

Chapter 7

Megaregions of China and the U.S.

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7.1 Introduction

A new geography is transforming how a large quantity of the world's population lives and works. The Megaregion, a vast expanse of urban, suburban and sometimes even rural territory connected through economic, social, cultural and environmental linkages is a global reality. From the Amsterdam-Brussels-Antwerp Megaregion of Europe to the Greater Tokyo Megaregion of Asia, these massive urban agglomerations are paving a new pathway to economic supremacy. Replacing the era of nations as the most important economic entities on the planet, Megaregions are the future of urban and economic life.

Megaregions consists of more than 10 million inhabitants and can stretch across national and international political boundaries. These 'endless cities' can be found on North America, South America, Europe, Africa and Asia. These poly-centric urban agglomerations account for a large portion of the world's economic

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activity and contain an increasingly large percentage of the world's population. According to one report, the top 40 Megaregions account for almost 1/4th of the world's population, more than 66% of the world's economic output and 85% of global innovation (Florida et al. 2007). This accumulation of population, wealth and knowledge is creating a new reality in which countries are not competing with each other, but rather vast colossal regions are challenging each other for global domination.

In this chapter we will explore several Megaregions located within China and the United States of America. These two countries offer interesting case studies from which to begin to understand the importance of Megaregions and the impact they have on the planet. The United States is home to what many would identify as the first Megaregion, Gottmann's 'Megalopolis'. Gottmann's research on the 500 mile stretch of the eastern seaboard from Boston to Washington, DC ushered in a new era of urban geography and is home to more than 50 million residents and an economic output of \$2 trillion. Meanwhile, according to a recent United Nations report China is home to the largest Megaregion based on population. The Pan Hong Kong-Shenzhen-Guangzhou Megaregion's population is estimated to be in excess of 120 million residents (UN-Habitat 2010). Additionally, China's Megaregions account for approximately 43% of China's economic output and deserve further examination (Florida 2008).

The discussion that follows will attempt to define the unique characteristics and provide a better understand of the evolving urban geography of Megaregions in each country. It is interesting to analyze this emerging geographic phenomenon in light of the drastically different political and economic realities of the United States and China. As you will discover, both countries have witnessed the development of similar Megaregional structures, but through vastly different circumstances and processes. While not explaining why Megaregions have become so important for each country, the discussion that follows does provide an excellent overview of this global experience in selecting Megaregions of China and the United States.

In the context of discussion the capitals of the two countries (Beijing and Washington D.C.) and major financial/ commercial centers (Shanghai and New York) are compared. Obviously, even if they cannot represent China and the U.S. in the largest expansion and the broadest definition, they are still regarded as the most typical cities in the countries. They were planned and built based on different purposes. The biggest difference between these two pairs is they don't have complementary organs of authorities. Though Beijing and Washington D.C. continue to represent their countries' political cultures in distinguish ways as capitals, Shanghai and New York have become more international as financial/ commercial centers. Shanghai and New York show the epoch-making trend in the progress of urbanization and high-tech development.

7.2 Defining “Urban”, Urban Development Patterns and Trends in the United States

7.2.1 Defining “Urban”

Defining the term urban can be difficult. However, most accepted definitions include a population size and population density component. The next three subsections provide the reader with a basic understanding of urban terminology at the Federal, State and Academic levels as it relates to the United States. While not all territory included in a megaregion is urban, urbanity provides the beginning point for any discussion on the topic.

7.2.1.1 Federal Designations: U.S. Bureau of the Census

The United States Bureau of the Census provides several designations of “urban” that are comparable across the entire country and which are very helpful for national analysis. According to the U.S. Census Bureau, an Urbanized Area (UA) must have a population of at least 50,000 people. To qualify as an Urbanized Area, the area does not have to be a legally incorporated entity. An Urban Cluster (UC) has a lower population requirement of between 2,500 people and 50,000 people. A density requirement of at least 1,000 people per square mile at the core is required for both definitions (U.S. Bureau of the Census 2010).

The building blocks of these Urbanized Areas and Urban Clusters are Census Tracts, Block Groups and Census Blocks. Census Tracts are geographic areas that remain relatively constant over time to allow for comparison purposes. They typically contain between 1,200 and 8,000 residents, but can vary greatly in geographic size due to density patterns. Block Groups are a smaller Census geography than Census Tracts and generally contain between 600 and 3,000 people. Census Blocks are the smallest statistical unit for which Census data is available and usually correspond to a city block in urban environs and less regular patterns in more suburban and rural locales (U.S. Bureau of the Census 2010).

These definitions served the United States well for numerous decades. However, as America’s urban form changed, the U.S. Census Bureau responded with new terms to better understand America’s shifting urban geography. The Standard Metropolitan Area (SMA) concept was introduced during the 1950 U.S. Census in response to the new urban reality of the U.S. This new concept, which was later renamed to Standard Metropolitan Statistical Area (SMSA) for the 1960 Census and subsequently to just Metropolitan Statistical Area (MSA) in 1983, incorporates population, employment and commuting thresholds into its definition.

Currently, the U.S. Census Bureau relies on four major statistical designations to define metropolitan America: Core Based Statistical Areas (CBSAs), Combined

Statistical Areas (CSAs), Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (μ SAs). CBSAs are the basic building blocks of metropolitan designation and consist of a county or county equivalent with at least one UA or UC of 10,000 residents and surrounding counties with significant social and economic integration. MSAs contain at least one urbanized area with a minimum of 50,000 residents and adjacent counties with high levels of employment and commuting overlap. μ SAs have an urban cluster of between 10,000 and 50,000 residents and surrounding counties with a high degree of integration. Finally, CSAs consist of two or more adjacent CBSAs with significant employment interchange (U.S. Bureau of the Census 2012a; b). CSAs may be formed from a combination of MSAs and/or μ SAs.

7.2.1.2 Sub-Federal Urban Designations: Cities, Towns and Villages

In the United States each State (e.g. Alabama, New York, Wyoming) has the legal authority to define ‘urban’ differently. In general, most states rely upon a few common urban designations to accomplish this task. The terms city, town, and village are the most common manifestations developed to help define and categorize ‘urban’ at the State-level. In sum, these terms can be grouped together and called municipal. Municipalities are geographic entities that are legally incorporated under the laws of their respective State.

In some states, these terms are used interchangeably and do not signify a difference in population size (e.g. North Carolina). However, in other States the difference between a city, town and village could include population requirements and legislative powers. For example, Kentucky, Minnesota, and New Jersey all use a population classification system to define differences among cities based on population size. The city class system then can be used to determine which laws are applicable to a particular size city.

Another peculiarity of the U.S. system is the use of township in much of the Mid-western United States. The usually large geographic areas can provide municipal like services including land use planning, road maintenance, and even police and fire protection. Unlike cities, towns and/or villages—townships tend to have lower population densities due to the large land area that they occupy. In some cases, townships eventually disappear due to encroaching annexation activity from nearby municipalities. In other instances, a township may go through a process of incorporation to become a municipality (U.S. Bureau of the Census 2007).

7.2.1.3 Academic Classifications

Over the last fifty years the academic literature has provided three major concepts that help define and understand urban America as it has taken on a more polycentric urban morphology. These terms include Jean Gottmann’s—Megalopolis (1961),

Lewis's-Galactic Metropolis (1983) and Carbonell and Yaro's (2005)/Lang and Dhavale's (2005)—Megaregions/Megapolitan Areas.

Megalopolis is a concept that was developed by the French geography Jean Gottman (1961) in his classic book *Megalopolis: The Urbanized Northeastern Seaboard of the United States*. Megalopolis in its original usage was the name of a city in the Peloponnese that existed between 371–368 BC. Later both Patrick Geddes (1854–1932) and Lewis Mumford (1895–1990) used the word with a negative connotation in describing an urban agglomeration that was at the later stages of development and headed into decline.

Gottmann's Megalopolis described the urban corridor of the Northeastern United States seaboard between Boston and Washington. In Gottmann's view the entire urban corridor had high levels of interaction among people and businesses. As a result, seven separate metropolitan areas with more than 1 million residents and 30 smaller metropolitan areas all coexisted and congealed into a single functioning urban entity unlike anything that had been previously seen. Since 1961 the term has been expanded and used to describe polycentric, multi-jurisdictional economic and social regions around the globe.

Lewis's Galactic Metropolis was another attempt to describe a new and evolving urban form that was appearing on the landscape. Building upon Gottmann's concept, Lewis highlighted the role of the globalization of capitalism in fragmenting the urban landscape. Lewis also discussed the importance of edge cities and suburban commercial and office centers on the metropolitan landscape. The declining importance of the traditional downtown or core of the city is also an additional characteristic of galactic metropolis's (Knox et al. 2012).

Finally, Megaregions and Megapolitan Areas are two concepts that build upon the megalopolis foundation of Gottmann. Carbonell and Yaro's (2005) Megaregion and Lang and Dhavale's (2005) Megapolitan Areas both describe a new metropolitan reality taking shape. *America 2050*, a project of the Regional Plan Association, has advanced Carbonell and Yaro's Megaregion concept that seeks to describe the coalescing of multiple metropolitan areas which is similar to the Megapolitan Areas concept, although with less specific boundary delineation. Megaregions are defined through the layers and relationships that connect urban areas. These connections can include: environmental systems and topography, infrastructure systems, economic linkages, settlement patterns and land use, and shared culture and history (Carbonell and Yaro 2005).

Lang and Dhavle's examination and creation of Megapolitan Areas has moved the discussion of polycentric metropolitan areas further ahead. Their research focused on developing a new overlay category that could be incorporated into the existing U.S. Census Bureau's terminology and work much like the existing CSAs, MSAs and μ SAs work. According to Lang and Dhavale's research, the United States contains 10 megapolitan areas each with a population that will exceed 10 million residents by 2040. Additionally, these 10 megapolitan areas can be found in each region of the United States and extend into 35 of the 50 states. To qualify as a

megapolitan region, a geographic area must have the following characteristics:(Lang and Dhavale 2005)

- 1) combine at least two metropolitan areas,
- 2) have a population that is currently or projected to be in excess of 10 million residents by 2040,
- 3) have a shared cultural identity across the region,
- 4) share a similar physical environ,
- 5) be united by major transportation corridors,
- 6) work as an economic entity.

Clearly, this new form of urban development will have profound impacts on the world.

7.2.2 Urban Development Patterns and Trends

Despite the romanticized view of America as a country of wide open spaces, the majority of Americans live, work, and play in urban settings. Since 1920, the United States of America has been an urban country with more residents living in urban environs than rural places. According to the latest figures from the U.S. Census Bureau, 80.7% of Americans reside in an urban area (U.S. Bureau of the Census 2012a). While the United States has been considered an urban country for almost a century, the pattern of urbanization has gone through several cycles. In the next section we will explore the metamorphosis of America's urban tradition from early urban developments to metropolitan supremacy (Hartshorn 1992).

Early urban America (1760–1860) developed primarily around coastal and river locations as a necessity for extracting natural resources and as a means to facilitate trade by water. Coastal locations with good port potential made for excellent urban settlements (e.g. New York, NY; Philadelphia, PA; Boston, MA; Charleston, SC). As trade increased and the growing population of America sought more opportunities for development, river cities emerged on the interior of the continent (e.g. New Orleans, LA; Cincinnati, OH; Albany, NY; Richmond, VA). During these early days of urban development and city building, urban populations were relatively small with the largest city (New York City) only containing approximately 33,000 residents at the time of the first Census in 1790 (Gibson 1998). However, in subsequent decades and with the beginning of the Industrial Revolution, American cities were on their way to larger populations and greater importance.

The period from roughly 1860–1950 can be viewed as the heyday for American cities or an era of Central City Domination. At the start of the Industrial Revolution, large influxes of immigrants to urban areas and the improvement in transportation technology ushered in an era in which American cities reach unprecedented heights. During this era New York became the first city to have a population of 1 million residents in 1880 (Gibson 1998). Within ten years, Chicago and Philadelphia both surpassed the 1 million person population plateau. This era of urban development saw

large swells in urban populations, large increases in urban economic importance and the development of the present day national urban system. The development of a national-city system featured some of the oldest municipalities in the country (e.g. New York, Boston, and Philadelphia) as well as some of the newer cities in the United States: Los Angeles, Denver, and Salt Lake City.

Since the 1950s, urban America has seen a dramatic shift in urban form. It has shifted from a period of concentration of economic resources and population in major cities that marked the previous era to a period of decentralization and fragmentation. The period of Metropolitan Supremacy was ushered in following World War II. The return of large numbers of service men and women, the development of the federal interstate system and the advent of a federal mortgage system all aided in the de-concentration of urban America to the periphery (Jackson 1985). This redistribution of population and economic opportunities resulted in a new behavioral model that for the first time separated residence and employment. The notion of working and living in the same city began to diminish as residents followed the American dream into the suburbs while still commuting into the city for employment. To better account for this new urban form and in response to the suburbanization of America, the Office of Management and Budget developed a new classification system to understand America's urban form: Metropolitan Statistical Areas.

This new metropolitan reality was further underscored after the 1961 release of Jean Gottmann's classic analysis of the Northeastern seaboard of the United States and the subsequent coining of the term 'Megalopolis' (Gottmann 1961). Gottmann, who brought a European lens to his analysis, rightly characterized the corridor between Boston, MA and Washington, D.C. as one large urban agglomeration. Unlike the European model of distinct urban and rural boundaries, Gottmann viewed the Northeast United States as one unified entity, from which one could not clearly identify where one city began and another ended.

Since Gottmann's pivotal work, the United States has witnessed acceleration in metropolitan agglomeration. Megaregions can now be found in all regions of the country (Regional Plan Association 2005). In many instances, these Megaregions stretch across multiple political jurisdictions (e.g. municipalities, counties, states). Three of these megaregional entities, the Northeastern (Boston-Washington), Southern California (Los Angeles—Las Vegas) and the Piedmont Atlantic (Raleigh—Birmingham), will be discussed in greater detail in a later section.

7.3 Mega-regions in the United States

In the next forty years the Mega-regions (see Fig. 7.1) in the United States are expected to capture two thirds of the United States economic growth and add millions of residents (Georgia Institute of Technology 2006). As a result, the following section explores three Mega-regions located within the United States in an attempt to provide the reader with a better understanding of the current patterns and trends of urban development in the United States. Each region was chosen for its

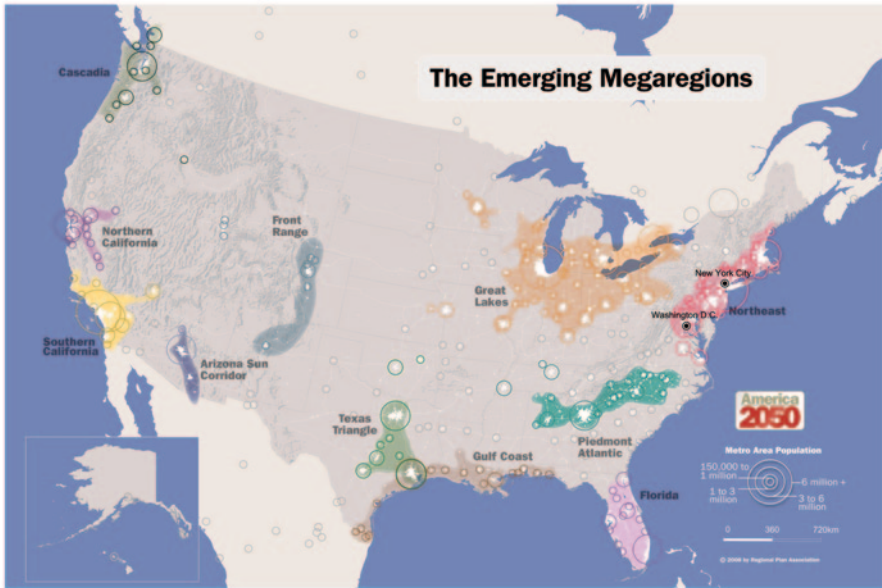


Fig. 7.1 Megaregions of the United States. (Regional Plan Association 2012)

unique stage of development and to show some of the differences and similarities that exist between the Mega-regions. An overview of the geography and population, transportation system, economy, and future prospects and challenges is provided for each Mega-region.

