

Analysis on the Competitiveness of High-end Agricultural Industry in Beijing by Diamond Model

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Abstract: Unique natural and geographic conditions and special functional orientation of Beijing determine the agriculture of Beijing to go on the development path of high-end industry. This paper clearly states the connotation and key areas for future development of high-end agricultural industry, then takes the diamond model of Michael Porter as the research and analysis form to make a qualitative assessment on the competitiveness of the high-end agricultural industry in Beijing through the aspects of factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry, chance and government, finding out the key influencing factors and bottlenecks of high-end industry competitiveness. Focusing on each key area, this paper states out counter-measures to improve the competitive advantages of high-end industry, so as to provide references for further increasing the development quality of Beijing high-end agricultural industry.

1 INTRODUCTION

Beijing agriculture undertakes significant responsibilities like ensuring the supply of agricultural products to the Capital, providing service of ecological leisure and offering scientific and technological demonstration, though it faces with severe resource constraints like soil, water and ecological environment. Under this background, Beijing agriculture should make full use of its advantages in science and technology, capital, information and other fields to constantly optimize industrial structure and production structure and improve technological content and product additional value. Being on the path of “high-end, high efficiency and high radiation” is to develop high-end agricultural industry.

Currently, the assessment research on high-end industry, especially on high-end agriculture industry is rather few even though there are many competitiveness assessment on special industries. On that account, by taking the diamond model of Michael Porter as the theoretical basis, this paper analyses the competitiveness of Beijing high-end

agricultural industry to find out the key factors and bottlenecks and states out the countermeasures to increase the competitiveness of Beijing high-end agricultural industry so as to provide references for further increasing the development quality of Beijing high-end agricultural industry.

2 CONNOTATIVE FEATURES AND KEY AREAS OF HIGH-END AGRICULTURAL INDUSTRY IN BEIJING

With the features of advanced technology, leading direction, relative standard and over constancy value, high-end industry is a modern industry system supported by advanced new technologies and innovation, marked by high-end products and directed by the target of improving value adding capacity. High-end agricultural industry commonly refers to the high-end industries related to agriculture. By combining the actual conditions and development demand of Beijing, the Beijing high-

end agricultural industry shall not only have the core elements of high-end agriculture, such as targeting on high-end market, using high-end technology to fulfil highly added value, but also have the features of urban modern agriculture, i.e., combining production, living and ecological functions together, which is the industry state mixing the primary industry, secondary industry, and tertiary industry together. So the Beijing high-end agricultural industry is under the category of industry at first, owning the common features high-end industry, meeting the requirements of the construction of Beijing modern agriculture technology city, catering new challenges of the agriculture in Beijing under new situation and satisfying the new demands of the adjustment of capital functional orientation.

3 ANALYSIS ON INDUSTRY COMPETITIVENESS OF HIGH-END AGRICULTURAL INDUSTRY IN BEIJING

Industry competitiveness is the comprehensive quality of a certain industry in a country or a region providing more efficient products and services to the market than other counties or regions in the same industry. As a well-known strategic management researcher of Harvard Business School, Michael Porter developed the diamond model for industry and state competitiveness in 1990 (see Figure 1). This model is the recognized tool for analysing the competitiveness of a country or a region and also adapts to analyse regional industry competitiveness according to a lot of researches and practices at home and abroad (Yu Wei, 2011). Most of the researchers on industrial cluster in China have used this model (Shui Wei and Chen Lie, 2009). Porter's diamond model was composed by four basic decisive factors and 2 assistant factors. Basic decisive factors include the factor conditions, the demand condition, the firm strategy, structure and competitiveness, and related and supporting industries. These four basic decisive factors and their interactions directly decide the competitiveness of a certain industry in a country or a region. Assistant factors are chance and government. These two assistant factors influence the competitiveness of a certain industry in a country or a region through the interactions of the four basic decisive factors (Zhao Xuelin, 2011).

