

A Study on the Coordinated Development of the Urban Areas around the Qinba Mountains

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Abstract: Urban areas around the Qinba Mountains in China's geographical center include the Chengdu–Chongqing, Guanzhong, Wuhan, and Zhongyuan urban agglomerations. Under China's new Belt and Road Initiative and multilateral opening-up strategy, the coordinated development of urban areas around the Qinba Mountains is crucial to Midwest China's economic growth, protection of the ecological environment, and the alleviation of poverty in these mountainous areas. However, due to the large geographical distances involved, linkages between these urban agglomerations are poor. Based on the experiences of foreign megalopolises, the author suggests that priorities for the coordinated development of the urban areas around the Qinba Mountains include their spatial organization, rapid transit, and the cooperative division of industrial labor.

Keywords: Qinba Mountains, megalopolis, coordinated development

1 Introduction

The Qinba Mountains and their surrounding regions are in need of protection and development. The support of neighboring cities in the region will be required to effect successful ecological protection, alleviate poverty, facilitate immigration, promote industrial development, and reorganize urban and rural communities; only by establishing a solid basis for coordinated development in the surrounding cities can we jointly promote the environmental protection and development of the Qinba Mountains region. The implementation of China's Belt and Road Initiative has already begun to alter the spatial pattern of national land, and the urban areas around the Qinba Mountains—the Chengdu–Chongqing, Guanzhong, Wuhan, and Central Plains urban agglomerations—will thus face greater unknowns as well as opportunities with respect to China's emerging strategic position. These events are closely related to the future protection and development of this region, and the coordinated development of these urban areas is therefore a research subject of great significance.

Beginning with a discussion of how national land use patterns have evolved, this paper examines land use patterns in Midwest

China in the context of the Belt and Road Initiative, clarifies the circumstances confronting urban areas around the Qinba Mountains, and analyzes these areas from the larger context of the protection and development of the Qinba Mountains. Based on a self-analysis of competitiveness, this paper proposes a coordinated development path for these urban areas that would also support protection and development of the Qinba Mountains.

2 Overview of the urban areas around the Qinba Mountains

2.1 Determining the scope

The cities surrounding the Qinba Mountains that are described in this paper regard the Qinling–Bashan Mountains as a shared source of ecological resources. These cities are geographically distributed around the Qinba Mountains and the hinterland. The term hinterland includes both the urban areas described earlier and the Qinba Mountains themselves. Because the surrounding cities are closely tied to the mountains, these cities have to be studied in their entirety. They are also core

Received date: 26 July 2016; **revised date:** 5 August 2016

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Funding program: CAE Major Advisory Project "Study on the Green & Circular Development Strategy of the Qinba Mountains" (2015-ZD-05)

Chinese version: Strategic Study of CAE 2016, 18 (5): 010–016

Cited item: Zhou Qinghua, Niu Junqing. A Study on the Coordinated Development of the Urban Areas around the Qinba Mountains. *Strategic Study of CAE*, <http://10.15302/J-SSCAE-2016.05.002>

components of Midwest China’s cities under the Belt and Road Initiative. As such, they are crucial to Midwest China’s economic growth and balancing the development between China’s eastern and western regions. The achievement of these desired outcomes depends on coordinated development, and research on this subject is thus essential to the protection and development of the Qinba Mountains. The surrounding cities are located in six provinces (municipalities): Hubei, Shaanxi, Sichuan, Henan, Gansu, and Chongqing. Excluding county-level cities, there are 34 cities: Chongqing, Chengdu, Deyang, Mianyang, Guangyuan, Guang’an, Suining, Nanchong, Dazhou, Bazhong, Xi’an, Baoji, Weinan, Hanzhong, Ankang and Shangluo, Wuhan, Shiyan, Yichang, Xiangyang, Jingmen, Xiaogan, Jingzhou, Suizhou, Zhengzhou, Luoyang, Pingdingshan, Sanmenxia, Nanyang, Xinyang, Zhumadian, Lanzhou, Tianshui, and Longnan.

