

# Study on the Spatial Pattern of Zheng-Luo Dual-core Metropolitan Circle to Construct the Provincial Urban System

Yizhen Huang<sup>1,\*</sup>

<sup>1</sup>Henan Urban and Rural Planning and Design Research Institute Co., LTD

\*Yizhen Huang. Email: yizhen0816@163.com

## ABSTRACT

In the face of the new situation of economic globalization, the unique pattern of the urban system began to appear. Instead of the competition among cities in the region, it gradually showed the continuous development of multiple cities, thus deriving the concept of the metropolitan area as an important regional unit of the result of new urbanization. Based on the construction path and process law of metropolitan areas in developed areas at home and abroad, this paper analyzes the characteristics of socio-economic change by studying statistical data to identify the development and evolution characteristics of Zhengzhou and Luoyang dual-core cities in a metropolitan area, and discuss the strategy and practice of Zheng-Luo dual core spatial form stability and balanced development. It is of great significance to promote the development of the theory and method of the spatial pattern of new urbanization at the provincial level.

**Keywords:** *Urban System, Metropolitan Circle, Dual-Core.*

## 1. INTRODUCTION

From the perspective of international and domestic urban development trends, central cities and urban agglomerations are becoming primary spatial forms carrying development elements [1]. The spatial structure of China's economic development is undergoing profound changes [2]. Under the new situation, promote the harmonious regional development, the general idea is by objective economic laws to adjust the regional policy system, to play around the comparative advantage, promote the rational flow of all kinds of factors and effective concentration, strengthen the innovation and development, speed up the construction of the power of the development of a high-quality system, to enhance the advantage of regional economic development, such as the central city and urban agglomeration economy and population carrying capacity, to strengthen the functions of other regions in ensuring food security, ecological security, border security, etc., and to form a regional economic layout with complementary advantages and high-quality development [3].

## 2. DEVELOPMENT TREND OF REGIONAL URBAN PATTERN

### 2.1. Economic Agglomeration Promotes the Development of Urbanization

Industrialization is the primary driving force for urbanization [4]. With the advancement of economic and industrial modernization, the tertiary industry plays an increasingly significant role in promoting urbanization. Urban producer services and other tertiary industries in developed countries play a leading role in the urban economy [5]. With the development of industrialization and the increasing proportion of modern service industry in current industrial structure, the degree of economic agglomeration is improved, and the trend of significant urbanization is further apparent [6].

Globally, in both developed and developing countries, urban economic activities are concentrated from small cities to big cities. Population and wealth are concentrated in big cities. The number of big cities increases rapidly, resulting in the emergence of new urban spatial layout forms such as megacities, city circles and megalopolis [7]. In 1950, there were 71 megacities with a population of one million in the world. In 1960,

the number rapidly increased to 114 [8], gradually forming a series of megacities, such as the Atlantic coastal metropolitan belt in the northeast Of the United States, the metropolitan belt in the northwest of Europe, the metropolitan belt along the Great Lakes of the United States, and the Metropolitan belt in England, which have become the core of national economic development.

**2.2. The Development of Central Cities Drives Regional Economic Growth and Balanced Internal Development**

Metropolitan areas in the United States have a long history of formation. The 11 metropolitan areas, which

account for only 25.7% of the land area of the United States, gather 77% of the population and 89% of the total economic volume [9]. However, the regional division of labour among the States is relatively coordinated, and the per capita GDP gap is tiny.

However, China's provinces have a large gap in economic aggregate and per capita, and the proportion of GDP and population in each province is mismatched primarily [10]. From the perspective of the internal development of provinces, the economic and population matching degree of cities in developed regions such as Guangdong and Zhejiang is better than that of underdeveloped areas.