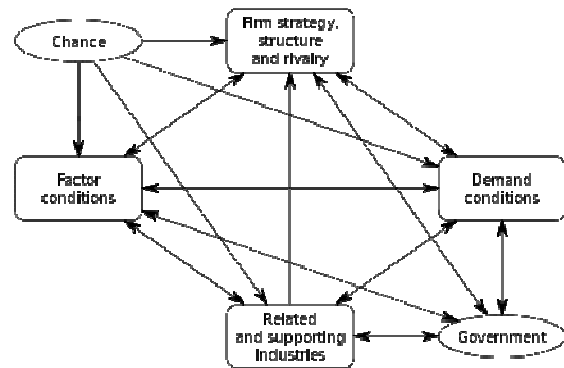


Figure 1 Schematic diagram of "diamond model".

3.1 Factor Conditions

From the aspect of natural resources, Beijing is a typical resource shortage city lack of land and water. As at the end of 2009, the cultivated area of the whole city is 3.408 million mu in total, and the cultivated area per capita in the rural area is only 1.22 mu which ranks the last nationwide. In addition, the amount of rural labour is constantly reducing and the amount of practitioners of the first industry in the city has been reduced from 712,000 of 2002 to 554,000 of 2013 by the average of 13,000 a year. From the aspect of human resources, Beijing has rather distinct advantages and ranks the first by the comprehensive agglomeration degree (Yuan Jing, 2014). As at the end of June 2014, Beijing has 389 academicians of Chinese Academy of Sciences, accounting for 52.4% in the country, 352 academicians of Chinese Academy of Engineering, accounting for 43.9% and more 1103 persons in accumulation having been selected to the Thousand Talent program of the central government and accounting for 30%. From the aspect of technology resources, Beijing is the city has the most abundant intelligent resources and has the most technological power. In 2013, the expenditure of scientific research fund is RMB 118.5 billion, ranking the first of the country and over nearly 3 times of the national average level. There are 24 scientific research institutes related to agriculture, 80 breeding industry research institutes, 10 national engineering and technology research centres related to agriculture and 41 key laboratories related to agriculture in Beijing and there are more than 1000 breeding specialists and nearly 20,000 agricultural scientific personnel. In a word, about 70% of breeding scientific research strength of the country is in Beijing.

3.2 Demand Conditions

Demand is the base of market expansion and the main drive force of industry development. Beijing's massive size of resident population makes an enormous consumption market with the number of 21.148 million in the end of 2013. The urbanization level of Beijing has approached that of high-income countries with a rate of 86.2% in 2012 and the consumption capacity of capital residents has significantly improved. By analysing the two factors above together, it is concluded that Beijing has a huge consumption demand on food. It is estimated that the overall food consumption of the whole city will be 98.82 billion. Even though the agricultural products in Beijing are in the situation of short supply for lack of soil resource and rather small production scale, the agricultural products are very popular among capital residents, especially high-end consumers, for short transportation distance, in time supply and high quality of freshness. According to the research of Jiang Heping(2006) and other experts, the high-end consumers in Beijing usually choose to buy the agricultural products of local brands with a rate of 34.91%. And the consumption rate of other domestic non-Beijing located brands and exported brands are 24.73% and 9.62%, respectively.

3.3 Conditions of Related and Supporting Industries

The high-end agricultural industry in Beijing mainly relates to the link before production and the link after production, so the upstream and downstream industries are basically belong to the links of agricultural production. Currently, facility agriculture is one of the important producing methods for vegetable and fruits in Beijing and the most crucial application carrier for new species and technologies. The alternative industries for high-end agricultural industry in Beijing are mainly the traditional industry of the same field. Owing to meeting the actual conditions of Beijing and representing the oncoming development direction, the high-end agricultural industry in Beijing has more powerful competitiveness and advantages. Take the safety input industry as an example, the main alternative industries of the segmented industries like bio-fertilizer and biopesticide are chemical fertilizer and traditional pesticide industry. With the increasing attention to problems like food safety and environment pollution by the whole society, there will be more and more limits on the

development of traditional chemical fertilizer and pesticide. In addition, the traditional agriculture mainly providing normal agricultural products lacks competitiveness in motivating the enthusiasm of farmers because of low additional value in production.