2.2 Scale

The Qinba Mountains and surrounding urban areas have a population of 197.27 million people, and a GDP of 7988.169 billion yuan. These areas extend over 5.73×10^5 km² [1]. National land use patterns can be compared to the urban agglomerations in Beijing, Tianjin, and Shijiazhuang (Jing-Jin-Ji) in the East, and to the Yangtze River Delta and the Pearl River Delta in the West. Research on urban areas around Qinba Mountains, including the Qinba Mountains region itself, covers a large land area that accounts for nearly 6% of China’s total land area; compared to the three urban agglomerations of Eastern China, Qinba Mountains’ land area is the largest. Qinba Mountains and surrounding urban areas account for 14.5% of the Chinese population, second in proportion only to the Yangtze River Delta, and the population in the hinterland accounts for a relatively large portion of the total. At 14.04% (Table 1), the economy of the urban areas around the Qinba Mountains ranks second nationally, next to that of the urban agglomeration in the Yangtze River Delta. In summary, the land area, population, and economy of the urban areas around Qinba Mountains are relatively large, and so they are a significant factor in the country’s land use development.

2.3 Geographical relationships

Urban areas around the Qinba Mountains are situated in our

country’s geographical center. From the perspective of development support, the urban areas around the Qinba Mountains include the Guanzhong, Zhongyuan, Chengdu–Chongqing, and Yangtze River urban agglomerations, and extend to the Liangjiang, Xixian, Tianfu, and Lanzhou New Areas, all of which have benefited from the advantages of being situated in Midwest China. Urban areas around the Qinba Mountains are linked to the Silk Road Economic Belt (Xi’an, Lanzhou) in the North, the core portal of the Silk Road Economic Belt (Xinjiang) in the West, and the central support area (Chongqing, Wuhan) of the Yangtze River Economic Belt and Kunming and Nanning through Guiyang to the South. Its position has given it the advantage of having ready access to the Silk Road Economic Belt, the Yangtze River Economic Belt, and the Maritime Silk Road. Given their unique locations and solid development foundations, urban areas around the Qinba Mountains are advantageously situated for development in the Midwest China.

3 Evaluation of the patterns of urban areas around the Qinba Mountains under the Belt and Road Initiative

3.1 Evolution of the national land spatial pattern

Any country with a large land area will have various land use development patterns that account for different development strategies. In the United States for example, during its early history eastern industrial cities were the focus of industrialization, and land use was polarized. With the development of the Pacific trade and domestic demand for western development, a gradual westward movement tilted the center of focus to the Midwest, and eventually three major urban agglomerations were created—Boston–Washington, D.C., Chicago–Pittsburgh, and Los Angeles–San Francisco—that together represented the balanced development of national space [3].

Since the establishment of People’s Republic of China, its land spatial patterns have undergone four primary stages: ① during the 1st Five-Year Plan, 156 key projects representing the early stages of development were undertaken; ② during the Third Front Movement, a special development stage during which construction was turned toward the Rear Area; ③ an unbalanced stage of development in the coastal areas during the early stage of reform and opening up; and ④ a multi-faceted, balanced stra-

Table 1. The development scales of the four urban agglomerations [1].

Area	Land area		Total population		Regional GDP		Urban quantity
	Area (×10 ⁵ km ²)	Proportion (%)	Population (million people)	Proportion (%)	GDP (billion yuan)	Proportion (%)	
Jing-Jin-Ji	2.17	2.26	109.20	8.03	6221.022	10.94	13
Yangtze River Delta	3.53	3.68	218.82	16.08	13955.67	24.53	41
Pearl River Delta	0.55	0.57	57.15	4.20	5306.96	9.33	9
Qinba Mountains	5.73	5.97	197.27	14.50	7988.169	14.04	34

tegic shift after 2000, which included the opening of coastal cities, development of the West, the economic growth of Midwest China, the revitalization of Northeastern China, and the proposed Two-Horizontal Three-Vertical Urbanization Strategy [3].

3.2 Demand for the national Belt and Road Initiative

Over the years, our land area has been subjected to an unbalanced development pattern, with the eastern shore as the new frontier, and the western inland as a source of resources. Under these circumstances, Belt and Road Initiative is an important national strategy that opens up a new channel to the West. It has begun to mitigate the polarization caused by the national spatial strategy, as China's western region has become a new frontier providing access to the West. Changing geopolitical, socioeconomic, technological, and cultural factors are influencing land use patterns, and this is particularly so in Midwest China. The goal of China's 13th Five-Year Plan is to expand the urban agglomerations and so further strengthen the overall pattern of the Two-Horizontal Three-Vertical Urbanization Strategy. New trends will surely require urban agglomerations to assume responsibility for opening the western region, thereby resulting in a development pattern that places equal importance on the East and the West, is open in all directions, integrates the land and the sea, and connects the North with the South. It is now essential to determine how and where urban agglomerations can truly realize the Belt and Road Initiative.