The descriptions and characteristics of each of these Mega-regions come from a combination of research conducted on Mega-regions, Megapolitan Areas and original research. It should be noted that the Mega-region concept espoused by America 2050 is utilized more frequently due to its pliable boundaries. However, Megapolitan Areas as a unit of analysis are quite helpful and much more exact due to their reliance on U.S. Census Geographies. For more information on the differences between the two concepts please see *Mega-regions: Planning for Global Competitiveness* edited by Catherine L. Ross (Ross 2009).

7.3.1 Northeast Mega-region

7.3.1.1 Geography & Population

The Northeast Mega-region (see Fig. 7.2) consists of more than 52 million people and stretches along the Northeastern seaboard of the United States for more than 500 miles. Beginning in southern Maine and ending in northern Virginia, the Mega-region extends into 12 states and is bounded on the east by the Atlantic Ocean and

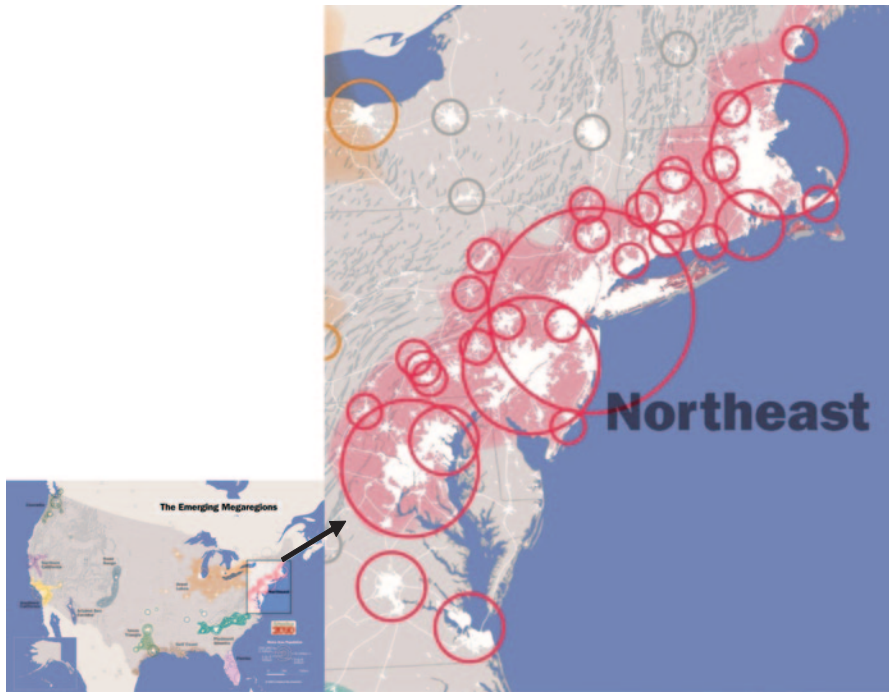


Fig. 7.2 Northeast Mega-region as Conceptualized by America 2050. (Regional Plan Association 2012a)

the west by the Appalachian Mountains (Regional Plan Association 2012a). The Northeast Mega-region is the oldest and most mature Mega-region in the country having been first identified in 1961 by Jean Gottmann.

The region has experienced steady growth over the last fifty years, growing from roughly 32 million people in 1950 to almost 49 million in 2000 and over 52 million people today. While the overall population of the region grew 62.5% between 1950 and 2010, the share of the United States population residing in the Northeast Mega-region has declined from 21% to approximately 17%. While fewer US residents call the Northeast Mega-region home compared to sixty years ago, one in six Americans still lives in this region. Meanwhile, population density has increased from 610 person per square mile in 1950 to 931 person per square mile in 2000 (Vicino et al. 2007). By 2050, the region is expected to have a population over 70 million.

The region includes the major population centers of Baltimore, Boston, New York, Philadelphia and Washington D.C.. While many of these cities have seen a decrease in the share of the region's population, they still serve as important economic and cultural hubs within the region. These cities began as independent entities that have coalesced over the decades into an interconnected urban agglomeration. While still maintaining their political autonomy, these cities have created strong economic, cultural and social linkages. The Northeast Mega-region is the most mature urban region in the United States and is the financial and governmental center for the country.

7.3.1.2 Transportation System

The region relies on a strong transportation infrastructure to facilitate the movement of goods, services and people. In the beginning, the sea and navigable rivers provided the necessary infrastructure for growth and development. Today, roads, airports and rail service are of crucial importance to the growth and prosperity of the Northeast Mega-region. The spine of the region is I-95, a limited access highway which stretches along the entire eastern seaboard and provides a vital transportation link for the region. According to the I-95 Corridor Coalition, the average daily traffic count is over 72,000 vehicles and peak traffic counts can reach over 300,000 (I-95 Corridor Coalition 2012).

Of growing importance globally is the presence of quality air facilities to handle passenger and air freight. According to 2010 Federal Aviation Administration data, the Northeast Mega-region contained six of the top twenty five airports for enplanements in the United States US Department of Transportation 2010a. Additionally, the Mega-region contains three of the top sixteen airports based on cargo weight landed (U.S. Department of Transportation 2010b). The geography of the Northeast Mega-region is such that airports in the region are viewed as shared entities and provide the population and business community with multiple means to travel by air. Data from New York City's three major airports show that 20% of all flights are less than 350 miles, keeping the majority of flights within the Northeast Mega-region (The Business Alliance for Northeast Mobility 2009).

Finally, the rail infrastructure located in the Northeast Mega-region is the oldest and most heavily traveled of America's passenger rail system. The population density and relatively short distances between major population centers allows the system to serve more than 750,000 passengers every day. These passengers depend upon the rail service to provide reliable and efficient service to support the economic vitality of the Mega-region. However, the rail infrastructure is aging and is in need of major investment. Without new funding the region could see a decline in performance and a decline in economic output.

Gottmann's original exploration of the region sixty years ago, the Northeast Mega-region has continued to be the "hinge of the US economy". According to estimates, the Northeast Mega-region is responsible for one-fifth of the nation's gross domestic product while occupying only two percent of the country's land area (Regional Plan Association 2012). Part of this economic wealth can be attributed to New York City, the financial capital of the world with almost 70 corporate headquarters and first level subsidiaries (Godfrey and Zhou 1999).

While the economic muscle associated with the region has been stable, there has been a restructuring around the type of employment generated in the region. The region which once dominated manufacturing employment for the country has seen that position erode from 50% of all jobs in 1900 to only 12% in 1997 (Vicino et al. 2007). The decrease in manufacturing employment was offset by a rise in service sector opportunities recently. The growth of finance and insurance,

securities intermediation, information and data processing, and professional/scientific and technical jobs has been pronounced. As Vicino et al (2007) noted in their examination of the Megalopolis 50 Years on, “Megalopolis has become more of an information processing center than a metal bashing economy” (349).

7.3.1.3 Prospects and Challenges

The future outlook for the Northeast Mega-region is generally optimistic. The global and national importance of New York and Washington D.C. cannot be overstated. These two growth poles will continue to be financial and government magnets for economic development. Additionally, Boston serves as a pseudo “Silicon Valley” for the East Coast. With excellent access to national and international markets, a growing population and the financial capital of the world all located within its borders, the Northeast Mega-region has a comparative advantage over most other Mega-regions. As a result, the Northeast Mega-region should continue to be an economic engine for the United States into the foreseeable future.

While the overall prospects for the future are encouraging, challenges do exist. The region’s population is expected to reach 70 million by 2050 and while that growth brings opportunities, it also has many challenges associated with adding an additional 20 million people. Two of the largest obstacles facing the Mega-region are transportation system deficiencies and a degrading environmental landscape.

Maintaining and improving the transportation infrastructure will be critically important to the health of the region. One of the major advantages of the region is the transportation connections that exist. As previously discussed, the highway, air and rail linkages reinforce the existing connections between the urban areas of the Northeast Megaregion. This transportation infrastructure is some of the oldest and most heavily traveled in the United States. The highways, airports and rail lines all need massive investments in order to maintain existing levels of service. Additionally, improvements are needed to stay competitive globally. A recently released report titled “The Future of the Northeast Corridor” highlights some of the needs related to rail service in the region including \$5 billion in basic infrastructure, improvements to enhance safety, expand capacity and reduce trip times and upgrading equipment and facilities (The Business Alliance for Northeast Mobility 2009).

A host of environmentally related problems pose a major challenge to the future of the Northeast Mega-region. A growing population will result in an overall loss of habitat for plant and wildlife, as well as reduce the amount of available open space. Additionally, a growing population will place further strains on the existing water supply and water quality. In the end, a regional approach to conservation must be developed to allow for the management of shared resources across political boundaries. This idea is currently being espoused by the Regional Plan Association in a recently released study titled “Landscapes: Improving Conservation Practice in the Northeast Mega-region”.



Fig. 7.3 Southern California Mega-region as Conceptualized by American 2050. (Regional Plan Association 2012b)

7.3.2 *Southern California Mega-Region*

7.3.2.1 *Geography & Population*

The Southern California Mega-region is a diverse mosaic of physical landscapes that include coastline, mountain and desert environs. The Mega-region stretches from the Pacific Ocean in the west to the desert borders of Nevada and Arizona in the east. The Sierra Nevada Mountains serve as the northern boundary of the region while San Diego and the Mexican border are the southern terminus of the region (see Fig. 7.3). In sum, the region encompasses more than 50,000 square miles of territory but only includes two states (California and Nevada) and has only eight county governments within its boundaries. Interestingly, approximately two-thirds of the region's land is owned by the government (Kern County Council of Governments, San Diego Association of Governments, and Southern California Association of Governments 2005).

According to recent estimates the Southern California Mega-region has a population rapidly approaching 25 million (8% of US Population) and is expected to add an additional 15 million residents by 2050. This represents a growth rate of approximately 62% and will place additional pressures on development within the region (The Business Alliance for Northeast Mobility 2009). Already, the limited availability of water, government ownership of land, and environmentally sensitive areas have resulted in population densities as high as 15,000–20,000 people per square mile in some coastal communities (Kern County Council of Governments et al. 2005).

The population that comprises the Southern California Mega-region is the most diverse in the nation. According to research conducted by Brenner and Pastor (2008), the Southern California Mega-region is the only Mega-region where

the majority of the population is composed of a non-white population. Additionally, 29% of the population in the Southern California Mega-region is foreign born. However, the percentage of foreign born residents is expected to decrease in the coming decades as the next wave of immigrants locates to other areas of the country (Benner et al. 2008). The major population centers for the region include Los Angeles, CA, San Diego San Diego, CA and Las Vegas, NV which have all experienced significant population growth over the last century. These communities serve as important centers of commerce, employment, and culture from which urban growth has dispersed.

7.3.2.2 Transportation System

The transportation system of the Southern California Mega-region is of vital importance to the region and the nation. The roads, rail, air and sea facilities serve to move people and goods within the region and around the globe. Of particular importance is the port system which acts as a global gateway between the nation and the rest of the world. The ports of Los Angeles and Long Beach combined are the fifth busiest in the world and the two busiest container facilities in the United States (Kern County Council of Governments et al. 2005). San Diego's seaport is also a top thirty port facility in the United States for containers.

The road infrastructure located in the region is also of major significance. The region has more than 10,500 lane-miles of highway and was a national leader in highway construction following World War II. Specifically, Interstate 5 and Interstate 15 serve as important highway corridors within the Mega-region and facilitate trade. However, due to traffic congestion it is estimated that Southern California loses almost \$14 billion annually. Traffic congestion is not forecast to decrease in the coming decades. Population growth, increases in vehicle miles traveled (VMT) and truck traffic will all add to the traffic congestion problem. However, it should be noted that carpool rates are the highest in the country and intelligent transportation systems are being implemented in the Mega-region.

The construction of additional highways and the widening of existing freeways have become exceedingly difficult in recent decades. As a result, high speed rail service has become an important issue for the Mega-region. As early as 1996 the State of California created a rail authority whose mission is to develop a high speed rail system for the State. While the Authority's jurisdiction is state-wide, the project could have major implications for the Southern California Mega-region linking the population centers and airports with high speed rail connections.

Finally, the Mega-region is served by more than 90 public use airports and almost 15 commercial service airports. This aviation cluster makes the Mega-region the busiest in the country for air traffic. According to FAA data in 2010 the Los Angeles International Airport served almost 29 million passengers (#3), McCarran International Airport in Las Vegas, NV served close to 19 million passengers (#9) and San Diego International Airport served 8.5 million passengers (#28). In addition to the high passenger volumes of many of the Megaregions airports, two of

the airports are also located in the top fifteen nationally for air cargo: Los Angeles International Airport (#7) with close to 4 million pounds of landed cargo and Ontario International Airport (#14) with approximately 2.3 million pounds.

7.3.2.3 Economy

The Southern California Mega-region has an estimated Gross Domestic Product (GDP) of between \$900 billion and \$1 trillion, making it the 10th largest economy in the world and representing approximately 7% of the United States GDP (Regional Plan Association 2012). The general public might perceive that the Mega-regions' economic might is the result of the entertainment industries of Los Angeles and Las Vegas. However, logistics and the movement of goods are vital components to the overall economy of the Southern California Mega-region.

Due in part to its relative geography of being located on the west coast of North America and fronting on the Pacific Ocean and its absolute geography which includes excellent harbors for port facilities, the Southern California Mega-region serves as a global gateway to the Pacific Rim and the growing markets of Asia. According to the Los Angeles Economic Development Corporation, international trade is responsible for one out of every fifteen jobs. The heavy reliance on international trade for employment has not always been so pronounced in the region. For example, in 1972 approximately 25% of jobs were classified as manufacturing. Today, roughly 10% of the Mega-regions' employment is generated by manufacturing.

The economic future of the Mega-region will be heavily influenced by global patterns and trends. Maintaining and enhancing the transportation related infrastructure that makes the Mega-region a global gateway for trade is imperative. The Mega-region must maintain its global competitiveness or risk losing international trade to other facilities on the west coast. Additionally, the role of the entertainment industry in the overall economic output can be fickle. The latest recession has resulted in a decrease in disposable income for most Americans and a decrease in the dollars spent on entertainment related purchases.

7.3.2.4 Prospects and Challenges

The future of the Southern California Mega-region is complicated. Having the 10th largest economy in the world that is based on entertainment, defense and agriculture provides for a diverse stable foundation for future growth and prosperity. Serving as the gateway to the Pacific Rim and as a major international trade center are envious attributes that any Mega-region around the globe would welcome. Finally, the diversity of landscapes and populations make the Southern California Mega-region truly unique. However, challenges exist in the form of transportation congestion, environmental concerns and sustainability.

