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The Development of Chinese Seed Industry: From Company Value Chain Upgrading Perspective

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Abstract: Food security is a challenge across the board, especially since the Russian-Ukrainian conflict. The experience of many countries shows that seeds are one of the key factors for increasing food production. Integration into global value chain development is a trend in the current development of the seed industry. China's seed market is huge, but there is still a gap between Chinese seed companies and the world's seed powerhouses. In this paper, it analyzes the value chain upgrading dilemma of Chinese seed companies and find out the suggestions for their value chain upgrading.

Keywords: Chinese seed companies, Value chain, Technological innovation capability.

1. Introduction

The seed industry is the agricultural chip industry. 2021, the Chinese government considered and adopted the Action Plan for Seed Industry Revitalization. This marks the full implementation stage of the revitalization of China's seed industry. Seeds are the "chip" industry in the agricultural industry chain, one of the most critical factors in the process of increasing agricultural production, and play an important role in maintaining food security. Seed industry is a basic and strategic industry of the country, and also a highly profitable industry with great potential. Compared with the world seed market, the Chinese seed market is large but not strong. As the main body of the seed industry market, whether the seed industry companies are in a good state of development directly affects the high-quality development of the seed industry.

Therefore, this article will start from the main body of industrial development-enterprise, and analyze the problems encountered in upgrading the company value chain in order to find strategies for upgrading the value chain of seed industry companies.

2. Basic Situation Analysis of Chinese Seed Industry Companies

2.1. Number and company size

By the end of 2021, the number of companies with valid seed production and operation licenses incorporated into the basic information statistics of the seed industry in China is 7,668, an increase of 296 over 2020. Among them, 84.75% of the companies packaged and sold the seeds of this enterprise, 11.6% of the companies sold seeds of other companies and accounted for more than 50% of sales revenue. The number of integrated breeding, breeding and pushing companies increased to 97, accounting for a relatively low percentage. The total assets of Chinese seed companies reached 264.067 billion yuan, an increase of 8.16%, of which 486 companies with total assets of 100 million yuan or more; the total net assets of companies 149.937 billion yuan, total fixed assets of 59.50 billion yuan.

2.2. R&D input

In 2021, the total investment in R&D was 5.75 billion yuan, accounting for 8.06% of enterprise product sales, of which 90.61% was invested independently by companies. Scale companies (registered capital ≥ 30 million yuan) research investment reached 4.171 billion yuan, accounting for 72.53% of the total investment in research, which accounts for 7.8% of enterprise product sales, higher than the industry average. However, compared with the seed industry powerhouse's R&D investment accounting for 10% - 12% of sales revenue(Fernandze-Cornejo, J. 2004), the gap still exists.

In 2021, seed industry companies applied for 4,012 pieces of agricultural plant variety rights, of which the number of applications from seed companies accounted for 59.20%. The number of authorized protected varieties is 1855, and the number of authorized seed companies accounts for 57.64%.

2.3. Seed Sales

According to the "2022 China Crop Seed Industry Development Report", the national seeds achieved seed sales revenue of 87.997 billion yuan in 2021, an increase of 10.287 billion yuan over 2018, of which commercial seed sales achieved revenue of 79.474 billion yuan, accounting for 90.31% of the total sales revenue. The profit margin of the seed industry was 6.88%, which was slightly higher than in previous years.

Analysis of the types of seeds operated by companies, corn wheat and rice and other field crops are the main crop seeds operated by seed companies in China. The situation of three major crops unifying the Chinese seed market has not yet changed.

3. The Dilemma of Chinese Seed Companies in Value Chain Upgrading

3.1. Insufficient core competitiveness of companies

China's seed companies do not have advantages in the international market. According to the International Seed Alliance statistics, China's seed industry import and export

trade shows a trade deficit phenomenon, 2019 seed trade deficit of up to 230 million U.S. dollars, and the trade deficit has a tendency to expand.

Seed companies present a situation of fragmented competition. Although China's seed industry has seen a good trend of concentrated development, however, overall, compared with the requirements of a developed and competitive industry is far from enough. The main manifestations are: first, the number of seed companies, the small scale, the low level of integration of seed industry development, the lack of a strong competitive leading companies. For example, the number of Chinese seed companies reached 6,393 in 2019, and 65% of them were below 30 million yuan in size, which shows that the overall distribution of the industry is concentrated in small and medium-sized companies; secondly, small and medium-sized companies mean that seed companies can hardly have their own proprietary varieties and distribution channels, and can hardly establish their own relatively perfect quality assurance system, let alone guiding farmers to plant and operate and other value-added aspects of after-sales services (Ministry of Agriculture and Rural Affairs, et al., 2020).