3.3 Pattern trends of densely populated homeland cities in the West China

In terms of land resources, the Hu Line represents the stable population distribution of the past few decades, as well as the aggregate state of relevant urban development factors (ecological, economic, social, and cultural). The mid-east region of China's geographical territory, which lies to the east of the Hu Line, contains 96% of the country's population. The densely populated eastern region has three major urban agglomerations: the Yangtze River Delta, the Pearl River Delta, and Jing-Jin-Ji. The densely populated areas in the West, near the Hu Line, should develop urban agglomerations that can both open up to the West and balance the eastern and western regions of the homeland, as determined by China's natural geography and socioeconomic conditions. Unlike the United States, with its urban agglomerations of Los Angeles and San Francisco on the Pacific coast, the plateau and desert regions of Western China typically support only scattered cities and towns. The area north of the Tianshan Mountains, with Urumqi as the core city, has the potential to achieve a certain scale and maintains regional relationships with central Asian countries based on nature, trade, culture, and other aspects. However, many factors make it unsuitable as a core city at the regional level, or as the western gateway for the Belt and

Road Initiative. For these reasons, national-level urban agglomerations in the West that are intended to assume the functions of the Belt and Road Initiative should be situated in the Chengdu–Chongqing–Guanzhong region.

3.4 The Chengdu–Chongqing–Guanzhong urban agglomeration is crucial to opening the West

How a city develops depends on its location, self-aggregation, operational capacities, and other factors. When cities are similar in terms of location and other factors, they are likely to try to differentiate themselves from one another by competing over operational capacities. In this sense, cities in the West such as Chongqing, Chengdu, Xi'an, Lanzhou, Zhengzhou, and Wuhan are all independent and have demonstrated this behavior. The Chengdu–Chongqing urban agglomeration, with its multi-valued elements of population and economy, undoubtedly has comprehensive advantages; its only poorness with regard to opening the West is geographical. For example, its transportation network is less developed than that of the nearby cities and towns in the Guanzhong. Thus, the Chengdu–Chongqing and Guanzhong urban agglomerations complement one another. Chengdu–Chongqing's integrated advantages couple with Xi'an's location and its other advantages in the fields of science and education, and its culture. This will promote the formation of a Chengdu–Chongqing–Guanzhong urban agglomeration that is well suited to providing the logistical requirements needed to implement the Belt and Road Initiative, while promoting the coordinated development of the urban areas around the Qinba Mountains. How this process may unfold is described next.

The Chengdu–Chongqing–Guanzhong core supporting area will be formed first. The Chengdu–Chongqing urban agglomeration's multiple advantages include its access to financial information, a manufacturing industry, strength in science and education, human resources, and its hinterland market. As the biggest urban agglomeration near the Hu Line, whether as a result of the demands of the hinterland's spillover or the requirements associated with a channel opening up to the West, the Chengdu–Chongqing urban agglomeration will begin to be associated with the nearby Guanzhong urban agglomeration. A core urban agglomeration that combines the advantages of Xi'an's position and factors will be developed, connecting with Urumqi through Lanzhou (Land Silk Road) and with Kunming through Guiyang (Maritime Silk Road), which ultimately creates a conversion platform for the Belt and Road Initiative. Meanwhile, the Wuhan–Zhengzhou urban agglomeration will undertake coordinated development using the national transportation network, and a double-vertical pattern of Wuhan–Zhengzhou and Chengdu–Chongqing–Guanzhong will form in the area surrounding the Qinba Mountains. Finally, connections between the Chengdu–Chongqing–Guanzhong and Wuhan–Zhengzhou urban agglomeration will be strengthened, gradually forming a Two–

Horizontal Three-Vertical pattern supported by the central urban agglomeration, and a coordinated and networked pattern of development will begin to appear in the central green heart and outlying urban areas of the Qinba Mountains.