First, transportation related congestion is a major problem. The Mega-region loses billions of dollars annual due to road congestion and the situation is not much

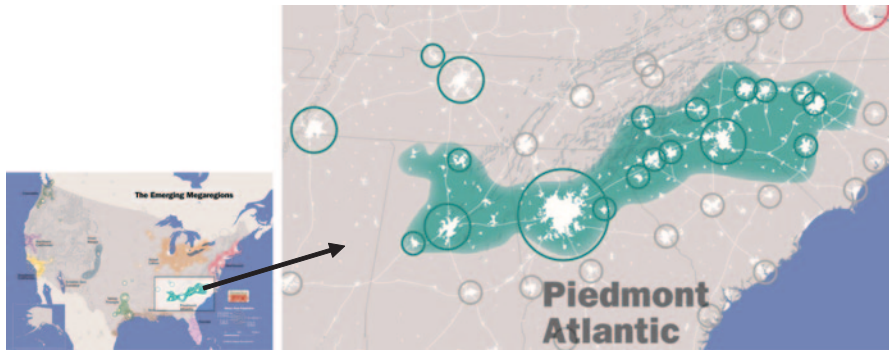


Fig. 7.4 Piedmont Atlantic Mega-region as Conceptualized by America 2050. (Regional Plan Association 2012c)

better for the Mega-regions airport and seaport facilities. Many of these facilities are reaching capacity. Secondly, environmental concerns are a challenge. Poor air quality has plagued the Mega-region for decades. While steps have been taken in the right direction future growth and development will continue to pose many problems for air quality. The general sustainability of the Mega-region is questionable. The Mega-region suffers from shortages of energy and water. Recent conservation efforts have resulted in changing consumer behavior and increasing reserves. However, future population growth and development pressures will place a large burden on the existing energy and water infrastructure of the Mega-region.

7.3.3 *Piedmont Atlantic Mega-region*

7.3.3.1 **Geography and Population**

The Piedmont Atlantic Mega-region (PAM) is located in the southeast United States and encompasses an area of more than 240,000 square miles. The Mega-region spans from the Atlantic Ocean in the east to the Appalachian Mountains in the West. The Gulf of Mexico serves as the southern boundary of the Mega-region and the northern boundary is approximately the North Carolina/Virginia border (see Fig. 7.4). In total, PAM includes territory in six states including: Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee. PAM is a relatively young Mega-region—in fact Gottmann himself commented on the burgeoning Mega-region developing around Atlanta, GA in 1987 (Gottman 1987).

According to research conducted at the Georgia Institute of Technology's Center for Quality Growth and Regional Development, more than 34 million people reside in the Piedmont Atlantic Mega-region, which is almost 11% of the total U.S. population. By 2050 the Mega-region is expected to be home to over 57 million people, a 68% growth rate. The population growth in the region will lead to the Mega-region becoming older, more diverse and is expected to result in smaller household sizes.

These demographic changes will have impacts on the urban growth and built environment of the Mega-region. An older population will place different demands upon the transportation system, potentially increasing demand for public transportation services. Smaller households may result in the desire for smaller living spaces. After decades of rising residential square footage, recent trends seem to predict a decrease in the size of homes. This may lead to opportunities to build infill developments in many of the Mega-regions urban areas and incorporate Smart Growth and more sustainable development patterns. It is estimated that by 2030 the region will see an additional 84 billion square feet of new construction, a 54% increase in the existing building stock. This represents an amazing opportunity to redesign the built environment of the region.

7.3.3.2 Transportation System

Interstates are of critical importance to the Piedmont Atlantic Mega-region and it could be argued that interstates bind PAM together more than any other Mega-region previously discussed. The Mega-region is crossed with a multitude of highways that provide links between the multiple cores of the Mega-region and between the periphery and core. In particular, I-85 and I-95 provide important north and south corridors for the movement of goods and services. Meanwhile, I-40 and I-20 serve as east and west conduits of automotive activity.

The seaport facilities that are located on the periphery of the Mega-region provide an important link to the core urban areas. Jacksonville, FL, Savannah, GA, Charleston, SC and Wilmington, NC all provide an opportunity for the import and export of goods. According to a 2012 Special Report on the top 30 U.S. Ports, Savannah, GA ranks 4th in the country for container shipments, Charleston SC ranks 9th, and Jacksonville, FL and Wilmington, NC rank 17th and 18th respectively (Burnson 2012). The key to maintaining and improving these rankings may lie in the Mega-regions ability to handle mega-vessels that are anticipated to increase in importance after the expansion of the Panama Canal is 2014.

Rail provides an essential component to the overall transportation system in the Piedmont Atlantic Mega-region. Railways serve an especially important role linking the inland ports of Atlanta, GA and Charlotte, NC with the seaport facilities located on the periphery of the Mega-region. Additionally, planning for the future extension of high speed rail is underway. The Southeastern High Speed Rail Corridor would connect the major cities of the Mega-region with Washington, DC and subsequently the Northeast Mega-region (Southeast High Speed Rail Corridor 2012). With speeds expected to approach 110 mph, this enhanced rail service would offer an alternative mode of transportation to combat traffic and air congestion within the Mega-region.

Finally, Atlanta and to a lesser degree Charlotte provide important air transportation connections for the Mega-region. Atlanta's Hartsfield Airport is the nation's largest airport measured by enplanements, with more than 43 million occurring in 2010 (22). Charlotte, the 11th busiest airport in the nation, served more than

18 million passengers in 2010. Both of these airports serve as important hubs for nationally based air service providers. The Mega-region is also served with numerous smaller airports including: Birmingham-Shuttlesworth International Airport (AL), Columbia Metropolitan Airport (SC), Greenville-Spartanburg International Airport (SC), Piedmont Triad International (Greensboro, NC) and Raleigh- Durham International (NC).

The transportation infrastructure of the region is a critical issue for PAM. Continued growth and prosperity requires an efficient and reliable transportation network. According to a participant of a forum hosted by Georgia's Institute of Technology, "Transportation is an intergovernmental activity...It involves the cities, it involves the states, it involves the regions, and we need to develop policies and funding systems that reflect everyone's needs" (America 2050 Forum 2009).

7.3.3.3 Economy

The Piedmont Atlantic Mega-region has undergone a dramatic economic transformation over the last century and as of 2010 represented 4% of the total U.S. GDP (Regional Plan Association 2012c). An economy that was once based in low skilled manufacturing (i.e. textile, furniture) and agriculture (tobacco) has been forced to reinvent itself to meet the challenges of a global economy. Traditionally, the Piedmont Atlantic Mega-region was able to depend on low cost workforce, low cost of living and few regulations to attract and retain business. Industries that once benefited from those characteristics have taken advantage of opportunities overseas in recent decades.

The economic spine of the Piedmont Atlantic Mega-region is the I-20/I-85 corridor that runs through the major population and employment centers of Atlanta, GA, Birmingham, AL, Charlotte, NC, and Raleigh, NC. These urban centers serve as important growth poles for the Mega-region. While these centers of economic advancement share some similarities, they all cater to different economic sectors. Atlanta, GA has developed into the pseudo-capital of the Mega-region and serves as an important inland port and center of logistics and trade. Birmingham, AL, once dependent on the iron and steel industries has more recently developed a growing healthcare sector. Charlotte, NC is the second largest center of finance and banking in the country. Finally, Raleigh, NC and the Triangle (Raleigh-Durham-Cary, NC) have utilized the presence of several institutions of higher learning to become a hub of research and development for the technology and pharmaceutical industries.

These centers of economic success are juxtaposed to the realities faced by many of the medium and smaller metropolitan areas of the Mega-region. Many metropolitan areas still rely on manufacturing to provide jobs for their residents which results in these areas having higher levels of unemployment and poverty. For example, poverty rates can range from 41 to 80% in the periphery of the region. It is clear that the economic success of the Mega-region lies with the core communities along the I-20/I-85 corridor, but attention must be given to the growing disparities of the outlying areas.

7.3.3.4 Prospects and Challenges

Over the last fifty years the Piedmont Atlantic Mega-region has witnessed explosive growth fueled by the migration of people and businesses out of the Northeast and Midwest and into the Sunbelt. This migration has transformed a region once perceived as “backward” or a “backwater” into a major force nationally. The strengths of the Mega-region lie in the strong record of economic development that has seen Charlotte, NC become a national banking hub; Atlanta, GA develop into a logistics and trade center for the southeast; and Raleigh, NC become a national center of research and development. Additionally, other smaller urban centers in the region have been successful in attracting automobile manufacturing plants and other industries to replace lost textile, furniture and tobacco employment generators. The Mega-region must build from this strength to ensure a successful future. However, the Piedmont Atlantic Mega-region is still developing and faces many challenges.

Some of the challenges confronting the Mega-region include political fragmentation, land consumption and an economic divide between the larger urban centers and surrounding communities. PAM covers 6 states, more than 500 counties and 4,000 municipalities that range in size from a few hundred residents to more than half a million (Hennie 2008.). These political organizations make it difficult to complete any regional planning that would benefit the entire Piedmont Atlantic Mega-region and this excludes the plethora of Council of Governments, Metropolitan Planning Organizations, and Chambers of Commerce (Godschalk 2007).

The rate at which land is consumed is another potential obstacle. The Mega-region is known for its suburban pattern of development and has experienced high levels of land consumption. On average, 650,000 acres of land are consumed by development each year. Atlanta witnessed an 81% increase in land that was used for urban purposes while its population only increased 61%. Likewise, Charlotte had a 71% increase in urbanized land to support only a 39% increase in population. These consumption patterns are not sustainable and need to be addressed.

Finally, there is a growing economic divide between the major growth centers of the region and the surrounding communities. The Atlanta, Birmingham, Charlotte and Raleigh Metropolitan Areas all witnessed healthy annual growth rates over the last twenty years. However, many of the medium to smaller sized communities that have had a more difficult time transitioning away from the manufacturing economy of old have not been as fortunate. These communities can act as a burden on the overall Mega-region and undermine the potential of the Piedmont Atlantic Mega-region.

7.4 Core Cities in Mega Regions of the U.S.

7.4.1 *Washington D.C.*

Washington D.C., formally the District of Columbia and commonly referred to as Washington, “the District”, or simply D.C., is the capital of the United States of

Fig. 7.5 Remote-sensing image of Washington D.C.



America. The signing of the Residence Act of 1790 approved the creation of the capital district. As permitted by the U.S. Constitution, the District is under the exclusive jurisdiction of the United States Congress and is therefore not a part of any U.S. state.

Washington D.C., located at 39°N, 77°W., is in the humid subtropical climate zone and exhibits four distinct seasons. Its climate is typical of Mid-Atlantic U.S. areas removed from water bodies. The average temperature in June and August is 25/26 °C, thunderstorms are frequent; during a typical year, the city averages about 37 days at or above 32 °C. Spring and fall are warm and long, while winter is cool with average temperature of 1.4 °C in January (Fig. 7.5).

The capital area was selected near the Potomac River and comprised parts of Maryland and Virginia. In 1791, the name of the capital city was chosen as Washington- in the honor of the first U.S. President George Washington. It was placed in a new “District of Columbia” which remained under federal authority (Bowling 1991). The original plan for the new capital city and federal district was designed by Pierre (Peter) Charles L’Enfant in accordance with contemporary European ideals of planning a capital city (Boquet 2010). The plan divided the city into a grid of North-South and East-West running streets as well as broader diagonal thorough ways. L’Enfant included in his layout the “President’s house” (the later White House), the “Congress house” (U.S. Capitol) and the wide East West running garden area which eventually would become the National Mall. The plan was slightly revised and completed by Andrew Elliott after L’Enfant’s dismissal in 1792. It was not until 1800/01 that the Congress began to convene in the new capital city. During the time period 1789 to 1800 the deliberations of the First and Second U.S. Congress were held in New York. The first U.S. President who moved into the “White House” and conducted his official functions there was John Adams.

Over the past two hundred years Washington, D.C. has changed considerably not only politically, economically and socially but also in terms of its physical appearance and the quality of the space. A multitude of new government offices, cultural and educational institutions and numerous memorials of national importance have been added on over the years. The Washington population continues to grow and to change. In 2010, the District of Columbia is home to 632,000 people. The Washington D.C. Metropolitan Area counts 5.58 million people who live in D.C. and surrounding counties of the States of Maryland, Virginia and West Virginia. In the past three decades changing transportation needs have contributed to a new subway system, two airports and the Capital Beltway. The latter is now widely considered the *de facto* boundary of the capital city displaying a specific political culture “inside the beltway”. With an area size of only 68 square miles (177 km²), the District of Columbia makes up a relatively small territory for a major capital city. Though, the core area of Washington was well planned and organized; it was able to contain all the functions of a capital throughout the 1800s. In later years, in particular after WW II, federal offices, such as the Department of Defense (Pentagon Building in Arlington, VA completed in 1945), were relocated beyond D. C. to nearby communities.

Washington is the unique center of political power with a distinct political landscape. It was the McMillan Plan of 1901 which formed an important extension of the symbolic lay-out of the capital city. The plan, an expression of the City Beautiful Movement, would considerably add to the aesthetic qualities of Washington and helped to establish among others the National Mall in the current form. It places the U.S. Capitol and White House—connected by a diagonally running grand avenue (Pennsylvania Avenue)—into the wider context of the D.C. power landscape (Boquet 2010). The National Mall and Memorial Parks includes such prominent structures as the Washington Memorial, the Lincoln Memorial and the Jefferson Memorial. The Washington and Lincoln memorials are visually bound together by a reflecting pool while the specific location of the Jefferson Memorial on the southern end of the Tidal Basin provides another important Washington vista. Meanwhile several other monuments have been erected in this garden and park portion of D.C., most notably the Vietnam Memorial (1982), the President Franklin Delano Roosevelt Memorial (1997) and a memorial for Civil Rights leader Martin Luther King Jr. (2011). Another addition to the power landscape of Washington is the Federal Triangle, with 10 key buildings built mostly in the 1930s. They fill the triangle shaped space between 15th Street, Constitution Avenue (which marks the northern boundary of the National Mall) and Pennsylvania Avenue. The largest federal office building, the Ronald Reagan Building, was dedicated in 1998.

On the northern and southern boundary of the National Mall several outstanding museums, such as the National Museum of American History, the National Gallery of Art and the Smithsonian, are located. Other buildings near the Mall honor the role of ethnic minority groups in American society such as the Jewish Community (in the U.S. Holocaust Memorial Museum established in 1993) and the Native Americans (in the National Museum of American Indian opened in 2005). All the above mentioned museums and memorials are part of a heavily visited national heritage



Fig. 7.6 The White House

in D.C. The power landscape of Washington, D.C. takes center stage during the presidential inauguration ceremonies which happens every four years (the last time January 20, 2013). The president is sworn in front of the U.S. Capitol and after a parade along Pennsylvania Avenue reaches his office, the White House. The public is invited to attend, and the whole core area of D.C., from the western edge of the National Mall to the Supreme Court Building and the Library of Congress East of the Capitol, is populated by large crowds of spectators. This carefully crafted D.C. event signifies a celebration of American Democracy (Figs. 7.6, 7.7).

7.4.2 *New York City*

New York City, the most populous city in the United States, is the center of the large New York Metropolitan Region, which is one of the biggest mega regions in the world.

