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Development of Digital Agriculture: Taking COFCO Group Co., Ltd. as an Example

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Abstract

Agriculture is the foundation of a country. Food is the most basic means of survival of mankind. The basic position of agriculture in the national economy is highlighted in the production of food. The digitization of agricultural industry is the fundamental requirement of productivity development. Taking China grain group, a leading agricultural enterprise in China, as the starting point, this paper systematically analyzes the digital development process of COFCO group and the new development of traditional agriculture under the digital wave. On this basis, it further analyzes the practical experience of the development of China's agricultural modernization and the digital development of China grain group.So as to draw valuable experience and Enlightenment for the development of China agriculture and state-owned enterprises.

Keywords

COFCO Group; Modern Agricultural Industry; Digital Food Security.

1. Overview

1.1. Enterprise Background

COFCO Group Co., Ltd. is one of the world top 500 enterprises. As China largest grain, oil and food enterprise, the central enterprise, and China leading diversified product and service provider in the field of agricultural products and food, COFCO Group Co., Ltd. is committed to building a grain, oil and food enterprise in the whole industrial chain from field to table and an urban complex in the whole service chain.

COFCO has driven the modernization of traditional agriculture through its own digital development in recent years, which has an extremely profound reference significance for the transformation and upgrading of China traditional industries and the development of digital economy under the new pattern.

1.2. Research Ideas and Methods

According to the idea of "COFCO group digital development analysis - traditional agricultural digital analysis - the company long-term development strategy and Enlightenment under industrial digitization", this case analysis first comprehensively combs COFCO group digital development path.

Clarify the contents, methods and steps of the research: starting from the digital development of COFCO, first analyze the development and evolution process of China agricultural digitization, analyze the core problems of China agricultural industry digitization through comparison with the traditional development mode, and clarify the strategic decision-making and development

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enlightenment of COFCO digital development. Finally, it puts forward reasonable suggestions for the digital development of modern agriculture and state-owned enterprises in China.

1.3. Development Overview of COFCO Group

From government companies to market-oriented enterprises, from trade business to diversified industrial clusters, from domestic layout to global operation. COFCO group has gone through all kinds of tests, broken through all difficulties and dangers, continued to grow and grow, and COFCO digitization has been successfully realized. The 70 year development course of COFCO group can be roughly divided into two times. These two times are bounded by the industrial digitization trend of COFCO. The emergence of COFCO digitization trend marks that COFCO productivity and production relations have reached a new level.[1]

2. Digital Status of COFCO Industry

2.1. Development Reasons

In essence, COFCO industrial digitization is not only the result of the interaction between market effect and enterprise competition, but also the result of the contradiction between productivity and production relations.

With the improvement of consumers income level, they tend to buy high-quality products to improve their living standards. In the information age, how to stand out among many homogeneous enterprises has also become an important factor for enterprises to obtain market share.

In this context, COFCO can improve product quality on the premise of improving production efficiency through industrial digitization, which plays a vital role in improving individual productivity.[2]

From the perspective of enterprise operation, COFCO actively tried digital e-commerce channels in the first half of 2020 when the market was depressed after the epidemic. As a result, many goods without flow finally gained high popularity and were in short supply.[3] This can be explained by Schumpeter innovation theory: with the help of the Internet platform, the logistics, information flow and capital flow of the upstream and downstream of the industrial chain are transmitted in a digital way, which improves the circulation efficiency, reduces the transaction cost and changes the cost structure, resulting in economies of scale.

The reason is that e-commerce has established a decentralized flow distribution mechanism through industrial digitization, which enables all kinds of complex agricultural products on Chinese land to accurately match the target users, thus breaking the "two-way information gap", creating preconditions for large-scale sales of agricultural products and finally obtaining a large market share.

2.2. Profound Changes in COFCO Industry after Digitization

2.2.1. Current Situation of Digital Development of COFCO Group

COFCO group, as a pillar enterprise in the field of grain, has systematically promoted industrial digitization and made continuous efforts as one of the enterprise development goals.