4 Analysis of the current level of urban agglomeration coordination around the Qinba Mountains

The motto of Qinba Mountains since ancient times is “Hard Road to Shu.” These mountains form a natural barrier to human settlements in the surrounding areas. Since national reform and opening up has been implemented, traffic conditions have improved, and with them the potential for interactions between the surrounding urban areas. The exchanges that occur between the cities remain poor, because of the cities’ physical features.

4.1. Current degree of coordinated contact

This paper analyzes traditional spatial economic linkages to evaluate the extent of the interactions between the urban agglomerations around the Qinba Mountains. Additional analyses are based on traffic flows and public service facilities. The formula for quantifying spatial economic linkages is premised on the following spatial interaction principle:

$$R_{ij} = \frac{\sqrt{P_i \times G_i} \times \sqrt{P_j \times G_j}}{D_{ij}^2}$$

Where R_{ij} represents the intensity of spatial economic relationship between the two cities i and j (100 million yuan·10 000 people·km⁻²), P_i and P_j are the cities’ resident populations, G_i and G_j are the cities’ GDP, and D_{ij} is the land distance between the two cities [4].

This study analyzed the intensity of spatial economic relationship between 34 cities (561 city pairs) from the urban agglomerations around the Qinba Mountains. These relationships were found to be relatively poor, with city pairs that the intensity of spatial economic relationships is less than 10 accounting for 80% of the city pairs, and only 12 city pairs that the intensity of spatial economic relationships is more than 100 (Fig. 1). Based on a comparison of the intensity of spatial economic relationships between urban areas around Qinba Mountains and those in the Yangtze River Delta, the Pearl River Delta, and Jing-Jin-Ji (Table 2), analyses shows that cities surrounding the Qinba Mountains rank lowest on both the total intensity of spatial economic relationships (S_{ij}) and the intensity of spatial economic relationships of each two urban (F_{ij}) [5]. This is explained by the distances between cities, and by their relatively poor economic activity and small populations.

To assess their collaborative potential, this paper also analyzes traffic levels, public service facilities, and other factors that characterize the core cities around the Qinba Mountains. Chongqing, Chengdu, and Xi’an have relatively greater traffic flows (Table 3), suggesting that potential transportation relationships between the Chengdu–Chongqing and Guanzhong urban agglomerations are relatively closer than those of the other

Table 2. Spatial economic relationships in the four big urban development zones [1] (100 million yuan·10 000 people·km⁻²)

Area	S_{ij}	F_{ij}
Pearl River Delta	19 918	553
Yangtze River Delta	35 120	43
Jing-Jin-Ji	9 875	123
Qinba Mountains	6 369	11