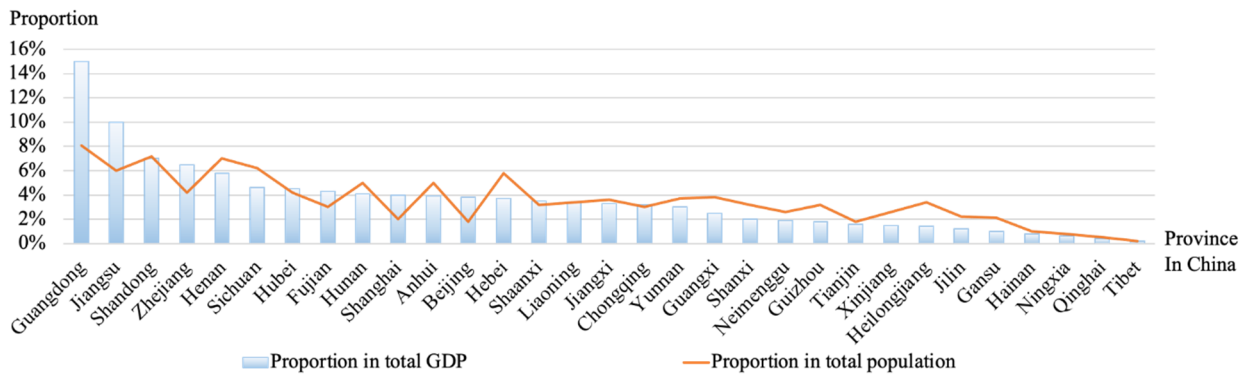


Figure 1 Analysis of GDP and population ratio of each province in 2020

In 2020, the economic aggregate of Henan province was mainly concentrated in Zhengzhou and Luoyang. Still, the population is not highly concentrated in the two cities, and the per capita GDP gap between provincial cities is enormous. From the internal development of Zhengzhou and Luoyang metropolitan circles, the

development of central cities is more conducive to the promotion of regional development level and balanced regional development. The development speed and per capita situation of counties and cities in Zhengzhou and Luoyang metropolitan areas are better than those outside the metropolitan areas.

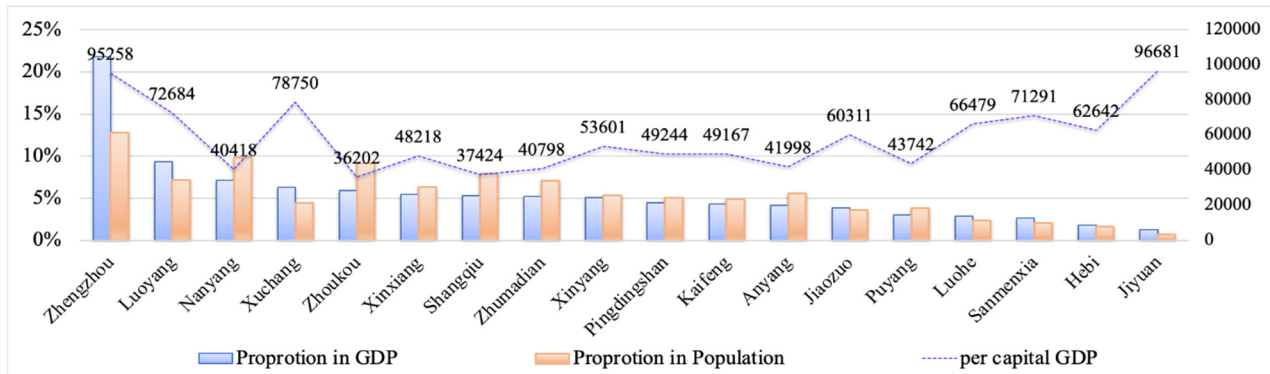


Figure 2 GDP, population share and per capita GDP gap in Henan province in 2020

Therefore, the goal of the balanced development is not the uniform distribution of regional economic aggregate, but the balance of labour productivity and real income, and the integrated development of the free flow of production factors is the primary premise.

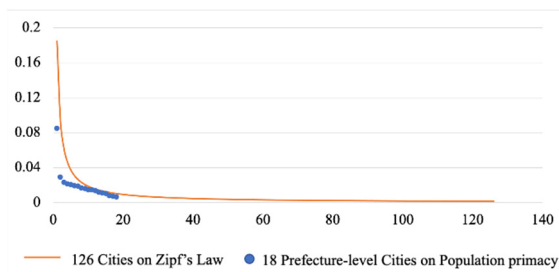
**2.3. The Slowdown of Economic and Population Agglomeration Will not Lead to the Decline of Agglomeration Degree**

From the perspective of urbanization development in developed countries, agglomeration development is an inevitable trend along with economic development, and the degree of aggregation gradually tends to be stable.

