Research on Value Chain Theory and Evaluation of Agricultural Enterprises' Core Competitiveness Based on Neural Network

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Abstract. In recent years, the status of agricultural enterprises in the social economy has become increasingly prominent and has become an important foundation for ensuring people's lives. Through the value chain theory and the neural network algorithm in the computer network model, the internal mechanism of the improvement of the core competitiveness of agricultural enterprises is analyzed, and the organizational costs and competitive advantages of agricultural enterprises are analyzed from a positive and rational point of view. The agricultural enterprises clarify the organization of the value chain Strategy, optimizing organizational functions, shaping organizational brand, and shifting development goals to rural supply-side reform; realizing the transformation of operating characteristics from "homogeneity" to "individualization" in core competitiveness, realizing the transformation from "quantity growth" to "quality improvement" Transform, enhance the intrinsic value and competitive advantage, and then enhance the core competitiveness of agricultural enterprises.

Keywords: Agricultural Enterprises, Core Competence, Value Chain Theory, Neural Network, Evaluation Mechanism

1. Introduction

China is an agriculture-based country, sustainable development is directly related to the long-term stability of our society and our development to industrialization and urbanization process of the road, since the reform and opening up, "three rural" issue has been a central party and agriculture highly anticipated. With the acceleration of economic globalization, both countries and enterprises are facing fierce market competition. In order to face this challenge, enterprises must strengthen their core
competitiveness through transformation and upgrading, and inject new impetus into their development through reforms. As the leading enterprises among agricultural enterprises, listed agricultural companies play an important role in promoting rural economic prosperity, promoting agricultural industrialization, and driving farmers’ income and agricultural efficiency. They are gradually becoming the main force driving agricultural development and international competitiveness foundation. At the eleventh meeting of the Central Finance and Economics Leading Group on November 10, 2015, Comrade Xi Jinping proposed to optimize supply, improve the total factor productivity of enterprises and promote the balance of supply and demand from five aspects: de-capacity, de-inventory, deleveraging, cost reduction, and shortcomings. As of the end of 2018, the central government had issued the No. 1 central document on agriculture 15 consecutive times. Among them, the No. 1 document of the central government in 2017 pointed out that the purpose of advancing the structural reform of the agricultural supply side is to optimize my country’s agricultural industrial system and promote the successful transformation and upgrading of agricultural enterprises.

With the continuous advancement of agricultural industrialization, the core competitiveness of agricultural enterprises has gradually been valued by people, especially among enterprises in the same industry, the competitive situation is particularly obvious. Our government every year for special projects agribusiness investment and increase its competitiveness in the capital markets with a view to promote the revitalization of rural industry driven by agricultural enterprises, which really help the farmers out of poverty. However, as China’s primary industry, due to its own attributes and environmental factors, agriculture will face many complex problems in the process of transformation and upgrading of agricultural enterprises. In order to increase the overall development speed of agriculture, it is necessary to fundamentally improve the market competition of agricultural enterprises. The reform of the agricultural supply side is imperative. Therefore, in this context, this article aims to improve the comprehensive competitiveness of agricultural enterprises and promote the long-term and rapid development of the agricultural industry through the evaluation of the competitiveness of agricultural enterprises.

2. The requirements of the times for the improvement of the core competitiveness of agricultural enterprises: speed up the reform of the agricultural supply side

In November 2015, General Secretary Xi Jinping first proposed the concept of supply-side reform. The basic content is to expand social demand, increase effective supply, improve production efficiency, and reduce costs. The basic connotation is to improve the quality and efficiency of agricultural supply, and to ensure the stability and quantity of agricultural products. The basic connotation of agricultural supply-side reform is to balance supply and demand, optimize the structure, rationally allocate and efficiently use agricultural production resources, be guided by market demand, and be based on market changes, continuously adjust the structure of agricultural production, improve the quality of supply, and achieve sustainable agriculture development of.