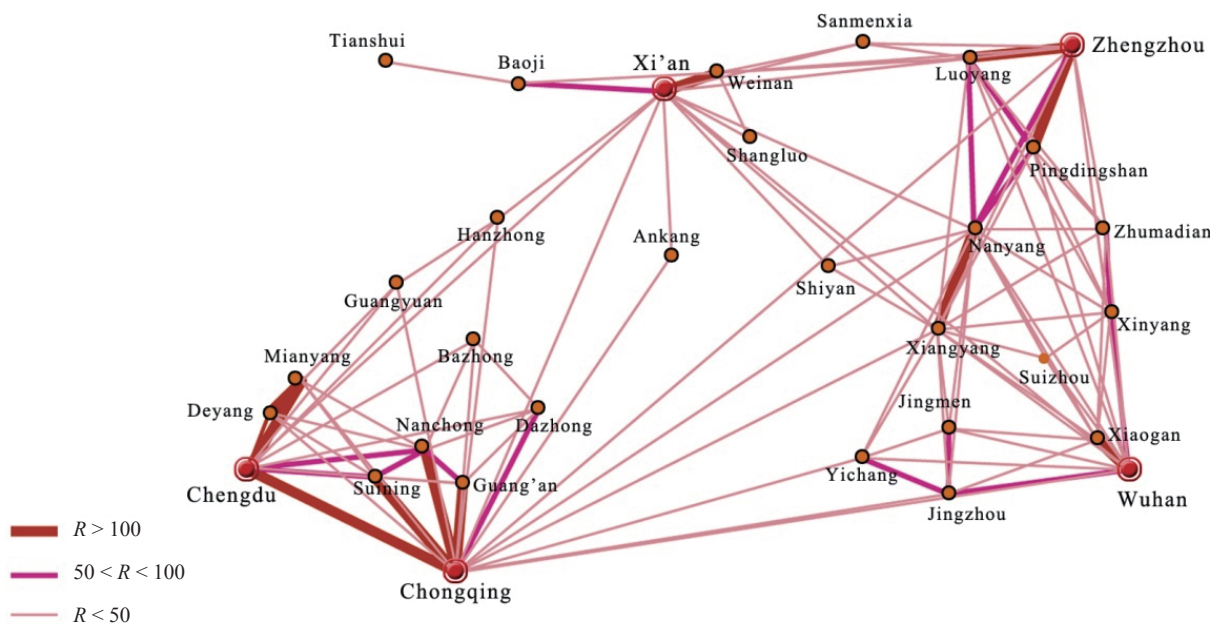


Fig. 1. Spatial economic relationships within the urban agglomerations around the Qinba Mountains.

Table 3. Relevant values of the relationships of the five core cities [6–10].

City	Air passenger throughput (10 thousand)	Road passenger throughput (100 million)	“Project 985” university	“Grade 3, Class A” hospital	Research institute
Chongqing	3 239	6.48	1	64	46
Chengdu	4 200	1.32	2	25	30
Xi’an	3 265	1.96	3	24	51
Wuhan	1 728	1.14	2	25	23
Zhengzhou	1 730	0.84	0	15	21

urban agglomerations. Chongqing, Chengdu, and Xi’an are also relatively strong in terms of science and technology education, with six “Project 985” universities and 127 research institutes, and therefore they have capacity to develop a national center for science and technology education in the mid-west region; doing so would help to alleviate lack of access to education and promote development in this region. Meanwhile, Chongqing, Chengdu, Xi’an, Wuhan, and Zhengzhou are able to guarantee central cities access to integrated medical and public service functions. In sum, although the urban agglomerations around the Qinba Mountains are constrained by distance and poor economic relationships, the core cities do have significant potential in terms of their transportation relationships, their educational relationships, and their public services.

4.2 Analysis of difficulties

Cities around the Qinba Mountains have poor connections with each other, and remain in the early stages of independent development. The problems confronting regional coordinated development are twofold.

First, due to the long straight-line distances between core urban agglomerations, the time and transportation costs needed to initiate coordinated development are overwhelming. The Guanzhong urban agglomeration are 600 km from the Chengdu–Chongqing urban agglomeration (geodesic distance), and 650 km from the Wuhan urban agglomeration; the Chengdu–Chongqing urban agglomeration is 760 km from the Wuhan urban agglomeration, and 880 km from the Central Plains urban agglomeration; the Wuhan urban agglomeration is 450 km from the Central Plains urban agglomeration; the Central Plains urban agglomeration is 400 km from the Guanzhong urban agglomeration. The length of the ring road around the Qinba Mountains’ surrounding cities is 2 500 km. In contrast, the length of the northeast–southwest axis of the US Boston–Washington, D.C. megalopolis is only 966 km, the length of the Tokyo–Osaka megalopolis in Japan is only 400 km, and the overall length of the Randstad urban agglomeration’s ring green heart in the Netherlands is less than 200 km [11]. The main problem facing coordinated development of the urban agglomerations around the Qinba Mountains is the significant distances between centers.

Second, the intrinsic attractions of the core urban agglomerations must be strengthened, since the cities’ primary function is

serving the hinterland, and they lack external functions. In recent years, Chongqing’s core competitiveness in financial services, foreign trade, and industrial advancement has grown continuously, thereby creating centers for these activities in the mid-west region. Apart from Chongqing, however, Chengdu, Xi’an, Wuhan, Zhengzhou, and other cities’ main functions still serve the hinterland population. Scientific and technological innovations, information transfers, logistics distributions, and other functions still need to be improved. A lack of internal urban competitiveness cannot influence the areas outside the agglomeration. This is an important concern, since it is currently hindering the formation of a coordinated system for the urban agglomerations around the Qinba Mountains.