3.4 Firm Strategy, Structure and Rivalry

From the aspect of firm strategy, Beijing focuses on the implementation of the strategy of industrial clusters to improve the radiation ability of the functional areas of high-end industry and actively develop new functional areas of high-end industry. According to the statistics, from January to November of 2013, the advanced manufacturing industry and the modern manufacturing industry within the six high-end functional areas respectively has realized income of RMB 322.82 billion and 602.58 billion, accounting for 97.1% and 81.5% of the city and with a year-on-year growth of 14.2% and 22.9%; and the income profit rates are respectively 7.2% and 7.6%, being higher than the whole city by 0.1% and 0.2% (Tu Lufang and Zheng Ruifang, 2014). From the aspect of firm structure, as the political centre of the country and the economic centre of Circum-Bohai Sea Region, Beijing has the most innovative technological firms and will play the most potential technological and innovative role in the country for the agglomerating of firm headquarters, large amount of technological firms and better firm structures than that of other provinces and cities. From the aspect of firm competitive ways, Beijing has abundant technological resource and the firms equipped with leading technologies related to high-end industry lay emphasis on making full use of technologies and properly turn their technological advantages into market competitiveness. According to the statistics, there are nearly 6000 newly established technological firms, 2362 firms having income over RMB 100 million and 229 listed companies at home and abroad in Zhongguancun in 2013.

3.5 Chance

The chances of an industry reflect the oncoming development potential to some extent. From the point of environmental chance, the functional orientation adjustment of the capital creates chances for the development of high-end industry and the construction targets of "world city" state out higher requirements on the agriculture development in

Beijing. In addition, the development of high-end industry reintegrates rural resource, entirely drives the upgrading of traditional industries in rural areas, assembly technology and human resources in rural areas and establish an interactive and development platform for urban and rural industries to enhance communication and connection, promote share and complementary and deepen strategic cooperation among urban and rural industries. From the aspect of industry chance, the Beijing agriculture has stepped into the development phase of urban and modern agriculture. The transformation and upgrading of agriculture are supported by expanding agriculture functions and change agriculture producing methods. From the aspect of policy chance, the Beijing government and even the central government have paid high attention to the development of high-end industry by making supportive policies from many respects to accelerate technology innovation, achievement transformation and industry development.

3.6 Government

As the “visible hand” to optimize resource allocation and boost industry development, government actions are of crucial importance for fostering competitiveness. From the aspect of governmental scientific decision, Beijing, as the political centre of China, attaches great significance to improving government’s efficiency. By the research results of Research Report of Provincial Local Governments’ Efficiency in China 2013, the government of Beijing has ranked the top among provincial local governments at the respect of government’s efficiency in 2013; From the point of measuring, the Beijing government has ranked the first, the second, and the first at the aspects of governmental public service, national economic welfare, and e-government affairs, respectively. From the aspect of governmental support, the construction of national and modern agricultural science and technology city carried out by Beijing provides a powerful platform for the development of high-end industry. Through developing high-end agriculture and high-end services related to agriculture, optimize the resource allocation of Beijing and the surrounding areas or even of the whole country, and establish an industry mode of “high-end research and development, brand service and marketing management being in Beijing, manufacturing and processing being out of Beijing”.