The reasons for this are that China's seed industry is not mature in terms of the organizational model of the industrial chain, which is mainly manifested in the following three aspects: first, in the basic link of seed R&D. R&D capacity of companies is weak and the capacity of research institutions is relatively strong, thus making the driving capacity of the industrial chain scattered or insufficient. Secondly, in the seed production, there is confusion in management and the phenomenon that the legal regulation is not strict. First, the protection of intellectual property rights is weak, the phenomenon of manufacturing fake seeds and inferior seeds happens from time to time; second, the seed production base, seed production companies do not operate in a standardized manner, and farmers who are not qualified to produce seeds still exist in large numbers; third, the phenomenon of fraud in the field of sales happens from time to time, and it is not uncommon to sell under a set of license and steal the license. Thirdly, in terms of promotion and use, the main goal of companies is still placed on the research and development of new varieties, and there is a lack of technical counselling for farmers' use, moreover, there is a lack of technology development and counselling combined with agronomy (Hou J, 2017). The long-term business approach of only focusing on production and marketing to pursue sales leads to the fact that although the companies have the integration qualification of "breeding, propagation and promotion" in name, in essence, most of the capital investment remains in the period of laying large-scale sales network, and the core competitiveness of companies will be gradually weakened (Zhang, L., & Zhang, N., 2019).

3.2. Inadequate enterprise breeding innovation capability

Technological innovation is an important driving force to promote the upgrading of the seed industry. From the value-added link of the value chain, generally speaking, R&D is the main cost link, accounting for about 40%, breeding seed accounts for about 25% of the cost, seed processing and treatment accounts for 15%, and sales and distribution is above 20% (Jorge, 2004). It is evident that the R&D segment of seeds plays an important role in the whole chain.

The situation of China's seed industry is that the main body of R&D is not companies but research units, thus not fundamentally completing the transformation of seed R&D and promotion from public input to enterprise input, and lacking the motivation to drive and build the industrial value chain. If companies rely on research units to provide new varieties for a long time, they will lack the ability to sniff out market demand, and will not be able to locate the next breeding direction and launch products that can dominate the market (Yang, 2012). From the application and authorized subjects of seed industry patents from 2009 to 2019, except for the three years of 2016, 2017, and 2018, the enterprise subjects exceeded teaching and research units, and teaching and research units were in the first place in all other years. Teaching and research units have made great contributions to research in basic fields, but industrial upgrading should be led by the head companies in the industrial chain, and joint upstream and downstream companies to strengthen industrial synergy and technical cooperation and research. In addition, according to the Seed Industry Development Report 2020, the number of seed processing patent applications accounted for 67.14% of the total number of applications and 68.70% of the total number of licenses from the distribution of seed expertise in 2019. From the value-added curve of the seed industry, the seed processing section is at the bottom of the value-added chain, indicating that the innovation of China's seed industry is still stuck in the link with a low degree of value-added in the value chain. While promoting the participation of the seed industry in the global value chain, enhancing the value chain status of the seed industry is the best way to develop the seed industry. Obviously, at present, the role of China's seed industry innovation in enhancing the value chain status of the seed industry is not very obvious, and the seed industry value chain upgrade power is not enough. This will directly affect the future development of China's seed industry (Pei, R.et al. 2022).

3.3. Low anti-risk capacity of Chinese seed companies

Seed industry is a capital and technology-intensive industry, China's main grain-producing areas have market advantages, but, no capital advantages and technological advantages, especially the advantages of technical personnel, thus making the main grain-producing areas of the seed companies do not show their advantages, not able to form a competitive leading enterprise. This is not only detrimental to the overall development of China's seed industry, but also to the development of agriculture in the main grain-producing regions. In the main grain-producing provinces, because of the large scale of growing grain crops, the market value of seeds is larger, which in turn can ensure the sales revenue and profits of seed companies. It is the availability of stable markets and revenues that creates a strong attraction for firms to enter, but the regional protection of competition and, in particular, barriers to exit (e.g., tied to various government subsidies) lead to the coexistence of firms below scale. Although the overall profitability of the industry is high in a short period of time, it is not conducive to the long-term development of the industry as a whole from a development perspective, especially for the development of a globalized competitive industry.

At the same time, affected by the Sino-US trade friction, the impact of the domestic seed market, epidemics and other factors, seed companies staff wages, breeding, seed production, publicity, packaging, processing, logistics fees,

the overall rise in the cost of sales. But because of the existence of adverse competition in the market, if "unilaterally raise prices is equal to give up the market", resulting in the terminal sales price or even reduced, showing "two tight", the enterprise profit margin is very tight, under great pressure. China's small and medium-sized companies in general, the problem of financing difficulties, seed companies are more so. In particular, the seed industry is affected by the season, which makes financing very difficult. The capital chain is not guaranteed, the cash flow is not enough, and the enterprise is very easy to fall into financial crisis.