5 A coordinated development path for the urban agglomerations around the Qinba Mountains

Belt and Road Initiative and the Ecological Civilization Strategy provide a rare historical opportunity to initiate the protection and development of the Qinba Mountains. Only green and sustainable development and ecological civilization construction can support implementation of the Belt and Road Initiative and lead to a new path of development. Simultaneously, the resources and urban development opportunities created by the Belt and Road Initiative offer powerful ecological protection and poverty alleviation measures, thereby supporting a platform on the periphery of the Qinba Mountains, and promoting interest in the area’s development. Therefore, promoting the coordinated development of the cities surrounding the Qinba Mountains has multiple benefits. The three-part path leading to coordinated development is described next.

5.1 Constructing a green heart pattern, maintaining an ecological base

The Qinba Mountains provide an ecological foundation for the surrounding cities, so the coordinated development of these cities depends on the mountains’ ecological protection. Compared with China’s other large urban agglomerations, the spatial patterns of the cities surrounding the Qinba Mountains have prominent ecological features that include the Qinba Mountains as the central green core. As has been learned from foreign development experiences, the ideal development of a metropolitan

area involves not only contiguous high-density urban areas but also intervals of green space created by mountains, rivers, and farmland, thereby integrating urban and natural ecological regions. Therefore, the coordinated development of the Qinba Mountains' surrounding cities should highlight the region's ecological advantages, thereby unifying the Qinba Mountains' objectives for ecological protection, and integrating the green heart space in the main urban area, with national parks as their core. This pattern has two important aspects. First, it highlights the ecological protection and construction of the hinterland green heart in the Qinba Mountains. Second, it precludes continuous development of the peripheral urban area, and guides the formation of a beaded scatter and small-concentrated urban layout models. Therefore, on the premise of maintaining the beaded state and satisfying modern demands in the Qinba Mountains' peripheral cities, and especially its big cities, development should focus on the populations and economic growth in the cities and towns in the mountainous areas, thus forming a strong core of functional urban advantages. The scale of urban development in the Qinba Mountains should be coordinated with the core urban functions provided at the periphery, combined with the original infrastructure in Third Front Movement. Science and technology should be developed, together with precise and green industries, while simultaneously paying attention to the needs of the urbanized population and developing the service industry.

5.2 Promoting fast transport, breaking spatial barriers

Rapid transportation technology is necessary to achieve long-distance spatial cooperation. Super high-speed rail trains and magnetic-levitated trains have the effect of shortening physical distances. Therefore, coordinated development of the cities surrounding the Qinba Mountains must include the construction of rapid transportation channels. Similar developments in comparable cities in countries bordering the Alps still allow for convenient traffic flows, although the Alps is also blocked from neighboring cities from these countries such as Switzerland, Austria, and Germany. Existing and under-construction rapid transportation lines in the Qinba Mountains region have demonstrated advantages; further logistical planning and construction will surely result in a low-cost ecological transportation system with high overall efficiency, so physical distances will no longer be an obstacle.

Based on the existing Longhai Railway and the east-west transport corridor in the north shore of the Yangtze River, a transport corridor should be built to extend along the Qinba Mountains through Zhengzhou to Wuhan, Lanzhou to Chongqing, and other lines. A number of existing national rapid transportation lines in the internal ring road should be enhanced, by constructing a rapid rail transport network between the Chengdu–Chongqing and the Guanzhong urban agglomerations, and accelerating the operations of the Xi'an–Chongqing, Xi'an–Wuhan, and Xi'an–

Chengdu high-speed railway. Doing so would form the backbone of a linear + circular transportation network that would connect the urban areas around the Qinba Mountains to the green heart, and provide fast and linear transportation—including rail transit, general aviation, and other technological means—through the green heart, while connecting the urban areas with other cities.

With the advent of the Internet, traditional concepts related to location and distance have been greatly altered, as information technology has gradually obviated the need to move physically from one location to another. Instead, industrial collaborations can occur across large spatial distances, and this collaboration is consistent with the ecological protection goals for the Qinba Mountains. Consequently, the use of these technologies has been developed vigorously in the Qinba Mountains, and the technological capacity now exists to initiate coordinated economic development remotely.

