each other driven by market forces. Enterprises at different section along the value chain, located in different cities of the delta region, form cross-regional cooperation networks. For example, Shanghai, with Shanghai Automotive Industry Corporation (SAIC) as the leading enterprise, has developed automotive manufacturing capacity, while cities in Zhejiang and Jiangsu provinces, with their local endowments, have developed upstream supportive industries such as transmission and electronic components for cars. Another example is how financial institutions such as Shanghai Pudong Development Bank have headquarters in Shanghai, while banking credit investigation firms such as China Data Group are located in Kunshan, Jiangsu. The market can also spontaneously develop coordination in public services. Shanghai and Jiaxing (in Zhejiang province), for example, carry out regional environmental management services guided by sustainable market principles. Environmental protection departments in the two cities have established inter-city mechanisms for joint prevention and treatment of pollution. Some 21 polluting factories were closed in three years, and the environment has experienced significant improvement.

For supporting mechanisms overall, government coordination mechanisms should be refined and applied down to the local level, and market-based coordination mechanisms should be fostered. While the central government has strengthened the top-level design for the Jing-Jin-Ji region, it is just a high-level coordination framework where only administrative power is involved, and the specifics of implementation need to be further refined. The coordination mechanisms should also draw on the strengths of businesses, research institutions, and other non-governmental actors, so as to make the measures more effective and practical. Detailed implementation rules and plans should also be released. In the long run, the coordinated development of the Jing-Jin-Ji region calls for less administrative intervention and more application of market forces.

## Notes:

1. The five major city clusters are the Jing-Jin-Ji, the Yangtze River Delta, the Pearl River Delta, Chengdu-Chongqing, and the Middle Reaches of Yangtze River.

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