4. Suggestions

4.1. Create a new seed industry value chain shape

The structure of the value chain is constantly changing with the continuous refinement of the industrial division of labor. As a branch of the agricultural value chain, the seed industry value chain belongs to the upstream high value-added related industries in the agricultural value chain. At the same time, the value chain of the seed industry and the agricultural value chain are in a U-shaped structure, i.e. the value added of seed processing actives is at the bottom of the U shaped structure.

W-type value chain is a new value chain governance model formed under the premise of continuous refinement of industrial division of labor. Unlike the single model of producer-driven or consumer-pulled U-shaped value chain, the W-shaped value chain is a composite model with platform technology and integrated technology. According to Hao F. et al. (2016), an excessively monopolistic industrial structure may make the industrial development stagnant, and reasonably encouraging the development of SMEs will promote the overall improvement of the value chain. And the W-type value chain is based on the extensive participation of various types of subjects, and companies take the initiative to participate in the international division of labor and industrial restructuring in the form of clusters, cultivate new comparative advantages, and reshape new dynamics of industrial development.

At present, China's seed market is not highly concentrated, and there are a huge number of small and medium-sized companies. Only by embracing the global value chain in a cluster approach can we cultivate a new comparative advantage in the seed industry, which is not only the trajectory of the evolution of the technology life cycle in the process of industrial evolution, but also the embodiment of collaborative innovation of all subjects. At the early stage of cluster formation, the technology is relatively backward and the degree of marketization is low, but with the continuous improvement of R&D, design, marketing and other links and the addition of professional institutions, the economies of scale of the cluster will gradually appear. At the same time, as the cluster's innovation ability and competitiveness improve, the higher the participation in the global value chain, the more solid the position of the W-type value chain will be, which in turn will lead to the overall upgrading of the industrial cluster technology.

4.2. Enhance technological innovation capability of seed companies

The focus of competition among seed companies shifts from the competition of scale, quality and price to the competition of new varieties, and supports the seed companies with strength to further optimize resource allocation through outward expansion or mergers and acquisitions to comprehensively enhance breeding capacity and core competitive ability.

At the same time, to activate the innovation ability of companies, the stratified development of large and medium-sized companies, the development of small and medium-sized companies in the direction of ultra-specialized division of labor, and the further development of large seed industry companies with strong scientific research capability in the direction of breeding, propagation and promotion, in order to reshape the new momentum of China's seed industry development.

Build a collaborative and efficient seed industry innovation platform. Implement the system of income from the transformation of scientific and technological achievements and remuneration for part-time scientific and technological personnel, and guide universities, research institutes and seed companies that promote crop breeding research to form seed industry innovation alliances that closely integrate industry, academia and research to focus on promoting breeding innovation and improving breeding efficiency.

4.3. Improving financial services and policies

First, provide policy leaning, lower bank interest rates to seed companies. The relevant departments of the seed companies to introduce preferential policies for bank loans, loans to seed companies, financing to provide convenience and interest subsidies; reduce the loan threshold and interest rates.

Second, innovative financial services. Combined with the characteristics of seed companies, provide seed enterprise mortgage loans, seed production insurance and other new financial products suitable for the development of seed companies, seed production cooperatives and the majority of seed farmers to develop seed companies to provide high-quality and convenient financial services.

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References

[1] Hao, F., & Zhang, L. (2016). The impact of low-end lock-in on the upgrading of local industries in the global value chain. Science Research Management, (S1), 131-141. https://doi.org/10.19571/j.cnki.1000-2995.2016.s1.021

[2] Hou, J. (2017). Research on the construction of China's seed industry technology innovation system [J]. China Seed Industry, (01), 13-17.

[3] Jorge, Fernandze-Cornejo (2004). The seed industry in U.S. agriculture. Agriculture Information Bulletin, (786), 1-71.

[4] Pei, R., Zhang, C., Chen, K., et al. (2022). Improving the national innovation system of crop seed industry in China and promoting the deep integration of innovation chain and industrial chain [J]. Journal of Chinese Academy of Sciences, 37(7), 967-976.

[5] Yang, J. (2012). Current situation and countermeasures for market-oriented development of seed industry enterprises [J]. Modern Agricultural Science and Technology, (21), 26.

[6] Zhang, L., & Zhang, N. (2019). Countermeasures for the high-quality development of China's seed industry from the perspective of seed industrialization [J]. Journal of Anyang Normal University, 4, 25-30.