5.3 Promoting external functions, and strengthening motivations for coordination

A lack of competitiveness among the core urban areas has led to the current lack of coordination between the cities surrounding the Qinba Mountains. Core cities should be encouraged to strengthen their advantages in external functions, and streamline their self-sufficient and self-governed function structure. The Chengdu–Chongqing urban agglomeration should strengthen its position as a regional financial center, and the Wuhan urban agglomeration should develop regional manufacturing and educational centers. The Central Plains urban agglomeration should highlight its functions as a logistical transportation service center. The Guanzhong urban agglomeration's functions as a scientific research and cultural center and a national defense and military base should be strengthened. Additionally, it is necessary to actively promote the cities' cooperation in areas of national defense and military, electronic information, equipment manufacturing, and new energy industry. Combined with Internet information technologies, it is very important to strengthen core cities' collaborations with regard to knowledge innovation, information exchange and coordination, and the regional division of labor.

6 Conclusion

The urban agglomerations around the Qinba Mountains are characterized by large scale and prominent regional values. These agglomerations are well situated to provide essential logistical support for the construction of a two-way, open, large-country development pattern. However, poor economic connections and the long spatial distances between cities hinder their ability to deal with issues such as ecological protection and poverty alleviation. These urban agglomerations—and particularly the Chengdu–Chongqing–Guanzhong urban agglomeration—should

be taking the initiative in opening the West. Coordinated development must be actively promoted to allow cities to realize their respective functions. The urban agglomerations around the Qinba Mountains should actively initiate their coordinated development by constructing green space patterns, promoting the construction of a rapid transport network, and complementing the functional division systems in dislocation, thus undertaking the historical mission in the Belt and Road Initiative.

References

- [1] Chinese Provinces and Cities Economy Development Yearbook Editorial Committee. China provinces and cities economy development yearbook 2014 [M]. Beijing: China Financial and Economic Publishing Houses, 2015. Chinese.
- [2] Liu M. Research on the development of American megalopolis in the second half of twentieth century (Doctoral dissertation) [D]. Xiamen: Xiamen University, 2006. Chinese.
- [3] Wang K. The four major changes of urban spatial structure in China in the past 50 years [C]. In: Urban Planning Society of China. Proceedings of planning for 50 years—Annual national planning conference 2006 (I). Beijing: China Architecture & Building Press, 2006: 9–14. Chinese.
- [4] Zhang W Q. Spatial structure of urban agglomerations and economic performance: By the case of China ten top urban agglomerations (Master's thesis) [D]. Guangzhou: Jinan University, 2014. Chinese.
- [5] Wang H J, Miao C H, Ru L F, et al. The spatial framework and change of Chinese provincial region economic links [J]. Economic Geography, 2012, 32 (7): 18–23. Chinese.
- [6] Xi'an Bureau of Statistics, National Bureau of Statistics Survey Office in Xi'an. 2014 Xi'an national economic and social development statistics bulletin [EB/OL]. (2015-03-26) [2016-08-01]. <http://www.shaanxi.gov.cn/0/1/65/365/371/191117.htm>. Chinese.
- [7] Chongqing Bureau of Statistics. 2014 Chongqing national economic and social development statistics bulletin [EB/OL]. (2015-03-16) [2016-08-01]. http://www.ccs.cn/news/2015-3/15_123241.shtml. Chinese.
- [8] Chengdu Bureau of Statistics. 2014 Chengdu national economic and social development statistics bulletin [EB/OL]. (2015-04-28) [2016-08-01]. <http://news.163.com/15/0428/05/AO8VR-R7400014O4P.html>. Chinese.
- [9] Wuhan Bureau of Statistics. 2014 Wuhan national economic and social development statistics bulletin [EB/OL]. (2015-03-12) [2016-08-01]. <http://www.huaxia.com/whtb/jjwh/2015/03/4310756.html>. Chinese.
- [10] Zhengzhou Bureau of Statistics. 2014 Zhengzhou national economic and social development statistics bulletin [EB/OL]. (2015-06-10) [2016-08-01]. <http://www.zztjj.gov.cn/zztj/tjsj/tjyb/zs/webinfo/2015/04/1427181435834684.htm>. Chinese.
- [11] Gottmann J, Li H, Chen X Y. Megalopolis: or the urbanization of the northeastern seaboard [J]. Urban Planning International, 2007, 22 (5): 2–7. Chinese.