The theory of core competence believes that core competence has three characteristics: one is that core competence can create value and reduce business costs; the other is that core competence is unique and difficult to be imitated by competitors; and the third is that core competence is malleable, can provide support for enterprises to expand the market in the future. Therefore, in order to gain a competitive advantage, companies should pay attention to cultivating their internal comprehensive capabilities and improve their core competitiveness. The core competence theory mainly focuses on
the impact of people or a series of actions related to people on the competitiveness of enterprises, while the school of basic resource theory only focuses on specific material resources and ignores the influence of people. Therefore, we should treat the enterprise as a whole rather than just consider a certain aspect. The ability of an enterprise is the result of the combined effect of many factors. The core ability of the enterprise determines the ability of the enterprise and other competitors to capture customer needs in the market; only skilled Only by using and expanding the core competence can an enterprise develop stably in the long term. This article takes an agricultural enterprise as a case to examine the time course of its value generation, and from the perspectives of "quantity" and "quality", it compares and analyzes the characteristics and laws of element changes in the process of improving core competitiveness, including the following three dimensions: First of all, from the perspective of process elements, the human, material and financial resources invested by agricultural enterprises in operation, management, and services are expressed in terms of quantity. Among the content elements, the number of personnel, types of operations, curriculum, teaching content, and class hours are expressed in terms of quantity. Indicates the quality of personnel, management methods, management level, scientific research capabilities, social services, etc.; The third is from the perspective of the result elements, the profit rate of the enterprise, the input-output ratio, the social contribution rate, the sustainable development rate, etc., the number of scientific research projects, etc. all reflect the number of connotative development; the enterprise human resources Physical and mental health, comprehensive quality, the development of innovation capabilities, the improvement of sustainable development capabilities, the improvement of corporate scientific research quality, the development of social services, and the ability to resist risks are all reflected in the quality of the development of core competitiveness. It can be seen that the increase in quantity only reflects the superficial phenomenon of the development of the core competitiveness of enterprises, and the improvement of quality often depends on scientific ideas, content and methods. The process from "quantity growth" to "quality improvement" is the process of connotation development. The observation elements for the development of the core competitiveness of enterprises are shown in Table 1.

![Figure 1. Basic Value Chain](image-url)

Agricultural enterprises are social organizations, with clear organizational positioning, organizational functions and development goals, and the general characteristics of social organization
management and operation. Therefore, we can learn from Michael Porter’s "value chain theory" to analyze the internal mechanism of the connotative development of private universities, find out the characteristics and laws of the correlation between the improvement of core competitiveness and the scientific management of enterprises, eliminate the path dependence of backward management concepts and development models of enterprises, explore a unique "value chain" suitable for its own development, finally, form a core competitiveness improvement path with its own characteristics.

3. Neural network algorithm

Training data usually contains many variables, some of which have nothing to do with the target ability or have little influence. When there are too many variables, the neural network is difficult to work normally, and it will increase the possibility of over fitting. Therefore, before inputting the data into the neural network for training, it is necessary to simplify the variables according to the target ability, select the appropriate characteristic variables and determine the input parameters of the neural network.

The classification contribution priority interactive genetic method is mainly based on the information gain of features. Its basic idea is to calculate and compare the information gain of each feature in the training data set, and select the feature with large information gain.

Set up training data set \( D \), \(|D|\) represents the sample size of the dataset, that is, the number of all samples contained in the dataset. There are \( k \) classes \( C_k, k = 1,2,\cdots,K \), \(|C_k|\) is for class \( C_k \) is the number of samples contained in, \( \sum_{k=1}^{K} |C_k| = |D| \). Let characteristic \( a \) have \( n \) different values \( \{a_1,a_2,\cdots,a_n\} \), Data set \( D \) can be divided into \( n \) subsets according to different values of feature \( a \), \( D_1,D_2,\cdots,D_n,D \) is \( D \), The information gain is calculated as follows.

Input: training data set \( D \) and all feature sets \( \{A_1,A_2,\cdots,A_n\} \);

Output: per feature \( A_j \) Information gain to training data set \( D \) \( g(D,A_j) \).

Step 1: calculate the empirical entropy of dataset \( D \) \( H(D) \):

\[
H(D) = -\sum_{k=1}^{K} \frac{|C_k|}{|D|} \log_2 \frac{|C_k|}{|D|}
\]

(1)

Step 2: traverse the feature set and calculate each feature in turn \( A_j \), Conditional entropy for data set \( D \) \( H(D|A_j) \):

\[
H(D|A_j) = \sum_{i=1}^{n} \frac{|D_i|}{|D|} H(D_i) = -\sum_{i=1}^{n} \frac{|D_i|}{|D|} \sum_{k=1}^{K} \frac{|D_{ik}|}{|D_i|} \log_2 \frac{|D_{ik}|}{|D_i|}
\]

(2)
Step 3: calculate the information gain $g(D, A_j)$:

$$g(D, A_j) = H(D) - H(D | A_j)$$  \hfill (3)

Step 4: repeat steps 2 and 3 until the information gain of all features in the feature set is calculated. The information gain of all the features of the data set is sorted from large to small. According to the specific application requirements, the feature ranking first is selected as the optimal feature combination.