However, the gap between regions and economic development shows an inverted U-curve relationship [11]. In the early stage of economic development, the gap between regions grows overgrows, and gradually shrinks with further economic development.

**2.4. Henan is still in the stage of agglomeration and development**

Formed in 2020 in Henan province town scale system structure megacities 1 (Zhengzhou), type II 3 big cities (Luoyang, Nanyang, Kaifeng), a medium-sized city 10 (Shangqiu, Pingdingshan, Jiaozuo, Xinxiang, Anyang, Puyang, Luohe, Xinyang, Zhumadian), type I 16 small cities, There are 9 types II small cities. According to the model measures such as Ziff's law and city priming rate, the scale of central cities and regional cities in Henan is relatively small and still in the process of accumulation and development.



**Figure 3** Zipf's Law in Henan Province

**3. STRENGTHEN THE PROVINCIAL PATTERN OF ONE CIRCLE, TWO CORES**

**3.1. The Development of the Two Core Cities**

The development of the Zhengzhou metropolitan area has gone through three stages. The first stage is the urban Master Plan 2008, which put forward the concept of the Zhengzhou metropolitan area and determined the spatial structure of one main city and two circles. The second stage is the release of the Zhengzhou Metropolitan Planning, which proposes the multi-centre and group-type open space structure of one main city, three districts, three sub-districts and twenty-six new towns. The third stage is the Spatial Planning of Zhengzhou Metropolitan Area 2018, which proposes to build a spatial structure of one core, four axes, three belts and multiple points.

Since the founding of the People's Republic of China, Luoyang has compiled five rounds of overall urban planning. In 2020, Luoyang Metropolitan Area Planning was collected, which has gone through four stages of urban spatial layout: The stage of industrial city promoting agglomeration development, the stage of proposing the concept of the metropolitan area under the background of the central city in the west of central China, the stage of integrated development group city under the

background of the provincial sub-central construction, and the planning stage of Luoyang metropolitan area under the background of the sub-central city of Central China.

**3.2. Zhengzhou and Luoyang Accord With the Development Characteristics of Constructing an Integrated Metropolitan Circle**

Central cities were selected based on population size and national strategic needs (built-up areas with more than 5 million people and population density of one-hour commuting circle with more than 1,500 people/square kilometer as the basic threshold), and the scope of metropolitan areas was determined based on the connection degree of central cities (on the basis of the one-hour commuting circle of central cities. The cities with the average two-way floating population with the central cities accounting for more than 1.5% of the city's population were selected as the peripheral cities. The urban circle with Zhengzhou as the central city, including Luoyang, Jiyuan, and other cities, was evaluated to be in line with the development characteristics of the metropolitan circle.

**3.3. The Construction of Zheng-Luo Metropolitan Circle with Two Core Cities is Beneficial to Protect the Ecological Civilization along the Yellow River Jointly**

The Yellow River basin in Henan province covers an area of 36,200 square kilometres, of which the city of Luoyang covers 12,400 square kilometres, accounting for 81.8% of the city's area, and the city of Zhengzhou covers 2,000 square kilometres, accounting for 39.78% of the province's Yellow River basin area. Zhengzhou and Luoyang share the same cultural roots. Heluo Area is the core area of The Yellow River culture, and the inheritance of cultural deposits is the key to the implementation of the Yellow River strategy. The three ancient capitals (Luoyang, Zhengzhou and Kaifeng), the Silk Road, the Grand Canal and the Wanli Tea Ceremony converge in Heluo Area.

In September 2019, General Secretary Xi Jinping visited Henan province, saying that the Yellow River culture centered on the Culture of the Central Plains is an important part and the root and soul of Chinese civilization. We should promote the systematic protection of the Cultural heritage of the Yellow River, deeply explore the value of The Times contained in the Culture of the Yellow River, tell the story of the Yellow River well, continue the historical context, strengthen cultural confidence, and gather spiritual strength for the realization of the Chinese dream of great national rejuvenation.

Relying on the densely populated urban development framework of Zhengzhou and Luoyang, we will build a dual-core metropolis circle, which is the spatial carrier to support the ecological protection and high-quality development of the Yellow River Basin. It is not only conducive to strengthen the channel function of Zhengzhou and Luoyang on the Longhai Railway line, but also conducive to the linkage of Jiyuan, Jiaozuo, Xinxiang and other cities along the line to form the urban agglomeration in Central China.

