

The Development of Regional Economic and Industrial Structure of Urban Agglomeration Based on Boston Matrix and Application Rules

—Taking Beijing Tianjin Hebei Capital Economic Circle as an Example

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ABSTRACT

Urban agglomeration plays a role of growth pole in the development of regional economy. As an important economic core in the north, the development of Beijing Tianjin Hebei capital economic circle has lagged slightly in recent years. This paper constructs the industrial development status and structure of Beijing, Tianjin and Hebei by using Boston matrix, analyzes and puts forward relevant policy suggestions by using a variety of application rules, and hopes to provide some references from the perspective of long-term development.

Keywords: Boston matrix; Urban Agglomeration, industrial structure, economic growth

1. INTRODUCTION

With the accelerating process of global economic integration and regional economic integration, urban agglomeration, as an important driving point of economic development, plays a role of growth pole in all regions. By the end of March 2017, China had formed 12 national urban agglomerations, including the Yangtze River Delta urban agglomeration, the Pearl River Delta urban agglomeration, the Beijing Tianjin Hebei Urban Agglomeration, the Central Plains urban agglomeration, the middle reaches of the Yangtze River urban agglomeration, the Chengdu Chongqing urban agglomeration, the Harbin Great Wall urban agglomeration, the central and southern Liaoning urban agglomeration, the Shandong Peninsula urban agglomeration, the West Coast urban agglomeration, the Beibu Gulf Urban Agglomeration and the Guanzhong urban agglomeration. A very obvious rule is that each urban agglomeration radiates outward in a circular or elliptical way around the central city, which can produce a agglomeration effect on the whole region and even the surrounding areas. From a global perspective, economists assert that urban agglomerations will be the basic unit of international competition in the 21st century. The cooperation, layout, competition and win-win between

urban agglomerations will determine the world economic pattern. As China's political and cultural center and an important core area of northern China's economy, Beijing Tianjin Hebei Urban Agglomeration shoulders the important task of protecting the stability and coordination of the capital economic circle. Therefore, studying its development and direction will help to offer some effective suggestions and development direction for decision-makers.

2. THE RELATIONSHIP BETWEEN URBAN AGGLOMERATION AND REGIONAL ECONOMY

Regional economy and urban agglomeration complement each other and are prerequisites and conditions for each other. Nowadays, urbanization is one of the main driving forces to promote regional economic growth. Wang Xiaoxin and Fu Sizheng (2021) believe that the coordinated, orderly and benign development of regional economy is an important cornerstone of the sustainable development of the economic circle built with urban agglomeration as the core [1]. The spatial structure and benign layout between cities can play the economic utility of twice the effort and half the effort through the agglomeration effect, become the growth pole of the

region, and drive the common development of the surrounding areas at the same time. Therefore, urban agglomeration and regional economy are interrelated, interdependent and play a role in each other. Ding Renzhong, Xu boyin and Zhang hang (2021) point out that the impact of urban agglomeration on regional economic growth is jointly affected by the spillover effect and siphon effect of core cities, and is related to the spatial distance and the economic level of core cities [2]. Their research results show that, as one of the four strategic core economic circles named by the state, Beijing, Tianjin and Hebei do not play an obvious role in driving the economy. However, urban competitiveness determines the competitiveness of regional economy in disguise. In response to the policy call of expanding domestic demand, Beijing Tianjin Hebei Urban Agglomeration should focus on improving urban competitiveness and optimize it from the perspective of adjusting spatial structure, accelerating urbanization and rural modernization, so as to maintain high-speed, stable and high-quality economic development. The research results of Chang Miao and Cao Haiqing (2021) show that: in the time dimension, the level of coordinated development of Beijing Tianjin Hebei Urban Agglomeration shows an unstable spiral upward trend; in the spatial dimension, the focus of coordinated development of Beijing Tianjin Hebei Urban Agglomeration shows obvious stages; At present, the degree of coordinated development of Beijing Tianjin Hebei Urban Agglomeration is still low [3].