New York City is located at 40°N, 74°W in a prominent coastal situation of the Mid-Atlantic Region. The region's climate is strongly affected by the nearby Atlantic Ocean, and it is classified—despite cold winters—as humid subtropical. Summer temperatures can go up to close to 40 degrees Celsius (above 100 degrees Fahrenheit). The City was first settled at the southern end of Manhattan commonly referred to as Lower Manhattan (with the 'Financial District'). During the 1790s and throughout the 1800s, New York's population moved North past Canal Street to Greenwich Village and the East Village direction 'Mid-Town' Manhattan and

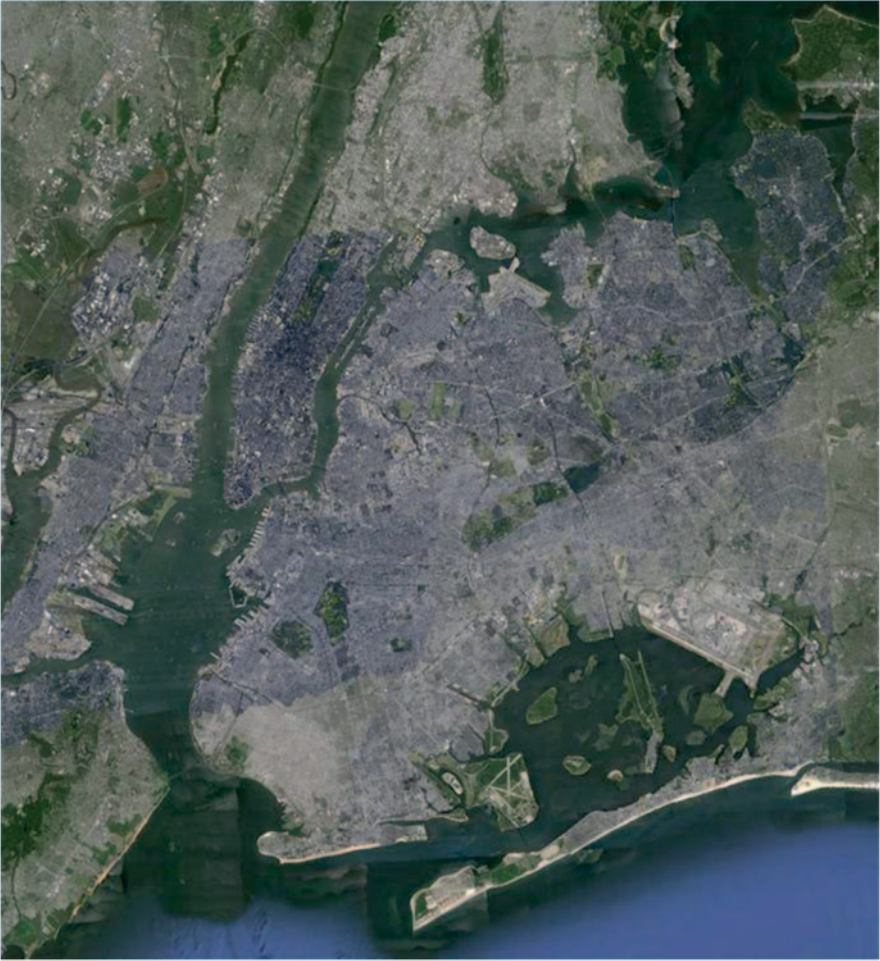


Fig. 7.7 Remote-sensing image of New York city

eventually to the Upper East and Upper West Side separated by Central Park, the first large planned urban park established in the U.S. (1857–1873). Midtown Manhattan serves as a second financial hub of the city, with the bulk of the skyscrapers including the Empire State Building erected there in the 1920s/1930s. The local geology, with hard schist rock formations, allowed the safe construction of Manhattan’s unique skyline. While the foundations of the two towers of the World Trade Center in Lower Manhattan were built, the excavated soil was used for land reclamation—to add on Battery Park City to the most southern tip of Lower Manhattan.

New York was founded as New Amsterdam, a Dutch trading post on Manhattan Island, in 1626, more than 150 years earlier than Washington, DC. When the British

took control of the settlement in 1664 it was renamed New York. The city has an excellent natural harbor which favored trade from Great Britain and the transfer of goods along the Hudson River into the interior. By 1790 New York surpassed Philadelphia by population volume. New York served as capital for the young nation from 1785 to 1800 and continued to grow by leaps and bounds. In 1898, the five boroughs Manhattan, Brooklyn, Queens, the Bronx and Staten Island were consolidated into New York City (Burrows and Wallace 1999) which evolved as the major commercial center in North America. In the 1920s, New York attained the status of a world city even surpassing London as the world's leading financial center. The current population of New York City is estimated at 8.3 million (2012); the New York Combined Statistical Area (CSA) comprising adjoining counties in New York State, New Jersey, Connecticut and Pennsylvania has 22.1 million residents (2010).

New York City may well be the most culturally diverse city of the world. It is estimated that over 800 languages are spoken in the five boroughs of the city. Queens and Brooklyn, with a multitude of ethnic neighborhoods and enclaves, show racially and culturally the greatest diversity within the city, while Staten Island has remained the only borough with a white non-Hispanic majority. The two largest ethnic/racial groups in the Bronx are Americans with Hispanic ancestry, mostly from Puerto Rico, and Afro-Americans. Early on, many distinct national or ethnic groups, first from Europe then from other parts of the world, made their home in New Amsterdam/New York depending on immigration laws enacted during the different time periods. Manhattan serves as an example of longtime persisting as well as ever changing ethnic neighborhoods in New York. Manhattan which reached with 2.3 million its population peak in 1910 (compared to 1.6 million in 2010) has had a large number of distinct ethnic neighborhoods during the 1800s and 1900s. Little Italy, Chinatown, the Lower East Side (with a large community of Eastern European Jews), Korea town in Midtown East, Hell's Kitchen (a predominantly Irish neighborhood), Yorkville on the Upper East Side (with a large community of Germans, Czechs and Hungarians), East Harlem (with Puerto Rican/Latino neighborhoods also called 'Spanish Harlem') and Harlem, the longtime center of the Black community in the city, are past and present names of such ethnically/racially defined places in Manhattan.

New York is the leading financial center nationally and worldwide. The New York Metropolitan Area economy currently ranks highest by GDP in the United States and is second only to Tokyo worldwide. A spectacular rise of the city economy occurred in the 1920s while the mid/late 1970s saw New York in a crisis and in economic decline, in particular its manufacturing sector. New York's harbor location and far reaching distribution system helped to build a well-diversified industrial complex in the region which eventually attracted a large number of corporate headquarters. The beginnings of a stock exchange market go back to the 1790s. Currently, the city houses, in particular in the Financial District of Lower Manhattan, the New York Stock Exchange (NYSE) and NASDAQ, the two world largest stock exchanges by market capitalization. Many leading companies in the financial sector have chosen to have their headquarters either in the Financial District or in



Fig. 7.8 Skyline of Manhattan

Midtown Manhattan. Financial services account for about 35% of New York City's employment income. Manhattan is home to altogether six major stock, commodities and futures exchanges. The NYSE building along Wall Street in the Financial District has become a tourist attraction. In a wider sense, Wall Street is considered a symbol of the financial power New York exerts nationwide and worldwide. Wall Street has generated many positive and negative associations, from the often quoted contrast of 'Wall Street' versus 'Main Street' in the public debate in the U.S. to the recent 'Occupy Wall Street' movement.

Another location in New York City with high place recognition is Broadway, with Times Square in its center. Manhattan is home to several dozen theater companies and stages for musicals and shows 'on' and 'off Broadway'. Besides its prominence in the entertainment business New York is also widely recognized for its outstanding role in the media and advertising, with the "New York Times" and the "Wall Street Journal" leading in the national print media, many influential advertising agencies and publishing houses, and the major national TV broadcasting corporations such as NBC housed in Rockefeller Center. The visual and classical performing arts have great museums and stages in New York, with among others, the Metropolitan Museum of Art, the Lincoln Center for the Performing Arts and Carnegie Hall. New York has also become an important location for film ventures and productions. Last but not least it should be mentioned that New York continues to be one of the world's leading fashion centers with many implications for the local economy (Fig. 7.8).

7.5 Defining “Urban”, Urban Development Patterns and Trends in China

7.5.1 Defining “Urban” China

Cities and regions in developed countries have experienced a process that has transformed individual cities and metropolitan areas into massive urban agglomerations and Mega-regions. Most research focuses on the state of individual city and urban agglomeration and ignores the intermediate process of urban development, which leads to the confusions of concepts, such as urban agglomeration, metropolitan area, and Mega-regions.

In the literature on urban development in China, there are various opinions on the development process of urban area and urban structure. For example, Cui divided the structure of urban areas into three types: urban region, urban agglomeration, and Mega-region (Cui 1991). Zhu divided the evolution model into four stages: dispersed individual core city, urban clusters, the expansion stage of urban agglomeration, and the formation stage of Mega-region (Zhu et al. 2002). Wang and Wu proposed a five-stage process: individual city, urban clusters, urban groups, urban agglomeration and Mega-regions (Wang and Wu 2008). Zhang argued that a central city and its surrounding urban areas experienced four stages of development: urban area, urban clusters, metropolitan circle and megalopolis. A megalopolis is composed of several urban agglomerations and an urban agglomeration includes several metropolitan areas. Metropolitan areas are the sub-units of a megalopolis (Zhang 2009).

The concept of urban belt refers to a huge urban region that is constituted by a number of socially, economically, and culturally interconnected metropolitan areas. Many researchers in China treat the concepts of urban belt, urban cluster and megalopolis the same. Zhou (1995) comprehensively compared and analyzed these concepts and proposed that the concept of megalopolis is the same as the concept of Metropolitan Interlocking Region (MIR) that he defined. An MIR is composed of various cities as its core area, with one or more transportation corridors. The major cities and the surrounding areas located within an MIR develop into a giant urban-rural integrated region with strong interaction and close socio-economic connections. Liu (2006) argued that an urban belt is organized and coordinated by one or a few core cities in space during urbanization process. Core cities play a significant role in coordinating a number of cities at various scales to constitute an urban network by highly developed transportation and information networks and spatial interactions.

Currently, the concept of urban agglomeration in the book under the same title published in 1992 is relatively agreeable by researchers in China (Yao et al. 2006). In this book, urban agglomeration is defined as a considerable number of cities with different nature, types and scales in a specific geographical region. Based on the natural environment, one or two megacities form the growth poles for the regional economy and constitute an integrated urban “agglomeration” with access to

the transportation network and internal links between cities. Three conditions are necessary for an urban agglomeration: First, there are a considerable number of cities of different types; second, there is more than one megacity as a regional center; third, there are internal links between cities.

An urban agglomeration has various characteristics: First, an urban agglomeration is not only a number of cities that are densely distributed in space, but also an organic integration that links with modern means of transportation and highly developed transportation and information networks. Second, an urban agglomeration is composed of a number of cities with one or more core cities. It is a giant polycentric urban system with continuity and strong internal interactions, and each core city has its own complete urban system. Third, there is a series of interactions between urban and rural areas as the cities grow. The non-agricultural industries grow rapidly in suburban and rural areas and result in a rising level of urbanization. Fourth, the polarization and spillover effects of core cities are obvious in urban agglomerations. The dual effects strengthen the regional core structure and constantly improve the functions and scale of urban agglomerations (Yao et al. 2006).

The combination of internal and international networks in urban belt promotes the convergence of population, ideas, capital, material and information flows, which influences the policy making of the national socio-economic and cultural development strategies. With the interaction of various flows, urban belt constantly produces new ideas, methods, technologies and products which promote progresses and innovations in society.

The six megalopolises in the world identified by Gottmann (1961) are all directly connected to the open sea except the urban belt of the Great Lakes in the United States. It is, however, connected to the Atlantic Ocean through the St. Lawrence River. Portal location of urban belts enables the flows of resources, technologies, and ideas to other regions and countries, which affects the development of the world economy (Yuan et al. 2007).

7.5.2 Urban Development Patterns and Trends

The history of Chinese cities date back to the Western Zhou Dynasty (1046–771BC). The spatial pattern of urban agglomerations in China, however, was dramatically changed after the foundation of the People's Republic of China in 1949. From 1949 to 1957, both China's urbanization rate and number of cities were significantly increased due to the national economic recovery from the Anti-Japanese War and the War of Liberation. The number of cities under 500,000 population increased from 98 in 1949 to 140 in 1957 (Lu 2007). Industrial cities, such as Baotou, Lanzhou, Xi'an, and Chengdu, emerged in central and western China, while some existing cities in the Yangtze River Delta, Central Liaoning Province, and Beijing-Tianjin area were further developed. The "Great Leap Forward" and the "Cultural Revolution" in China effectively slowed down the process of urban development in China after 1958. Since the end of the "Cultural Revolution" and the opening of China to the West, the urbanization rate has significantly increased. The central government proposed a series of national development strategies, such as the "T"-shape development strategy



Fig. 7.9 The urban agglomerations in China in 1949

in Yangtze River Delta, the development of West China, and the revitalization of the traditional industrial base in the northeast (Miao and Wang 2005).

The development process and spatial distribution pattern of urban agglomerations in China from 1949 to 2003 can be divided into five stages (Guand Pang 2007).

7.5.2.1 Germination

In 1949, Beijing-Tianjin, Central Liaoning Province and the Yangtze River Delta started to develop urban agglomeration, even though the influence each area had on each region was small at this stage (see Fig. 7.9).

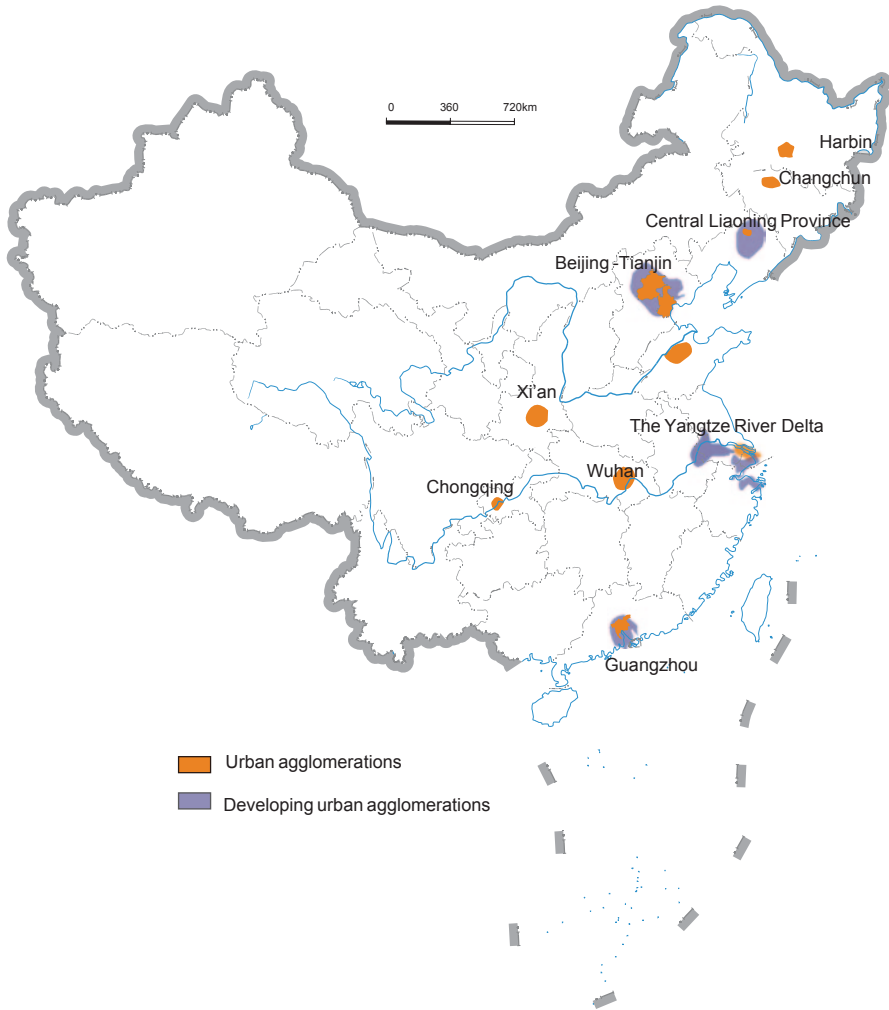


Fig. 7.10 The urban agglomerations in China in 1975

7.5.2.2 The Second Stage

By 1975, urban areas in Beijing-Tianjin, Central Liaoning Province, and the Yangtze River Delta further developed and expanded. Central Liaoning Province and the Yangtze River Delta formed urban agglomerations at a certain scale. Population began to centralize in Harbin, Changchun, Wuhan, Chongqing, Guangzhou and Xi'an (see Fig. 7.10). By the end of this stage, there were two urban agglomerations and seven developing urban agglomerations.