### ***3.4. The Construction of Zheng-Luo Dual-Core Metropolitan Circle is Conducive to Improving the Overall Development Level of the Province***

By comparing the two metropolitan areas of Zhengzhou and Luoyang with the metropolitan areas of other regions in China, the integration of Zheng and Luo will greatly enhance the status of the centre of our province in the whole country. Zheng-Luo metropolitan circle covers 42,900 square kilometres, ranking seventh among 29 metropolitan areas nationwide. The total GDP of Zheng-Luo metropolitan area is 2.49 trillion yuan, accounting for more than 45% of the total GDP of the whole province, ranking fifth among 29 metropolitan areas in China.

Zhengzhou metropolitan area has changed from siphoning to absorbing high and leaving low, high-end elements and high-end industries have been gathering in the central city of Zhengzhou, while low-end elements and manufacturing have been flowing to the relatively marginal areas. The innovation ability of Zhengzhou is weak, but Luoyang is the biggest board city in Henan province to incorporate text brigade development model as the important fulcrum of regional industry transition development, to promote the Ancient Capital Luoyang Card for many years tourism tourist reception population and per capita income, and to gradually realize from the key industrial city to the historical and cultural city transformation. As one of the dual cores of metropolitan circle, Luoyang jointly lead the province to a new stage of innovative development.

## **4. CONCLUSIONS**

Compared with the booming metropolises globally, the gap of Chinese metropolises is not in core cities, but mainly in micro-centres and node cities. To maintain the stability and balance of the evolution of metropolitan areas, core cities should focus on solving the problems of large cities such as over-concentration of population and optimization of functional layout, and at the same time build metropolitan areas with the orderly division of labor and close coordination of various functional groups.

### ***4.1. Strengthen the Status of the Primary and Secondary Core Cities***

Follow the trend that the central city has become the main spatial form gathering all kinds of elements, concentrating the resources of the whole province, making Zhengzhou the national central city bigger and stronger, speeding up the pace of zoning adjustment, improving the scale and energy level, play a good role in the national team and develop into a peak. The core growth pole of central Plains urban agglomeration is built form the driving force core of high-quality development in central China and open the door to the outside world, and lead the province to participate in national and global competition. Based on making Wuhan bigger and stronger, Hubei province has pooled resources to build Xiangyang and Yichang sub-central cities successively, and actively planned and strengthened the construction of a transportation hub in Luoyang, to support the Luoyang sub-centre and form growth pole.

### ***4.2. To Foster a Comprehensive Multi-Centre Network System***

In terms of urban pattern system, the method of large, medium and small cities in Zheng-Luo metropolitan circle is perfect, and the polarization function of the central city is prominent. It is necessary to cultivate node cities with distinctive characteristics while developing core cities, to promote the coordinated development pattern of large cities with more than 500 thousand population, medium cities with more than 200 thousand population, and small cities with below 200 thousand population in the metropolitan circle.

In the aspect of the comprehensive transportation system, giving full play to the solid driving effect of the intercity railway and municipal railway on the development of the metropolitan area, work out and perfect the integrated development plan of rail transit in Zhengzhou and Luoyang metropolitan area, and build a metropolitan area with the public transport-oriented rail network.

### ***4.3. Darning Ecological Space and Strengthening Joint Control of Space***

Metropolitan area is an area with a developed economy and dense population, but also an area with serious ecological degradation and environmental pollution. Zheng-Luo metropolitan area should respect the natural landscape spatial pattern of mountains and rivers, take the Yellow River as the blue and green belt, Songshan mountain as the green core, to complement the landscape ecological space, and strengthen the space joint control mechanism of Zheng-Luo metropolitan area over the Yellow River basin and Funiu Mountain region.

Following the Yellow River basin ecological protection and development of the high quality, the metropolitan circle can full of upstream and downstream of the urban planning as a whole. It is necessary to promote the Yellow River management and build the green ecological network. Zhengzhou-Luoyang dual-core metropolitan circle not only guarantee the production and business operation space, but also to ensure that the periphery liveable ecological space and the agricultural efficient space.

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