3. BOSTON MATRIX THEORY

The BCG matrix is often called market growth rate relative market share matrix or four quadrant analysis. Its main connotation is that the general product structure is mainly affected by two factors: relative market share and sales growth rate, and the products are divided into the following four situations according to different situations, as shown in Figure 1:

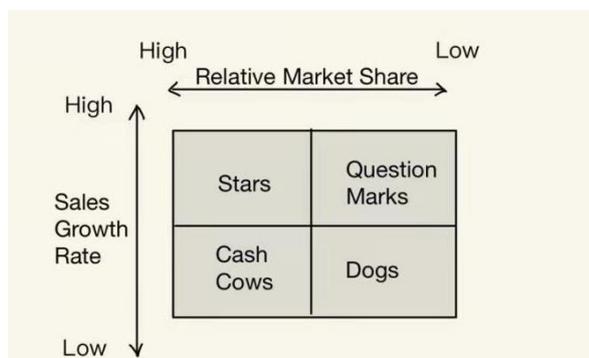


Figure 1. BCG matrix diagram

Among them, different products have different development prospects and coping strategies. The first is Star products, which means those with high relative market share and high sales growth rate at the same time,

have the greatest development potential, need to increase investment to support their rapid development, and aim to expand their market share. The second kind of Dog products refers to the product group with very low relative market share and sales growth rate. It can also be said that their failure is also called recession products. Generally, it is best to adopt retreat strategy and use elimination or merger to preserve the value. The third kind is generally called Cash Cow products. It refers to products with high market share but sales growth rate has reached a certain bottleneck. It is the key for enterprises to maintain competitiveness in the market. It does not need to invest additional costs to expand the scale (diminishing marginal utility of capital), but because Taurus products have lost room for growth, with the continuous renewal of social investment and technological progress, enterprises need to make timely decisions to drain their utilization value before they withdraw from the market. The fourth is the Question Mark product, which is a product group in the quadrant of high growth rate and low market share. The former shows great market opportunities and good prospects, while the latter shows problems in marketing. Enterprises need to implement principles and policies in a targeted manner, and need to have enough patience to wait for long-term development.

4. BOSTON MATRIX OF BEIJING TIANJIN HEBEI URBAN AGGLOMERATION

The premise of Boston matrix is that the research object needs to be the products of the same enterprise. Although the products may be different from each other, they are different individuals in the same environment (enterprise), in the same corporate culture, raw material source, etc. from the abstract part level, the products have a certain correlation. In this paper, Beijing Tianjin Hebei Urban Agglomeration is regarded as a whole. Different cities are different products. The economic links and spatial structure within the urban agglomeration provide good preconditions and credibility for the use of Boston matrix.

In order to improve the driving force of economic growth, Beijing Tianjin Hebei region urgently needs to reform the industrial structure, so the research will adopt the macro industrial structure. Due to the prevalence of China's market economy in recent decades, the urban-rural dual structure has been gradually broken, more and more floating people travel between urban agglomerations, the tertiary industry dominated by service industry has gradually occupied the mainstream, and the development of the tertiary industry has become an important task. Therefore, this paper will replace the "relative market share" in the original matrix with "relative proportion of employees in the tertiary industry"; replace the "sales growth rate" in the original

model with "the proportion of the added value of the tertiary industry in GDP". After querying the statistical yearbooks of various regions and the Yearbook of Chinese cities, the data collected for the prefecture level cities of Beijing Tianjin Hebei Urban Agglomeration

(Beijing, Tianjin, Zhangjiakou, Chengde, Qinhuangdao, Tangshan, Cangzhou, Hengshui, Langfang, Baoding, Shijiazhuang, Xingtai, Handan and Anyang) are as follows in Table 1:

Table 1. The relative proportion of tertiary industry employees and the proportion of tertiary industry added value in GDP of prefecture level cities in Beijing Tianjin Hebei Urban Agglomeration (2019)

Number	City	Proportion of employees in tertiary industry	Relative proportion of employees in the tertiary industry	Proportion of added value of tertiary industry in GDP
1	Beijing	84.4%	1.32	83.5%
2	Tianjin	61.9%	0.97	63.5%
3	Zhangjiakou	79%	1.23	55.6%
4	Chengde	73.8%	1.15	46.5%
5	Qinhuangdao	68.2%	1.06	54.3%
6	Tangshan	57.4%	0.9	39.9%
7	Cangzou	72.3%	1.13	52%
8	Hengshui	76.8%	1.2	52.9%
9	Langfang	63.9%	0.99	60.4%
10	Baoding	70.2%	1.09	53.3%
11	Xingtai	69.9%	1.09	47.3%
12	Shijiazhuang	73.7%	1.15	60.7%
13	Handan	63.9%	0.99	45.6%
14	Anyang	46.2%	0.72	46.3%

Among them, the standard value of the proportion of employees in the tertiary industry is measured by the average level of the core cities of each major economic circle (Zhengzhou, Xi'an, Shanghai, Guangzhou, Shenzhen, Chengdu and Chongqing). At the same time, the coordinate benchmark value of the added value of the tertiary industry in GDP is also set at the above level, which is calculated to be about 63.71%. The matrix distribution graph is drawn roughly as follows in Figure 2:

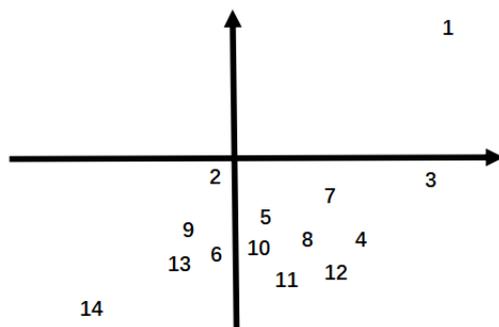


Figure 2. Four-quadrant distribution

5. ANALYSIS OF APPLICATION RULES OF BOSTON MATRIX IN BEIJING TIANJIN HEBEI URBAN AGGLOMERATION

5.1. Successful Crescent

It can be found from the conventional matrix diagram that among the four types of products, cash cow products and star products are located in the northeast and Southeast directions, and these two products can usually bring greater economic benefits to the company. Naturally, the more the better. If at a certain time point, the Boston matrix graph appears a crescent like distribution similar to the curve to the East, it shows that the enterprise is relatively successful at this event node and its development is also good. Observing the Boston matrix of Beijing Tianjin Hebei Urban Agglomeration Industry, such crescent still exists, indicating that in 2019, the development of Beijing Tianjin Hebei Urban agglomeration industry basically meets the national requirements, but there is an extremely unbalanced situation. Beijing, the only star city, is far higher in development degree and potential than other regions. The backbone of most other crescent moons are included in the fourth quadrant of cash cow products, indicating that

from the development of the tertiary industry, most cities have begun to slow down their growth due to the restrictions of various factors, the government and the country should actively explore the structure and outlet of emerging industries and create strength for them. Zhangjiakou deserves special attention. The joint bid with Beijing to host the Winter Olympics is likely to become an important opportunity to develop the tertiary industry.

5.2. Failed black ball

This rule means that if there is no cash cow product in the matrix, a black ball will appear in the third quadrant, that is, the cash cow product area, which means that the enterprise has no products that can maintain a high profit level and is in a state of recession. Beijing Tianjin Hebei Urban Agglomeration does not have this problem. Thanks to the state's attention to the status of urban agglomeration in the regional economy and the huge economic infrastructure established by the capital, it can even be said that the cash cow region has been occupied. Therefore, it can also show that the development and occupation of Beijing Tianjin Hebei Urban Agglomeration is successful.

5.3. Northeast prosperous

This rule means that if the product changes and moves to the northeast to become a star product, it shows that the enterprise product structure is developing in the direction of benign optimization, and the future trend will rise; On the contrary, if there is a declining trend of cheap and close to thin dog products in the southwest, it shows that the products of the enterprise have been declining and need to seek new development and outlet. The Boston matrix of Beijing, Tianjin and Hebei has a trend similar to that in the northeast. The data changes from 2010 to 2018 show that the numerical indicators of each city are increasing. In particular, we need to pay attention to Tianjin. As one of the four municipalities directly under the central government, its development potential can not be underestimated. The gap with the average level of developed cities has gradually narrowed, and the development planning is appropriate. It is possible to become the next star city with Zhangjiakou.

6. CONCLUSION

Some experts believe that urban agglomeration is the inevitable manifestation of the historical process of urbanization in industrial society and post industrial society. Urban agglomeration is a complex with highly concentrated production factors such as population, capital, technology and market. It is the hub and transit station of regional economic ties. It uses its push-pull effect on resources and talents to continuously maintain the coordination and high quality of the development of

regional economic and industrial structure. By studying the industrial development of Beijing Tianjin Hebei Urban Agglomeration, this paper finds that Beijing Tianjin Hebei Urban agglomeration has basically completed the basic goal of building into the strategic task of the national economic center in the north, but there is still the problem of uneven development. Due to the continuous acceleration of today's globalization process, the development speed of many Hebei cities represented by Zhangjiakou, Baoding and Shijiazhuang has begun to slow down, Therefore, in formulating the new plan for the development of Beijing, Tianjin and Hebei, the state needs to focus on the development of new strategic industries with innovation as the core, provide new economic drivers and bring new vitality to development, and take Beijing as the development benchmark and core to further improve and adjust the spatial industrial structure of urban agglomeration and ensure the sustainability of economic growth.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Xiaohan Zhong.

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