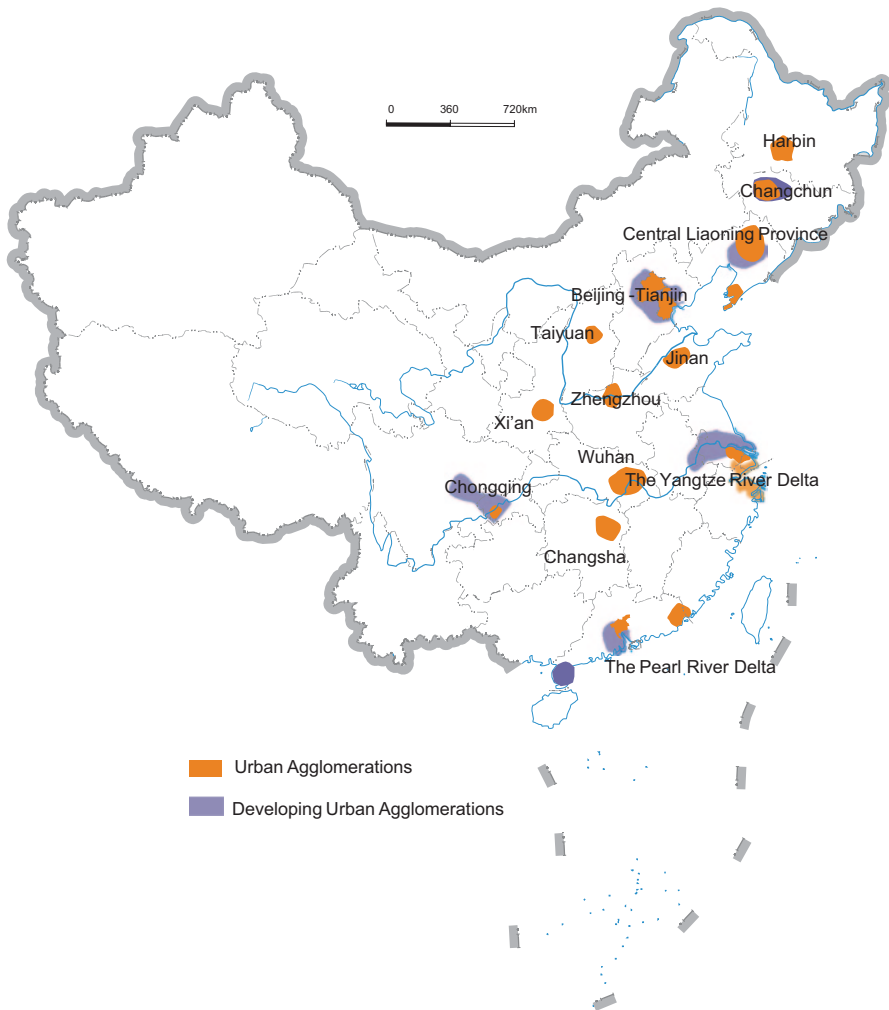


Fig. 7.11 The urban agglomerations in China in 1985

7.5.2.3 The Third Stage

By 1985, the Beijing-Tianjin area and the Pearl River Delta formed two new urban agglomerations. The urban agglomerations in the Central Liaoning Province and the Yangtze River Delta continued to expand, and population continued to centralize in Harbin, Changchun, Wuhan, Chongqing, Guangzhou, and Xi'an. Jinan, Taiyuan, Zhengzhou and Changsha were four emerging cities that attracted population concentration (see Fig. 7.11). At the end of this stage, there were four urban agglomerations and nine developing urban agglomerations.

7.5.2.4 The Fourth Stage

By 1995, multiple urban agglomerations were developed at various scales in China. The larger ones were Central and South Liaoning Province, Beijing-Tianjin-Tangshan area, the Central Plains, Shandong Peninsula, the Yangtze River Delta, Wuhan, Chengdu-Chongqing, and the Pearl River Delta urban agglomerations. Among the eight areas, the Central Plains-Central Shanxi- Central and South Hebei, Shandong Peninsula, the Yangtze River Delta and the Pearl River Delta were relatively more developed and had a potential to form Mega-regions. The Central Plains agglomeration stretched towards north to Shijiazhuang and Taiyuan with Zhengzhou as its core area. Shandong Peninsula agglomeration stretched south-west towards the border of Jiangsu, Shandong, and Anhui provinces with Jinan and Qingdao as its core area. The Yangtze River Delta agglomeration expanded towards the west to Central Anhui Province with Shanghai-Nanjing-Hangzhou as its core area. The Pearl River Delta agglomeration stretched towards the two wings. In addition, Changsha-Zhuzhou-Xiangtan, Lanzhou, Central and South Hebei Province, North Jiangxi Province, the border of Jiangsu, Shandong, and Anhui provinces, Central Yunnan Province, Central Guizhou Province, and the North Slope of Tianshan Mountains started to develop urban agglomerations (see Fig. 7.12). By the end of the stage, there were eight urban agglomerations and eleven developing urban agglomerations.

7.5.2.5 The Fifth Stage

By 2003, Southeast Fujian Province and Baotou in Inner Mongolia were two new developing urban agglomerations. The existing urban agglomerations and their core areas continue to expand. The “Yangtze River Delta, Shandong Peninsula, the border of Jiangsu, Shandong, and Anhui provinces”, “Beijing-Tianjin-Hebei, Central Plains, Central Shanxi Province” and the Pearl River Delta formed larger scale Mega-regions (see Fig. 7.13). Currently, there are eleven urban agglomerations and nine developing urban agglomerations.

7.6 Mega-Regions in China

Currently, the urban agglomerations can be divided into three levels based on GDP, because the economic scale of an urban agglomeration directly impacts its radiation area (Table 7.1). The highest level is the developed urban agglomerations of national significance, such as the three major urban agglomerations on the east coast of China. The GDP of the three urban agglomerations on the top level contribute for around 40% of the national GDP. Urban agglomerations on the second level

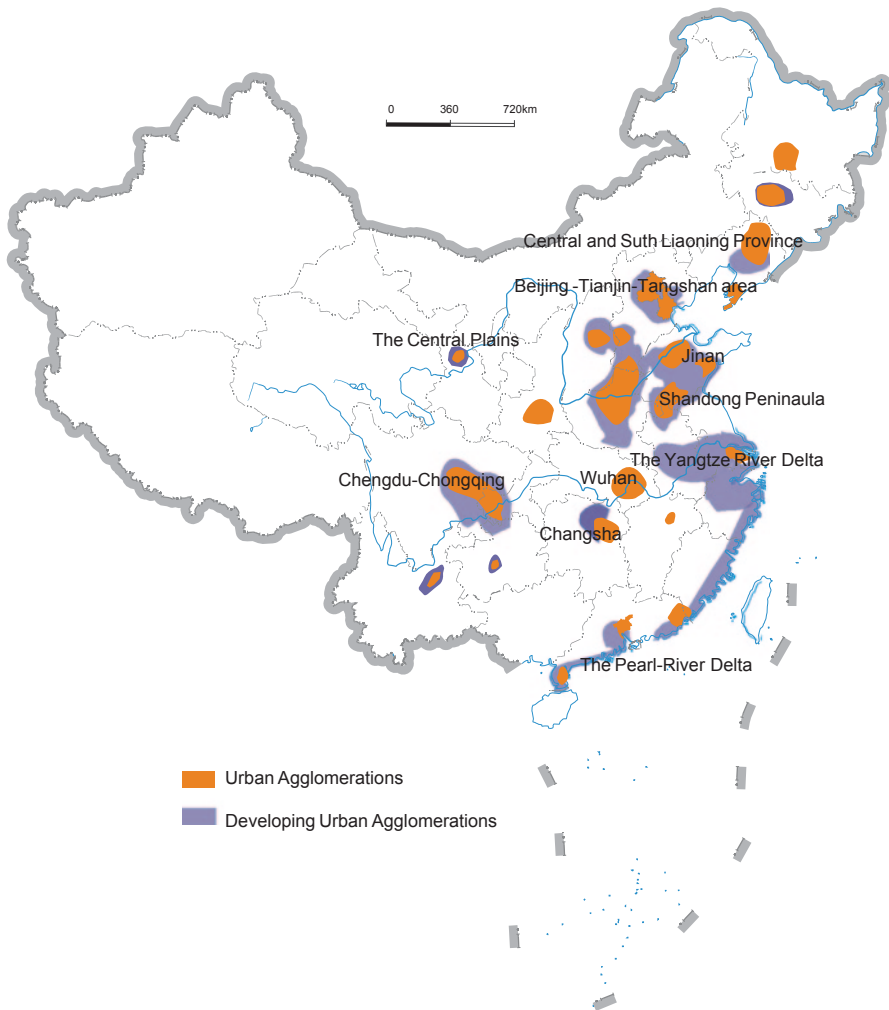


Fig. 7.12 The urban agglomerations in China in 1995

play important roles in regional economy. The urbanization level of the urban agglomerations on the third level is relatively low. The contribution rate to the national GDP is lower than one percent in the third level urban agglomerations, but they are significant at the provincial level. The following section focuses on the three Megaregions that are the highest level urban agglomerations in the country. An overview of the geography and location advantages, economy, regional industrial specialization and cooperation, and spatial structure is provided for each Mega-region.

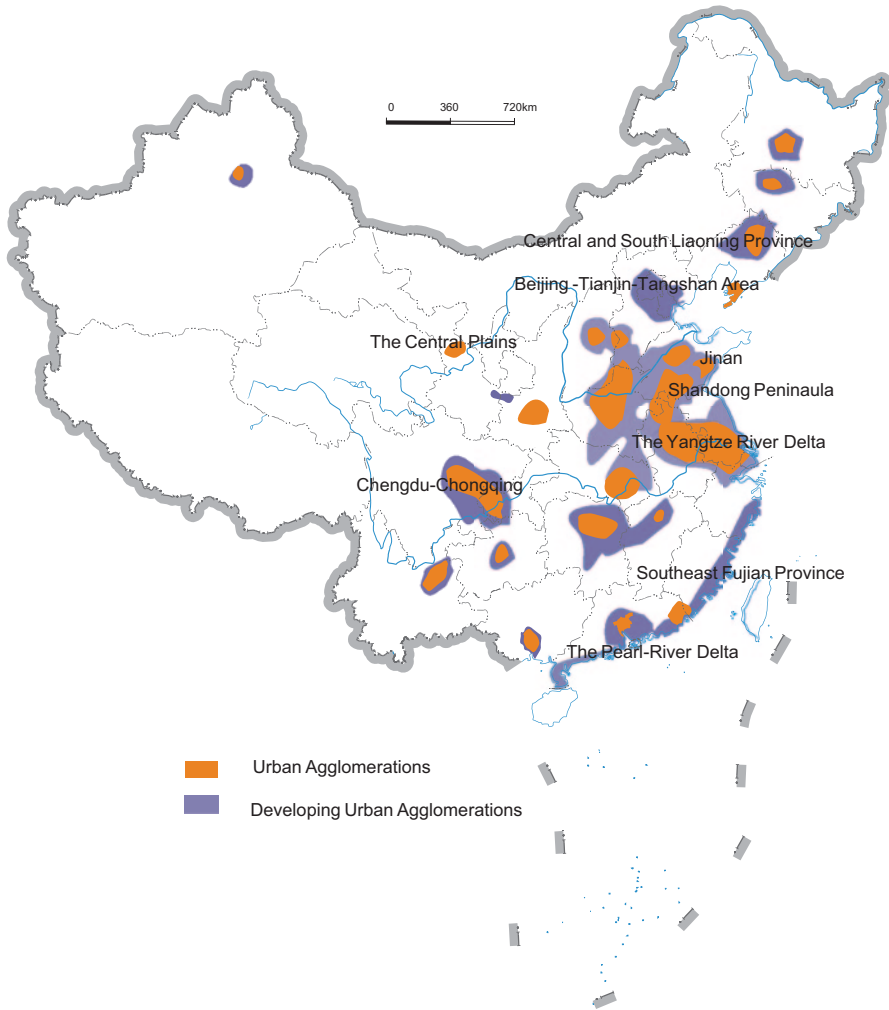


Fig. 7.13 The urban agglomerations in China in 2003

Table 7.1 Population, Area and GDP of the three Mega-regions. (National Bureau of Statistics of China 2010)

	Population (10,000)	Proportion (%)	Area (km ²)	Proportion (%)	GDP (10,000 Yuan)	Proportion (%)
Beijing-Tianjin-Hebei	7344.49	5.50	182601	1.90	335325554	9.85
Yangtze River Delta	11527.87	8.64	167521	1.75	685380121	20.13
Pearl River Delta	2967.02	2.22	55036	0.57	321470045	9.44
Total	21839.38	16.36	405158	4.22	1342175720	39.42

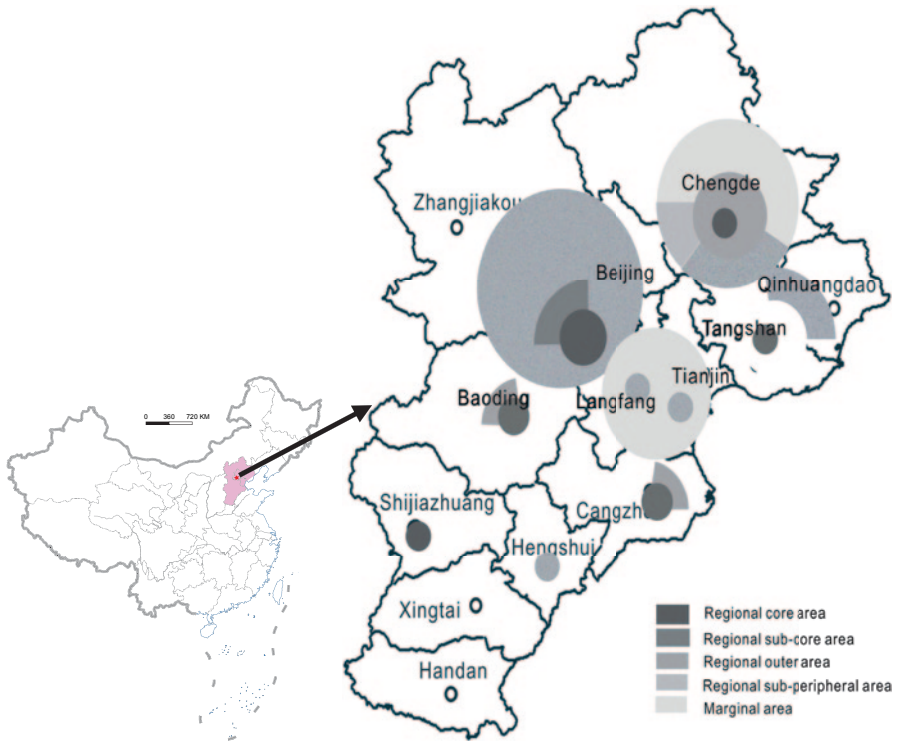


Fig. 7.14 The location and spatial structure of Beijing-Tianjin-Hebei Megaregion

7.6.1 Beijing-Tianjin-Hebei Mega-region

7.6.1.1 Geography & Location Advantages

The Beijing-Tianjin-Hebei Mega-region was formed in the middle 1980s. Its administrative area includes 10 cities, which are Beijing, Tianjin and the other eight cities in Hebei Province (Shijiazhuang, Tangshan, Qinhuangdao, Baoding, Zhangjiakou, Chengde, Cangzhou, and Langfang). The Mega-region is located at the junction of the North, Northeast and East China with an area of 185,000 km² (1.9% of the total area in China) and 73.4 million population (5.5% of the total population in China in 2010). It is the political and cultural center of China with a high density of population and economic activities (see Fig. 7.14).