4 COUNTERMEASURES TO IMPROVE THE COMPETITIVENESS OF BEIJING HIGH-END AGRICULTURAL INDUSTRY

To further consolidate and improve the competitiveness, this paper gives the following suggestions focusing on six key areas:

4.1 Modern Seed Industry based on Biology Breeding Technology

Firstly, increase the capacity of self-innovation and propose the change of breeding method. Enhance the basic application research and biotechnology development emphasizing on molecular breeding, make breakthrough in the fields like gene detection, breeding for biotic stress resistance and polyploid breeding and speed up the establishment of new and high through-put gene discovery technology system. Secondly, accelerate the transformation of applications, and promote agricultural production efficiency. Strengthen the infrastructure constructions of seed production bases, adopt advanced processing technology and device for seed, make the production condition better and establish modernization seed processing centre and delivery system to enhance seed production and processing capacity and service level. Thirdly, support the growth of firms and service industry. Attract the headquarters of seed industry to settle in Beijing, promote the seed industry to form into clusters, facilitate the extension of industry scale and support the development of modern agriculture. Encourage the leading firms to set up seed producing base in other places outside Beijing and make a trans-regional breeding, cultivating and promoting industry chain.

4.2 Modern Agriculture Equipment Manufacturing Industry based on Internet of Things Technology

Firstly, carry out researches on key technologies. Focusing on the following aspects including development of photoelectric control system of agricultural machinery, software research and development of agriculture system and the study on new agricultural machinery materials and the life time extension of materials, build a standard system for selecting agricultural machinery engineering

materials. Secondly, intensify technological and financial support. To be specific, intensity the support for the qualified innovative firms to seek financing by listing on the stock market and the already listed firm to seek financing through acquisition and reorganization in the market. Thirdly, speed up the extension and transformation of achievements. Support and encourage key firms to set research and development institutes in demonstration areas and develop socialized technology services like technological achievement evaluation, intellectual property management, technology property right transaction and technological finance to promote the transformation and industrialization of technological achievements, propel products and technologies to radiate outwards and boost the development of regional and national trade.

4.3 Modern Food Manufacturing Industry based on New Processing Technology for Agricultural Products

Firstly, propel the upgrading of food manufacturing technology. Depending on the key special scientific project "Capital food safety assurance" and focusing on new technologies and processes like the one for producing infant formula and evaluating and identifying the quality of manufactured food, carry out researches on key technologies and develop a batch of advanced devices with self-owned intellectual property right to enhance the assurance of food quality. Secondly, construct a food industry cluster district. Promote industry clusters, drive the upgrading of industry chain based on modern service factors, and actively establish an industry service mode of "high-end research and development, brand service and marketing management being in Beijing, manufacturing and processing being out of Beijing". Support leading firms to adopt integration production plan and establish a standardized production base for agricultural products by coordinating with nonlocal firms to guarantee the safety and steady supply of raw materials. Thirdly, complete the food quality and safety monitoring system. Establish a comprehensive and efficient food safety testing service platform for many varieties, form a safety chain for the whole industry chain for agricultural products from "producing area exiting, sales market entering, quality tracing, to risk controlling", construct a food safety risk supervision network covering the whole city complete the traceability supervision system for food safety to

promote the application of new technologies and products on the producing, circulating and marketing of agricultural product and further improve the test and supervision level for food quality safety.

4.4 Safety Inputs Industry based on Biological Manufacturing Technology

Firstly, carry out scientific research and improve innovation capacity. Establish an application platform for developing and industrializing the generic technologies of safety inputs, accelerate the development of new resource of biological species and the research core technology and new product of animal and plant bioreactor, develop key technologies and devices for scaled fermental cultivation and promote the application of biotechnology products like feed enzyme preparation, probiotics, antibacterial peptide and plant extracts in biological feed. Secondly, accelerate the transformation of achievements and extend the scale of application. Set up innovation service association and carry out the cooperation combing producing, learning, scientific researching and practical applying to drive the collaboration among such sectors as science and technology, agriculture, economy and food and medicine sectors and accelerate the industrialization of achievements. Thirdly, intensify policy supports and straighten out business modes. Set up a special fund for supporting biological agricultural industry, and complete the subsidy system for the safety inputs of biological agriculture by expanding the range and degree of subsidy to encourage agricultural producers to use biological inputs.