4. A value chain analysis framework for the improvement of the core competitiveness of agricultural enterprises

From the perspective of value chain elements, the entire process of improving its core competitiveness is a complete "value chain", and each optimization link constitutes the basic and supporting elements of the value chain. Based on previous research results, the basic elements and auxiliary elements of value chain development are summarized from literature review and practice. The basic elements include process elements (technical innovation, procurement management, production operations, marketing, logistics management), content elements (asset scale, personnel quality, management ability, anti-risk ability, profitability) and result factors (development level, social contribution, innovation ability and sustainable development ability); auxiliary factors include internal conditions (operation strategy, facilities and equipment, human resource management), Work information system development) and external conditions (policies and regulations, fund allocation, project support, government, school-enterprise collaboration). The value chain analysis framework is shown in Figure 2.

In this article, we use the representative of the algorithm effect evaluation index, and use the evaluation effect of the effect evaluation index to express. Then the following formula can be used to express the evaluation model of the core competitiveness of agricultural enterprises:

$$E_{MODEL} = \lambda \mu \times E_{MIN} + \mu \times E_{MCP}$$  \hfill (4)

$$f(x) = \sum_{j=1}^{m} a_j y_k(x, x_j) + b$$  \hfill (5)
5. The Realization Way to Improve the Core Competitiveness of Agricultural Enterprises: Optimization and Perfection of Value Chain Elements

From the perspective of organizational management, according to a certain structure of responsibility and authority composed of organizational rules and procedures, through further defining the strategic positioning of the organization, the internal elements and resource allocation conditions of the organization can be effectively improved, to promote organizational efficiency and achieve goals, Xi Jinping, general secretary general, attended the speech of the nineteen Guangdong provincial delegation's group, and pointed out: "innovation is the first driving force, development is the first priority and talent is the first resource." talents play a decisive role in promoting the development of local economy and society. Agricultural enterprises can improve their technological innovation capabilities from the following three aspects: First, establish demand docking with colleges and universities and scientific research institutions to realize the integration of production, education and research. On the one hand, it provides job opportunities for students of various colleges and universities, and on the other hand, it uses the advantages of technology, equipment and talents of scientific research institutions to supplement the lack of innovation capabilities of enterprises; Second, it can involve scientific research units and high-tech personnel through contracting, shareholding, transfer, etc., so as to promote the transformation of enterprise scientific and technological achievements; Third, the construction of high-quality agricultural personnel, to establish their own research and development department and research and development team, by introducing and
cultivating innovative talents agriculture, difficult technical issues research group set up to encourage the development of new technologies, while building capacity development departments, regular training, training enterprises staff awareness of innovation, so as to enhance innovation ability of agricultural enterprises. In the context of agricultural supply-side reforms, agricultural listed companies that want to improve their competitive advantages must undergo transformation and upgrading, realize large-scale and automated production models, increase industrial research and development efforts, change traditional production and operation methods, and become the mainstay of technological innovation. Grasp core intellectual property rights, use innovation as the driving force, cultivate and promote new varieties with good taste, good quality, rich nutrition, and multiple disease resistance, organize the implementation of the "Internet + agriculture" development model, carry out digital agriculture construction, and establish agricultural industry resource databases. Promote the construction of big data for the entire agricultural industry chain.

6. Conclusion

Agriculture is the foundation of political and economic stability. The evaluation of the competitiveness of Chinese agricultural enterprises in the context of agricultural industrialization and the transformation and upgrading of agricultural enterprises is one of the important frontier topics in the research of agricultural enterprises. Agricultural enterprises are important for transforming China's agricultural economic development mode, promoting agricultural industrialization and intensive functioning. However, in the process of transformation and upgrading of agricultural enterprises, a series of problems have also appeared. Through the analysis of the competitiveness of agricultural enterprises, this article proposes some suggestions for improving the competitiveness of agricultural enterprises and for enterprises, investors, and government management departments. Related positive suggestions to improve the market competitiveness and sustainable development capabilities of listed agricultural companies in China.

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