Since the “Eleventh Five-year Plan” (2006–2010), the national development strategy has planned to develop Tianjin coastal area, Pudong in Shanghai, and Shenzhen as the three poles for regional growth (Zhu 2009). Beijing is positioned as “the National Capital, an international city, a cultural city, and an age friendly city”, while Tianjin is entitled as “an international port city, the economic cen-

ter of North China, and an eco-city". Beijing and Tianjin share complementary advantages.

7.6.1.2 Economy

Beijing had an average annual growth rate of nearly 11% during the 1990s. Traditional agriculture has been transformed to modern agriculture, and the industrial structure has been upgraded. Metallurgy, petrochemical industries, automotive, electronics, machinery, equipment, and high-tech industries have been rapidly developed. The construction industry has a leading position in the country. Service industries such as business services, financial sector, tourism, transportation, communication industry, real estate, and information services are flourishing. Beijing is also China's largest technology and intellectual-intensive area supported by many universities and research institutions. The vast majority of the national bank headquarters are located in Beijing and foreign banks also set up offices in Beijing to carry out extensive domestic and international business, which enable Beijing to take advantage of capital markets. In addition, Beijing is a megacity with more than 17 million people which provides a large consumer market. The main challenge for the economic development in Beijing is that the industrial structure and layout have not met all the requirements of a capital city. The major industries in the secondary industry grow at a slow pace and a large proportion of the tertiary industry provides traditional services. Emerging industries are lagging behind economic development due to severe resource constraints, especially water shortages, limited land resources, and environment pollution.

The economic scale of Tianjin is much smaller than Beijing. Secondary industry has played an important role in Tianjin's economy and its average growth rate has been the highest in North China since 2000. Tianjin is an important port that serves the north and northwest provinces in China. Tianjin Port has established long-term shipping services and trade with many countries and regions. It is also the starting point of the Eurasian Continental Bridge by railway transportation. Tianjin has various types of natural resources including oil, crude salt, coal, natural gas, geothermal, mineral and marine resources. The abundant land resources in Binhai New Area of Tianjin provide favourable conditions for its economic development. In recent years, the four pillar industries in Tianjin have been automobiles, electronics, chemicals and metallurgy. The challenges for the development of Tianjin are that the tertiary industry lags behind and some state-owned enterprises have financial difficulties for operation. The mode of economic growth is relatively extensive and people's income level is relatively low compared to Beijing.

Hebei province actively cooperates with Beijing and Tianjin to boost the regional economic development of this Megaregion over the past 20 years. Tangshan, Shijiazhuang and Langfang are cities that have achieved rapid economic development. Some central cities, such as Zhangjiakou, Qinhuangdao, and Baoding also significantly enhance the economic strength in the region. The development of these central cities

balances the economic development in the Beijing-Tianjin-Hebei Megaregion and narrows the gap with other developed coastal provinces (Liang et al. 2009).

7.6.1.3 Regional Industrial Specialization and Cooperation

Regional industrial specialization is based on the conditions and advantages of the leading industries. Hebei Province's primary industries are agriculture and animal husbandry, which provide needed agricultural products for Beijing and Tianjin. Tianjin focuses on the development of secondary industries to the region. Meanwhile, Beijing has advantages in the development of the tertiary industry, such as transportation, post and telecommunications industry, finance and insurance, real estate, wholesale and retail, and catering industries (Zhang 2008).

Currently, the Beijing-Tianjin-Hebei Megaregion is at a stage of integration. The industrial cooperation within the region is based on new industrial specialization and gradually forms an industry chain, which will be a benefit for joint development, dislocation competition, and the win-win industrial pattern (see Fig. 7.11). In the future, Beijing will focus on the development of the tertiary industry, and secondary industry will be shifted to the high-end development. The most dynamic industries in Beijing will be transnational headquarters, high-tech industries, financial management, intermediary services, cultural and creative industries, and logistics. Tianjin will focus on the development of heavy chemicals, high-tech industries and logistics. The most dynamic industries in Tianjin will be the automotive industry, electronics industry, the petrochemical industry, the aerospace industry, the ship-building industry, the pharmaceutical industry, and warehousing logistics industry. Hebei Province will develop ten pillar industries. The most dynamic industries will be the iron and steel industry, the pharmaceutical industry, petrochemical, equipment manufacturing, building materials industry, and textile industrial. Beijing-Tianjin-Hebei Megaregion has all types of industries and a considerable advantage for industrial development.

7.6.1.4 Spatial Structure

The spatial structure and economic structure of the Beijing-Tianjin-Hebei Megaregion fit into Burgess's Concentric Zone model (see Fig. 7.15) (Burgess 1924). The industries of the core area, the sub-core area, peripheral area and marginal area from the center outwards are producer services, general services, industry and agriculture, forestry, animal husbandry and fishery, or the general service sector, industry, agriculture, forestry, animal husbandry and fishery. Cities such as Baoding, Zhangjiakou, Chengde, Tangshan, Cangzhou, and Qinhuangdao are gradually connected to the Beijing-Tianjin core area, while some other cities such as Hengshui, Xingtai, Shijiazhuang are dispersed located (Yu and Wu 2006).

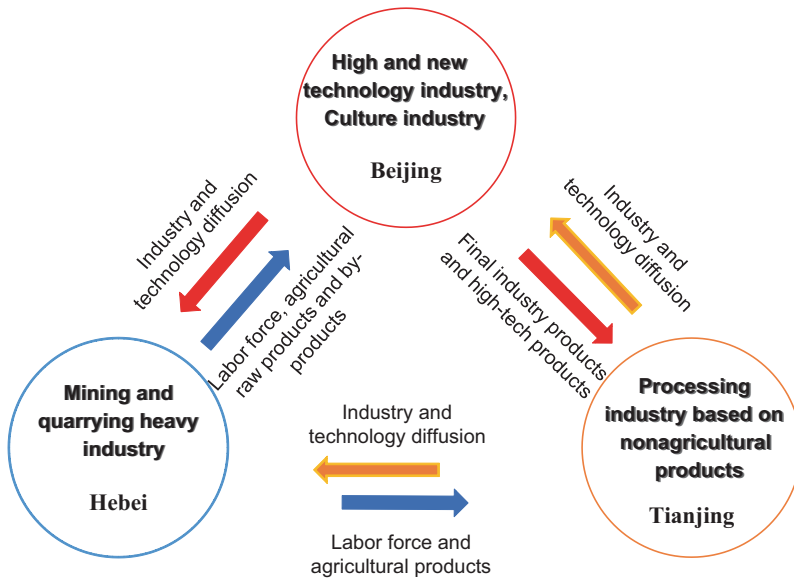


Fig. 7.15 Regional cooperation model of Beijing-Tianjin-Hebei Megaregion

7.6.2 Yangtze River Delta Mega-region

7.6.2.1 Geography & Location Advantages

The Yangtze River Delta Mega-region is the most developed and influential Mega-region in China, which is also known as the sixth largest Mega-region in the world. The administrative area of this Mega-region includes Shanghai, nine cities in Jiangsu Province (Nanjing, Suzhou, Wuxi, Changzhou, Zhenjiang, Yangzhou, Xuzhou, Nantong, and Taizhou) and six cities in Zhejiang Province (Hangzhou, Ningbo, Huzhou, Jiaxing, Shaoxing, and Zhoushan) with Shanghai as the core city. In 2010, another four cities in Jiangsu and Zhejiang province (Yancheng, Huai’an, Jinhua, and Quzhou) and two cities in Anhui province (Hefei and Ma’anshan) joined the Mega-region (see Fig. 7.16). The entire area covers 168,000 km² (1.75% of the total area in China) with 115.2 million population (8.64% of the total population in China in 2010). In recent years, with the improvement in transportation and economic links in this region, the Yangtze River Delta Megaregion refers to a much greater region than the original region, which included Shanghai, Jiangsu Province and Zhejiang Province.

7.6.2.2 Economy

The Yangtze River Delta is the most important economic and trade region in the east coast of China. In 2004, Shanghai proposed to establish an international economic,

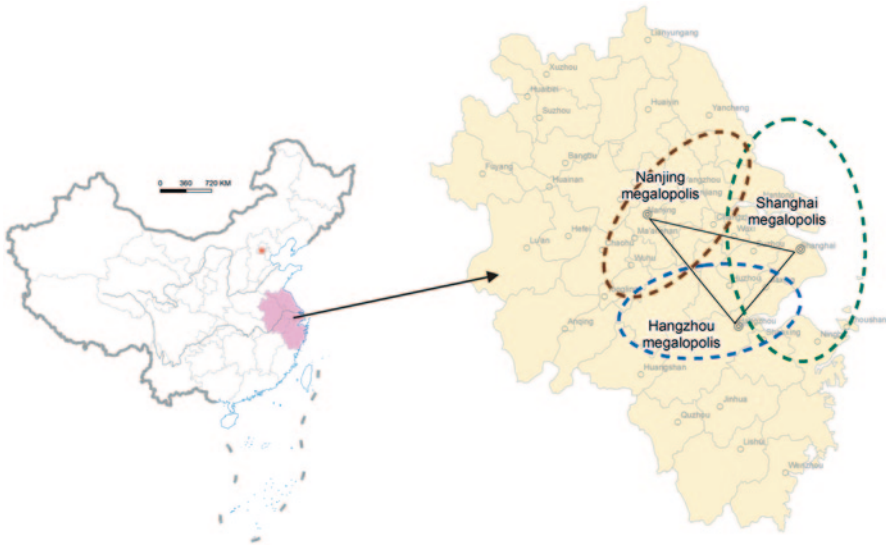


Fig. 7.16 The location and spatial structure of Yangtze River Delta Megaregion

financial, trade and shipping center. A significant number of large and medium-sized cities in the Yangtze River Delta region and the hinterland of non-agricultural industries joined in the Shanghai metropolitan area (Lu and Zhu 2004). In 2010, the State Council officially approved “Regional Planning of the Yangtze River Delta” and made strategic planning for the development of the Yangtze River Delta region. The Yangtze River Delta region is positioned as an important international gateway to the Asia-Pacific region, the center for service and advanced manufacturing industries, and a competitive Megaregion in the world.

Currently, the Megaregion is in a transitional phase from developing manufacturing industries to industrial specialization. Beginning in 2000, Shanghai gradually relocated labor-intensive industries and some capital-intensive industries to Jiangsu and Zhejiang provinces. Shanghai put forth an effort to develop port and urban industries, such as petroleum processing and coking industry and the printing industry, and reduced the share of manufacturing industries in the region. Zhejiang Province steadily absorbed the labor-intensive industries that were relocated from Shanghai and Jiangsu provinces; thereby it increased the share of manufacturing industries in the region. Jiangsu Province was balanced by absorbing and relocating the manufacturing sector and the share remained unchanged. After years of adjustment in the Yangtze River Delta Megaregion, industrial relocation and replacement contributes to the optimal configuration of the industry chain and the formation of industrial specialization.

Table 7.2 The industrial specialization and advantages of Jiangsu, Zhejiang and Shanghai

Region	Economic characteristics	Priorities	Advantages
Shanghai	High-tech enterprises, high-level tertiary industry	Economy (services), financing, trade, shipping	Technology, information, research and development, service personnel
Jiangsu	Processing and manufacturing, high-tech, large-scale enterprise	Economy (manufacturing), shipping	Industry, technology, management talents, skilled workers
Zhejiang	Private enterprises, private capital, private market, and talents	Economy (manufacturing), trade, shipping	Structures, entrepreneur human resources

7.6.2.3 Regional Industrial Specialization and Cooperation

Industrial clusters were developed in Shanghai, South Jiangsu Province and Zhejiang Province though their industrial structures are quite different. The industry clusters of services and financial services are located in Shanghai, and the industry clusters of manufacturing are located in South Jiangsu Province and Zhejiang Province. The specialization, collaboration and interaction among industrial clusters greatly contribute to the international competitiveness of the region. The industries in Shanghai and the surrounding areas are complementary. Shanghai gathered a large number of high-skilled talents and has strong technological strength, which enable Shanghai to develop high level service industry and build high-tech research and development base. Jiangsu and Zhejiang provinces have a strong basis for the processing industry and have formed a unique and sizable industry cluster. South Jiangsu Province has attracted a large amount of foreign investment and rapidly developed as the manufacturing center of IT products, especially computer equipments and integrated circuits. Zhejiang Province is also a big manufacturing province and has advantages in secondary industries, such as communications, software, traditional textile, clothing, and machinery. The Yangtze River Delta Mega-region has developed “three centers” with different functions (Table 7.2).

7.6.2.4 Spatial Structure

The Yangtze River Delta Mega-region has formed around a polycentric urban spatial pattern with Shanghai, Nanjing and Hangzhou as the core cities (see Fig. 7.16). The inner ring is the urban agglomeration with Shanghai, Suzhou and Wuxi as the core cities and has formed Shanghai-Suzhou-Wuxi Growth Golden Triangle. The influential areas extend to Changzhou and Nantong in Jiangsu Province and Jiaxing and Huzhou in Zhejiang Province. The second circle covers the area of Nanjing and Hangzhou and has formed Shanghai-Nanjing-Huangzhou Growth Triangle. As the three corner cities of the triangle and the provincial capitals, Nanjing, Hangzhou and Ningbo have powerful economic strength and have developed two relatively

independent metropolitan areas. Nanjing metropolitan area includes Zhenjiang and Yangzhou in Zhejiang Province and Ma'anshan, Chuzhou and Wuhu in Anhui Province. The influential areas extend to Changzhou, Taizhou, and Huai'an in Jiangsu province. The Hangzhou metropolitan area includes four cities— Hangzhou, Shaoxing, Ningbo and Zhoushan. The influential areas extend to Jiaxing, Huzhou and Taizhou City. The peripheral sphere is the radiation area of the Shanghai-Nanjing-Hangzhou Golden Triangle, including Yancheng, Huai'an in North Jiangsu Province, Jinhua and Quzhou in South Zhejiang Province, and other cities along the Yangtze River in Anhui Province (Li et al. 2006).