4.5 Energy Saving and High Efficient Agriculture based on New Material Technology

Firstly, promote technology innovation on new agricultural materials. Focusing on facility agriculture inputs, grasp the leading technologies in the fields of agriculture materials at home and abroad through introducing, absorbing and self-innovating technologies. Make preferential policies, make use of abundant new material technology resource in Beijing, attract abroad firms or nonlocal new high-tech firms to enter Beijing new material industry base and set research and development centre in Beijing. Secondly, speed up the development of water-saving agriculture. Measures shall be taken to develop water-saving agriculture

including researching and developing precise and high efficient water-saving devices for sprinkling irrigation, trickle irrigation, micro-irrigation and small tube flow irrigation, promote techniques like efficient and fine water-saving technique, dry-farming water-saving technique, field crops water-saving technique and integration of water and fertilizer water-saving technique and strengthen standardization and delicacy management on agricultural water to improve agricultural water using efficiency. Thirdly, cultivate photovoltaic agricultural industry. Enhance the application of solar power technology in modern agriculture at the respects of planting, breeding, irrigating, pest controlling and agricultural machinery providing, explore a proper photovoltaic greenhouse construction mode according to the actual conditions of Beijing and take some supporting forms like financial subsidies to encourage agricultural producers to promote the applications.

4.6 Ecological Agriculture based on Low-carbon and Circular Technology

Firstly, improve the technological supporting system through focusing on agricultural waste recycling and resource utilization, summarizing and making systematic analysis on current ecological agriculture technology and model, strengthening research and development effort on ecological agricultural product, new technology, new model and appropriate devices and greatly promoting the application of new product, new technology, new model and appropriate devices. Secondly, promote the industrialization of biological agriculture and form a coordination linkage mechanism for all sectors. Make researches on the development problems of ecological agriculture and give priority to the implementation of scientific demonstration projects of biogas industry to promote large-scale production of biogas. Thirdly, establish a long-term mechanism for industry development. Make an assessment index system and set pollution control standards for ecological agriculture and establish a long-term mechanism for ecological agriculture development, to fulfil systematic and sustainable development of ecological agriculture in Beijing.

5 CONCLUSIONS

Except for lack of natural resource, the high-end agricultural industry in Beijing is competitive in

other respects and even takes the lead of the country in some fields. The key fields for future development of the high-end agricultural industry in Beijing are modern seed industry based on biology breeding technology, modern agriculture equipment manufacturing industry based on Internet of things technology, modern food manufacturing industry based on new processing technology for agricultural products, safety inputs industry based on biological manufacturing technology, energy saving and high efficient agriculture based on new material technology and ecological agriculture based on low-carbon and circular technology.

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REFERENCES

- Yu Wei, 2011. Study on the Competitiveness of Regional Conference and Exhibition Industry Based on the Diamond Model - Take the Chaoyang District of Beijing as the Example. *Jiangsu Commercial Forum*, Vol.11, p. 89-92.
- Shui Wei and Chen Lie, 2009. Analytical Framework and Application Route of Diamond System for the Competitiveness of Industry Clusters. *Inquiry Into Economic Issues*, Vol.4, p.33-39.
- Yuan Jing, 2014. Comprehensive Agglomeration Degree of Talents in Beijing Ranking the First in China. *Beijing Daily*, 27 Mar.p.4.
- Jiang Heping, et al, 2006. Study on Market Demand of Agricultural Products by High Consumer Groups (high-end) in Beijing . Beijing Municipal Research Centre For Rural Economy. *Balancing Urban and Rural Development: Forward Building a New Socialist Countryside*, Chinese Agricultural Press, Beijing, CA, P. 25-274.
- Tu Lufang and Zheng Ruifang, 2014. Revenue of the Six High-end Functional Areas Increased by 20% Last Year. *Beijing Daily*, 9 Apr. p. 4.
- Zhao Xuelin, 2011. Analysis of the Overall Development of China's Cultural Industry Cluster Elements Based on Diamond Model. *Probe*, Vol.6, p.95-110.