The links between each city and Shanghai decreases from the central area to the peripheral area of the Yangtze River Delta in a circle structure. The population density, level of economic development, and industrial structure, however, do not show the same distribution pattern that decreases from the center outwards. A series of secondary cities with relatively good development basis, large population size and rapid economic development are located in the peripheral area of Shanghai Metropolitan Area, such as Nanjing, Hangzhou, Suzhou, Wuxi, and Ningbo. These cities become dynamic economic growth poles in the Megaregion.

7.6.3 Pearl River Delta Mega-region

7.6.3.1 Geography and Location Advantages

In 1994, Guangdong Province established the Pearl River Delta economic zone, which included Guangzhou, Shenzhen, Zhuhai, Dongguan, Zhongshan, Foshan, Zhaoqing, Jiangmen and Huizhou. In 2005, the government planned “the Small Pearl River Delta—the Greater Pearl River Delta—the Pan-Pearl River Delta” triple strategy as the goal for strategic integration of the Pearl River Delta Mega-region (see Fig. 7.17). The “Small Pearl River Delta” includes seven cities—Guangzhou, Shenzhen, Foshan, Zhuhai, Dongguan, Zhongshan, and Huizhou with an area of 55,000 km² (0.57% of the total area in China) and 29.7 million population (2.22% of the total population in China in 2010). The “Greater Pearl River Delta” includes the “Small Pearl River Delta”, Hong Kong and Macau. The “Pan-Pearl River Delta” includes the Pearl River basin and the surrounding nine provinces (or autonomous regions), which are Guangdong, Guangxi, Hunan, Fujian, Jiangxi, Hainan, Sichuan, Yunnan, and Guizhou, and the two special administrative regions (Hong Kong and Macau). The “Pan-Pearl River Delta” is also referred as the “9+2” region. The development of the Pan-Pearl River Delta created a bottom-up model in accordance with the demand for regional cooperation. It was a milestone in China's regional economic development and an innovation in economic cooperation.

The formation of the Pan-Pearl River Delta economic cooperation zone was affected by natural, economic, social and political factors (Li et al. 2005). The region is located in the tropical and subtropical regions. The cities in this region have

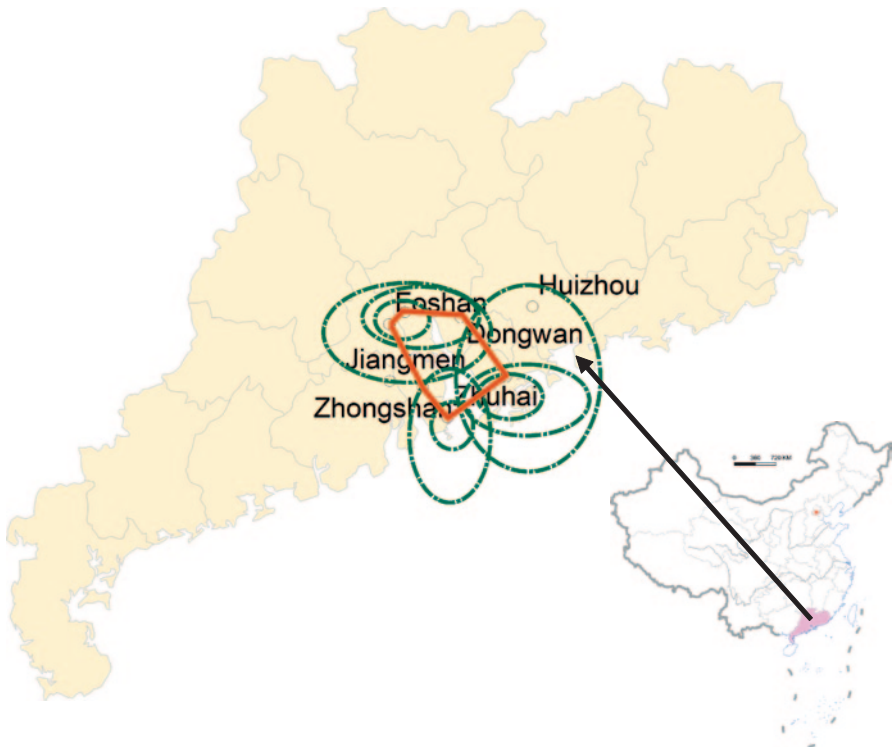


Fig. 7.17 The location and spatial structure of Pearl River Delta Mega-region

advantages in spatial proximity and rich natural resources. The spatial structure of the dominant industries is complementary although the levels of economic development in these cities are different. The economic development in this region promotes population migration and logistics flows in recent years, which also constitutes a basis for economic cooperation. In addition, the “Closer Economic Partnership Arrangement” (CEPA) between mainland China, Hong Kong and Macao, and the Association of Southeast Asian Nations (ASEAN) Free Trade Area provide great opportunities for the regional development.

7.6.3.2 Economy

The regional cooperation in Pan-Pearl River Delta Mega-region is based on the regional growth in Hong Kong and Guangdong Province. The optimized combination of production, capital, technology, human resources, information and natural resources enable the region to achieve a higher level of regional economic development. The Pearl River Delta has become the production base for the IT industry and more of a focus has been placed on quality economic growth and not just

quantity. The goals of the “Tenth Five-year” plan (2001–2005) for the Pearl River Delta Mega-region were: to enhance the competitiveness of the Pearl River Delta Mega-region and become the major cities of the Asia-Pacific Region; to strengthen the function of the central cities, such as Hong Kong, Shenzhen, and Guangzhou, and improve the international influence of these modern cities; to develop a number of large cities and promote the development of smaller size cities around them; and to actively develop small and medium-sized cities and attract population migration to these cities.

7.6.3.3 Regional Industrial Specialization and Cooperation

Regional cooperation in the Pearl River Delta began in the 1980s. Hong Kong, Macao, and the Pearl River Delta experienced disorderly and excessive competition in investment and in the development of export-oriented economies. The service sector in Hong Kong failed to enter the Pearl River Delta as the manufacturing sector did due to structure limitation. The industrial structure of each city was identical. For example, electronic communications manufacturing, electrical machinery manufacturing, chemicals, plastics, pharmaceuticals, textile and garment, and food industry accounted for more than 60% of the total industrial output value in each city. The duplicate construction in industrial development resulted in a waste of resources, low level of industrial technology, and a weak complementary of industrial structure between cities. All these factors reduced regional economic competitiveness.

The “Pan-Pearl River Delta” Megaregion breaks the traditional constraints of the economic zone and the local protection barriers. It has changed the economic link that relied solely on capital and resource inputs in the past to regional integration. The latter has promoted regional economic cooperation and the formation of a unified market in Pan-Pearl River Delta. It has increased consumption, export, investment, the efficiency of resource allocation, and the capability of gathering production elements.

7.6.3.4 Spatial Structure

Major cities in the Pearl River Delta Mega-region are highly concentrated in the estuary area of the Pearl River. It forms two urban circles with different levels of development and characteristics (see Fig. 7.17). The inner circle includes six prefecture-level cities: Shenzhen, Dongguan, Guangzhou, Foshan, Zhongshan and Zhuhai. Most of the ports, airports, highways, railways and other infrastructures in the region are located in this inner circle. Shenzhen-Hong Kong, Macao-Zhuhai, and Guangzhou-Foshan constitute three cores of the Golden Triangle in the Pearl River Delta Mega-region. The outer circle includes three prefecture-level cities: Zhaoqing, Huizhou and Jiangmen.



Fig. 7.18 Remote-sensing image of Beijing

7.7 Core Cities in Mega-regions of China

7.7.1 *Beijing*

Beijing (“Jing” for short, sometimes Romanized as Peking), is the capital of the People’s Republic of China, the center of political, cultural, transportation and international communication. It also plays a role as the center of national economical/financial decision-making and management. Beijing is one of the “Four Ancient Capitals” with six UNESCO World Heritage Sites (Fig. 7.18).

Beijing is located at the northwestern edge of the North China Plain, at latitude 39° to 41° N and longitude 115° to 117° E. West of Beijing is the Xi Shan of the Taihangshan Mountains, while the Yanshan Mountains protect the city from the north and northeast. The Bohai Sea is about 150 km southeast of Beijing. The area has a semi-dry monsoon influenced humid continental climate. The annual precipitation is 571.8 mm. Beijing has four distinct seasons. Spring can bear witness to sandstorms. Summer is hot with pretty much rainfall. Fall is clear and dry. Winter is cold and windy. The spring and fall are rather short for two months at most. The summer and winter are quite long for three months and more than five months. Beijing has a typical monsoon climate with 60% of precipitation in July and August. The annual temperature is 12.3 °C. The month daily average temperature in January (the coldest) is –3.7 °C, while in July (the hottest) is 26.2 °C.

Bei Jing, meaning Northern Capital, has been the capital city of the country for more than 700 years. It was first chosen by Kublai Khan in 1264 as capital for the Mongolian led Yuan Dynasty (1279–1368). Originally, it was called Da Du (“Grand Capital”). With the exception of two interludes (1368–1421, 1928–1949) Beijing served as seat of the government for two imperial dynasties (Ming Dynasty 1421–1644, Qing Dynasty 1644–1911), for the Republic of China and The People’s Republic of China since 1949.

Beijing (and Da Du) was built according to the layout of the Chinese capital in traditional China as expressed in the Confucian classic text Zhou Li (Sit 1995). Some of the major principals for building the capital were the centrality of the capital, its square or rectangular shape and a central axis with a North South orientation. The capital city was started during the reign of the Yongle Emperor (1402–1424). The Ming Dynasty capital city of Beijing consisted of four parts: the Palace City (or ‘Purple’ Forbidden City which now houses the Palace Museum) where the emperor and his family resided; the Imperial City which comprised the two main ceremonial buildings (Ancestral Temple and Altar of Grains and Soils) to the south, the Coal Hill to the north, and a group of royal mansions and gardens placed in the three lake area of Shishahai to the northwest; the Inner City and the Outer City. The latter area to the south of the Inner City was added in the late Ming Dynasty. The layout and architecture of the capital city reflected the feudal society during the last two dynasties in Chinese history which ended in 1911. In a wider sense, the royal gardens in the outskirts of the city, the Ming and Qing Tombs outside the city and the nearby sections of the Great Wall in the Yanshan Mountains were part of an elaborate system of structures.

In modern Beijing, the built up areas have expanded more and more to the suburbs which are well connected to the downtown areas of the Inner and Outer City. The Municipality of Beijing, with 14 urban districts and 2 rural districts, has a most modern transportation infrastructure including an efficient subway system and a new national airport (PEK Capital International Airport). Automobile traffic has increased tremendously, and several concentric beltways surround the city, one immediately outside the old city walls and gates of the Inner City. The beltways have gone beyond third and fourth ring roads to a fifth ring road (with a sixth ring road partially completed) where the new Olympic Stadium, the Bird’s Nest, is located. Not surprisingly, urban planners and architects deliberately placed the main sites of the 2008 Summer Olympic Games at the northern end of the Central Axis to integrate these pre-eminent contemporary additions in the city within the timeless frame of the capital city.

Beijing is the political, cultural, scientific, technological and educational center of modern China. The capital houses the headquarters of the State Council, the National People’s Congress (NPC), the Chinese People’s Political Consultative Conference (CPPCC), the central ministries and other main national institutions. The offices of these state offices, state agencies as well as other representative buildings of the state are mostly found on or near Tiananmen Square, the power center of the city. It was here that Chairman Mao Zedong proclaimed the People’s Republic of China in 1949 and it is in the center of the 1958/59 largely expanded square where



Fig. 7.19 Tian'anmen Square and the axes

his mausoleum was established after his death in 1976. On the west side of the square towers the Great Hall of the People where the National People's Congress and the CPPCC National Committee convene as well as other important state meetings are hosted. The east side of the square is dominated by two museums of highest national importance (Museum of the Revolution and the Museum of National History). Tiananmen Square is the continuation of the symbolic North South running Central Axis whereas the wide Chang'An Jie Street on the northern end of the square marks the East West Axis of modern-day Beijing (Fig. 7.19).

Beijing hosts many prestigious cultural institutions including the China Peking Opera Company, the State Conservatory of Music, the Central Academy of Fine Arts and the National Centre for the Performing Arts. The Centre, an ellipsoid dome of titanium and glass surrounded by an artificial lake dubbed The Giant Egg was opened in a prominent location just one block West of Tiananmen Square in 2007.

It is also important to note that a large majority of China's universities and leading national research institutions are found in Beijing. The greatest cluster of universities, colleges and institutions of higher learning is in Haidian District in Northwest Beijing which has become a neighborhood for students, artists and intellectuals. Here were the beginnings of Beijing's "Electronic Street" (see more on the Beijing Zhongguancun Science Park in Chapter 9). This high tech core area continues to thrive in the immediate neighborhood of the two highest ranked universities in China, Peking University and Tsinghua University.

Beijing is an ancient city occupied by many ethnic groups and practitioners with a diversity of religious beliefs. The main groups which make Beijing their

home are the majority ethnic group of the Han and the minority groups of the Manchu (once the leading group occupying the Inner City during the Qing Dynasty), Mongolian, Hui, and Korean. Among the smaller ethnic minority communities in town are the Uyghur, Moslems from Northwest China, and Asian groups such as the Vietnamese which, among others, showcase their distinct culture and cuisines in a multitude of local restaurants. Major religions represented in the capital city are Buddhism, Taoism and Islam, but there are also sizable religious communities which practice Christian beliefs (Catholics, Protestants, and Orthodox Christians). There are many temples in the city. A leading and nationally recognized Buddhist temple is the Lama Temple. There are also several historic sites in Beijing which honor the philosopher Confucius and his disciples. The Niujie Mosque, the oldest mosque founded in the 10th century and reconstructed during the Qing Dynasty, is the spiritual center for 10,000 Muslims living in or near Beijing. Among the established Christian churches in Beijing is the Wangfujing Catholic Church. With the opening up of China in the 1980s and the 1990s the goal of a harmonious development of religious beliefs within the society of the People's Republic of China has been more widely supported; it is a trend that can be observed currently in the practices of many residents of Beijing.

Among the unique features of the Beijing urban landscape are several thousand hutongs, narrow and winding alleys which crisscross the old sections of the Inner and Outer Cities of the Ming and Qing Dynasties. Some of the hutongs even pre-date these time periods. In fact, the term hutong was coined during the Mongolian led Yuan Dynasty. In general, the alleys run in an East West direction, but some also North-South. Sanmiaojie (Three Temple Alley) is considered the oldest one (900 years old); the longest alley is the East West running Dongjiaominxiang, with a length of 3,250 m. The shortest alley is about 10 m; the narrowest alley is Qianshi (Money Market Alley) in the Dashilan area south of Qianmen Gate, which is only 0.7m wide. The hutong alleys, with quadrangle house complexes called siheyuan, usually have their entrance gates to the South. Historically, the more respectable larger siheyuans were in the areas West and East of the Forbidden City; they were mostly occupied by high ranking officials and merchants. In recent years, hundreds of hutong alleys have fallen victim to waves of modernization, and new emerging high rise areas have frequently re-placed them. The pressure is greatest in the poorer sections in town. In the large courtyard complexes, residents plant trees and flowers and even raise chickens and ducks. Some yards have Chinese flowering crabapple and lilac, showing the owner's cultural accomplishments. In the Shichahai historic area (northwest of the Forbidden City), in South Luoguxiang and North Luoguxiang, from Xisi to Xinjiekou Avenue, and even from Dongdan to the Lama Temple, the siheyuan courtyard complexes have remained relatively intact. Many of them are already listed as Beijing Architectural Conservation Areas. As the hutongs display traditional Beijing ways of life they have been discovered more and more by tourists, and tours on foot and by bicycle are offered. Preservationists and historically minded residents keep a record of these endangered environments to secure the survival of the hutongs into the future (Fig. 7.20).

Fig. 7.20 Hutongs in Beijing



7.7.2 *Shanghai*

Shanghai (“Hu” for short, “Shen” for another name) is the largest city in China. It is one of the three national integrated gateway cities which are given the title by the State Council. It is also one of the largest cities in the world (Fig. 7.21).

The city is located at 31 to 32°N and 121 to 122 °E, near the mouth of the Yangtze River, China’s longest, navigable river. Its original port location is near Suzhou Creek and the Huangpu River, a tributary to the Yangtze twelve miles from its outlet, which made for a well-protected harbor. Shanghai has a humid subtropical climate and experience four distinct seasons with abundant sunshine and precipitation. The annual temperature is 15.7°C. The flood season here is from May to September with 60% of the whole year’s precipitation for spring rain season, plum rain season and fall rain season. The summer drought comes every July and the weather becomes hotter and wetter with average temperature of 27.8°C.



Fig. 7.21 Remote-sensing image of Shanghai

The port town of Shanghai became a major city much later than Beijing. Although it is now, with over 23 million people (2011), the most populous city in China, its urban history is relatively short. It was not until the mid-Qing Dynasty, that it became a big city in East China thanks to the advantageous location of the port. It offered access to internal routes along the Yangtze River into the interior of China as well as international routes to Japan, Korea and Southeast Asian countries. The rise of Shanghai as a leading port city and commercial center in Asia from the 1840s to the 1930s is intricately connected to external influences. The Treaty of Nanking, the first of several “unequal treaties” China had to sign after the Opium War (1839–1842), allowed European powers to establish sovereign “concessions” in Shanghai eventually resulting in the Shanghai International Settlement. By the 1920s/30s, Shanghai’s economy flourished, and the Chinese and foreign population surpassed 3 million thus making the city one of the largest urban centers of the world. “Old Shanghai”, dubbed the Paris of the East (though with a rampant opium

trade, gambling and prostitution), came to an end during the Japanese occupation of the city 1937–1945 and with the foundation of the People's Republic of China in 1949. In the following decades, the international trade advantages were lost to Hong Kong. It was in the 1990s that Shanghai's economy rebounded. Later, the administrators helped to reduce the tax burden of the city and to greatly encourage foreign and domestic investment into the Pudong Area, a special economic zone established in 1990. Shanghai became a major economic hub in East Asia with a stock market and hundreds of international, national and regional corporate headquarters.

Shanghai is the economic center of China. Its GDP ranks number one among the cities in Greater China and number two in Asia. In 2009, Shanghai's GDP surpassed Hong Kong's, and its container port was leading worldwide in volume. By the 1950s and 1960s, Shanghai had become a leading industrial city in China. Its heavy industry comprised the Shanghai Baosteel Group, the largest iron and steel manufacturer of the nation, shipbuilding plate companies and also eventually automobile manufacturers (Shanghai Automobile Industrial Company) in the mid-1990s. Because of its heavy industry and other industry sectors Shanghai became a major contributor of tax revenues to the central government. Shanghai's manufacturing base was soon extended to the petroleum and chemical industries and eventually to household electronic appliance manufacturing, equipment assembly and the pharmaceutical/biomedicine industry in the 1990s and early/mid 2000s. Shanghai's economy went through major structural changes from 1978 to 1990 and 2006, from agriculture and a dominating industry sector in 1978/1990 to a leading service sector in 2006. While in 1978 the percentage of GDP (out-put) was 4% (agriculture), 77.4% (industry) and 18.6% (services), the proportion of the sector outputs was 4.3%/63.8%/31.9% in 1990. By 2006 the relative importance of the three sectors switched to 0.9% (agriculture), 48.5% (industry) and 50.6% (services). The changes were even more dramatic in terms of employment: from 34.3% in agriculture, 44.0% in industry and 21.6% in services in 1978 to 6.2% (agriculture), 37.0% (industry) and 56.8% (services) in 2006 (Chen 2009). The structural changes resulted in a decrease in agricultural activities and in the output of goods in traditional industries like the textile industry which were moved more and more to the periphery of the City (Chongming Island) or outside Shanghai. The remarkable increase in service industry employment as well as out-put/contribution to the Shanghai economy was closely tied to the success of a new special economic zone in the Pudong Area. By the mid-2000s the "rising Shanghai" (Balfour 2007) had the attention of the national and international business community. For 15 years in a row, from 1992 to 2007, Shanghai's GDP rose by 12% plus annually which was even above the impressive national trend for China. A visual expression of the paramount changes in Shanghai was the new skyline towering over the Pudong side of Shanghai (east bank of the Huang-pu River), frequently showcased in the international press as the "new face of China".

Till the mid-1980s, the Pudong District of Shanghai was largely an agricultural area in town which could be reached by ferry service only. This would change in the late 1980s and 1990s when the New Pudong Area Special Economic Zone

including the Lujiazui Financial and Trade Zone was introduced in 1990. It allowed foreign direct investment and encouraged massive economic development in this part of town. A corner stone of the changes was the re-opening of the Shanghai Stock Exchange in November/December 1990 (after the longtime prominent role the Shanghai stock market had played from 1920/21 to 1941). The SSE is now the leading stock market on the mainland and the 6th largest stock exchange worldwide in terms of market capitalization. The largest stocks traded at the SSE include Petro China, Sinopec, China Life and several leading banks in China. Dozens of regional headquarters of international corporations relocated to the Lujiazui Financial and Trade Zone area. With the establishment of the New Pudong Area the growth of hi-tech and service industries in Shanghai accelerated. The Pudong District is the location of many new ventures in the information industry, most notably in the 17 km² large Zhangjiang Hi-Tech Park area, in the Jingqiao Export Processing Zone and the Waigapoqiao Free Trade Zone. The financial and insurance industry, real estate and tourism service sectors gained enormously both in the Pudong District and city wide. It was also in the Pudong area that the 2010 World Expo was held. The event attracted seventy million of visitors and showcased new developments in China and worldwide. The World Expo was in the tradition of Shanghai's leading role in international trade, technology, the media, film production and fashion in China. Another major Pudong project in the entertainment field is Shanghai Disneyland to be opened in 2015. It is a joint venture between The Walt Disney Company and the Shanghai Shendi Group, a state owned company working in collaboration with the Shanghai Lujiazui Group, Shanghai Radio, Film and Television Development Company and Jinjiang International Group Holding Company. The Pudong District's population has risen to over 5 million, with a growth of nearly 2 million new residents during the past decade 2000 to 2010. Most of the new residents come from other provinces in China (Fig. 7.22).

Shanghai is the railway hub and the airline hub in China. It owns the largest container port in the world. Since its inception as a special economic zone the New Pudong Area has been more and more effectively connected with Shanghai's Downtown area (on the west side of the Huangpu River) with four bridges and several tunnels. The citywide highway system has seen substantial improvements, to currently close to 400 miles in total length, as car ownership in the city has dramatically increased. At the same time the Municipality of Shanghai has made major strides in expanding and modernizing the subway system. The Shanghai Metro's number of lines and current length is comparable to that of the subway systems in London and New York. Several new lines are in the planning and/or implementation phase. Since 2000 Shanghai has two international airports, the older Shanghai Hongqiao International Airport (west of the Downtown area) and the Pudong International Airport. The latter has seen considerable increases in passenger volume, to more than 41 million in 2011. Both Shanghai airports have a joint volume of about 75 million—comparable to that of the new Peking Capital Airport and significantly more than that of the Hong Kong airport. The Pudong airport is connected to the financial area with a 30 km (18.6 miles) long magnetic levitation train (“Shanghai Maglev Train”) that reaches a maximum speed of 430 km/hour (268 miles/hour). This

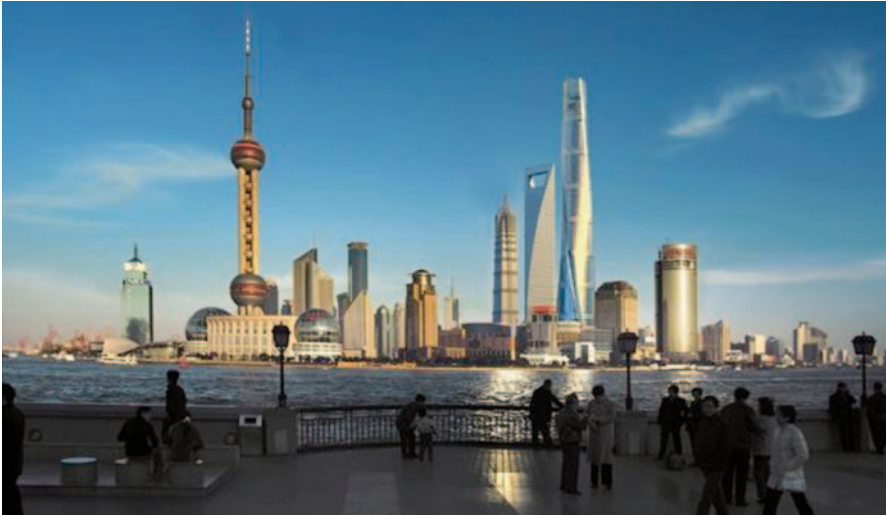


Fig. 7.22 Skyline of Pudong

innovative link to the airport and the subway system underlines the willingness of the city officials and their planning departments to break new ground in transportation technology.

Needless to say Shanghai is also well connected within the national high-speed railway system. The Beijing-Shanghai line was opened in 2011 reducing the travel time for the 1,300 km (800 miles) distance to less than 5 hours.

Shanghai is in the process of fully developing its Yangshan Deep Sea Water Port, south of the Municipality in the Hangzhou Bay. The port is connected to the city/mainland with the 32.5 km (20 miles) long Donghai Bridge which opened in 2005. The new Yangshan Port has the potential of making the Shanghai port the leading shipping center in Asia and worldwide.

Lilong Shikumen is a traditional housing structure in Shanghai which was very common in mid/late 19th century and in the first half of the Twentieth century. Shikumen along an alleyway are two or three story buildings with a stone gate (“shikumen”) and a courtyard allowing sunlight and rain to reach the ground. This type of building represents a blend of American type townhouses and homes built in the tradition of the Lower Yangtze architecture. By 1949 there were more than 9,000 shikumen style buildings in the Municipality of Shanghai comprising about 60% of the housing stock. In the 1950s and 1960s, when Shanghai’s population grew by leaps and bounds, many shikumen were subdivided and sublet which resulted in very crowded living conditions in town.

In the reform period after 1978 Shanghai families began to move to larger apartments and eventually in the 1990s and the first decade of the 2000s to the ubiquitous modern high rise residential towers in town. Nevertheless, shikumen continue to stand for an important Shanghai tradition and way of life. In recent years, locally produced films and TV series have portrayed this side of Shanghai from the

1920s/30s; the production of “Shanghai Shanghai” and other series have found a wide distribution within China and in Asia responding favorably to a romanticized picture of ‘Old Shanghai’ including a recreation of the main shopping street Nanjing Road and Shikumen of that era.

As the local economy restructured and became more service and consumption oriented in the past years the shikumen environments were socially and structurally affected as well. Many lilong shikumen areas lacking modern amenities were bulldozed and replaced by high rise structures. The most prominent case of a redesigned and rebuilt shikumen lane is Xintiandi (“New Heaven and Earth”) once hailed as the site of the first congress of the Communist Party of China. The neighborhood was redeveloped by Shui On Land (from Hong Kong) which hired American architect Benjamin Wood and Nikken Sekkei International (from Japan) to redesign Xintiandi in the mid-2000s. It is a widely recognized rejuvenation project that introduced “the concept of adaptive reuse” (Rutcosky 2007) thus helping to maintain a preexisting vernacular architecture to survive in a rapidly changing city environment. As adaptive reuse of Shikumen, Xintiandi contributes towards a more sustainable architecture otherwise endangered of being eradicated. Visitors and locals alike are drawn to this new type of a mixed-use urban setting combining traditional housing elements with new boutique style stores and cafes/bistros/restaurants (Balfour 2007). It has become the home of local elites and expatriates as most Shanghainese were priced out. The southern block alleyway includes an Open House Shikumen Museum. The economically successful urban renewal project led to the displacement of 3,500 Shanghai families—an implication which has been one of the many consequences of Shanghai’s rapid transformation to a more cosmopolitan city.

7.8 Conclusions

In this chapter we have explored six Mega-regions in the United States and China. An examination of the geographic, economic, transportation and spatial structures of these Mega-regions has resulted in a broader understanding of the similarities and differences that exists among Mega-regions in the two countries. Interestingly, the path to the development of Mega-regions in each country are vastly different. The formation of America’s Mega-regions was the result of a market-oriented economy with little interference from the national government. Cities in the United States tend to be incorporated around economic concerns and urban competitiveness rather than administrative exercises. The development of urban agglomeration is based on individual and cooperative development of the cities, while the central cities play the key role in coordination and management. The industrial structure and spatial layout of these cities are the results of market competition. The type and scale of the cities are diverse and together form an organic entirety.

There are, however, some limitations in the American model. Lack of effective coordination between cities, states and the federal government has resulted in relatively weak regulatory capacity related to urban planning. For example, cities

develop policies to improve their own urban competitiveness which inevitably causes redundant construction, waste of resources and excessive competition. The internal stakeholders in American cities have a strong awareness of their rights. As a result of strong property rights, there is an intense conflict of interests and tensions in the American model, which makes planning difficult. For example, during the reconstruction of an old industrial area in San Francisco, poor coordination and a lack of communication have led to delays and poor use of resources.

In China, cities are developed in accordance with State led administrative initiatives. The dual social structure of urban and rural areas restricts the process of urbanization. For example, the identity system, education system, employment system, public service, and public finance systems have huge gaps between urban and rural areas. In fact, urban development policy in China “strictly controls the size of large cities and rational development of medium-sized and small cities”. This policy was developed based on the household registration system management rather than from the perspective of economic and social development.

The current dual structure of the rural-urban division in China is gradually changing through modernization processes. The large rural migration into urban areas is an irresistible trend that will continue to occur in China into the foreseeable future. The development of urban agglomerations in China needs to break through the restrictions of administrative divisions and begin to adjust through market competition. This in the end will help to optimize the allocation of internal resources in urban agglomerations. However, the government should also still have a role in determining the various functions of cities and the division of labor according to regional advantages and resources of the cities.

In the end, the Mega-regions of China, the United States and the world face many of the same challenges from traffic congestion, escalating land rents, and environmental degradation. These challenges are not easily dealt with and due to the multi-jurisdictional nature of these issues cooperation among varying political entities at the local and national level will be of critical importance. How countries manage these urban agglomerations will determine if we are able to minimize the negative side effects of Mega-regions and take advantage of the economic opportunities that Mega-regions afford.

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