After years of attempts, COFCO has made considerable achievements in the field of industrial digitization, and has invested some research results in many fields such as production line renewal and variety improvement. With the help of industrial digitization technology, COFCO has made breakthroughs in all aspects including variety, transportation and sales, and has undertaken COFCO production for grain, prosperity for grain, rooted agriculture the concept of serving agriculture.[4]

2.2.2. Changes in Enterprise Production End

The role of industrial digitization on COFCO production side can be summarized as follows:

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First, digitization helps to improve the quality of COFCO products and services and promote quality change.

The old production mode is backward, the ability of independent innovation is weak, and the overall product quality is not high. Digital transformation will change the R & D and production process of COFCO traditional production and gradually build a digital supply chain. Taking the manufacturing industry as an example, through the analysis of a large number of data generated in the production process of COFCO, further optimize the production process parameters, predict the possible problems, and improve the quality of products and services.

Second, digitalization helps to reduce transaction costs in COFCO market and promote efficiency reform. The development and application of industrial digitization make it possible for COFCO to significantly reduce the transaction costs with relevant enterprises, better promote market clearing and realize the effective docking of resources between supply and demand. With the full penetration of digital technology into COFCO marketing, service, production, R & D and other links, the digital transformation has been further accelerated.

Third, digitalization will help speed up the cultivation of new drivers of COFCO growth and promote dynamic change.

The new round of scientific and technological revolution brings more fierce scientific and technological competition. COFCO will have inexhaustible power for high-quality development by transforming it into an innovation driven mode.

Industrial digitization itself is the innovative achievement produced by the scientific and technological revolution, and realizes different forms of innovation in a digital way. The new driving force based on data is increasingly becoming the new direction of COFCO development.

For example, digitization has also given birth to a number of dynamic new models, new formats and new industries.

For example, the current exploration of digital transformation at the enterprise level has effectively promoted management innovation, business model innovation, marketing innovation and brand innovation.

2.2.3. Changes in Enterprise Demand Side

Through industrial digitization, COFCO has coordinated the global integrated network layout, continuously transported agricultural products to all parts of the world, established a perfect logistics system between global grain producing areas and sales areas, and is committed to building a comprehensive whole industry chain enterprise integrating collection and storage, processing, logistics, sales trade and distribution all over the world. By taking advantage of overall synergy, we can realize efficient operation and low cost of the system.COFCO is accelerating the establishment of a unique industrial digital model combining global supply chain with Chinese demand. Relying on the steady growth of grain consumption demand in China and Asia, COFCO is organically connecting the global supply chain system and grain source control ability with domestic logistics, processing and distribution networks, so as to reshape the competitive pattern of the global grain market with its unique competitive advantage.

Continue to deepen the digital exploration of the group industry and become a world-class integrated agricultural supply chain enterprise. At present, the epidemic is spreading all over the world. COFCO group is keenly aware that this will have an impact on important agricultural product suppliers. Subsequently, COFCO quickly deployed a smooth international logistics channel through industrial digitization to ensure the stability of the international supply chain. In the face of the continuous spread of the epidemic in Brazil, Argentina and other places, COFCO took timely measures locally, which not only effectively controlled the epidemic risk, but also realized the rise of performance against the trend. In Brazil, COFCO effectively ensured the stability of grain and oil procurement and trade volume, achieved a historic harvest in

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sugarcane harvesting, and the sugarcane crushing volume reached a record high.In Argentina, the total amount of grain and oil products exported through its own terminals increased slightly compared with the same period last year.[5]

2.2.4. Changes in Transportation and Storage

Compared with traditional database applications, industrial digitization has the characteristics of large amount of data, various types, low value density and fast processing speed. COFCO related transportation and storage enterprises involve a large amount of data and have high economic value. Industrial digitization can process these data quickly and efficiently and get correct and useful information, which is of great significance to the development of transportation.

(1) Reduce transportation costs and improve distribution efficiency through digital means

Industrial digitization covers many high and new technologies, mainly including big data storage, management and big data retrieval (including data mining and intelligent analysis). Through technological development and innovation, all links of COFCO product production have been optimized.For example, there will be more and more data centers in the aspects of identification, positioning and perception in the collection of information, mobile Internet technology in the transmission of information, and data application and development.The arrival of the industrial digital era effectively promotes the formation of COFCO's digital storage system. [6] Through the software to split the goods of the order, COFCO and relevant enterprises scientifically plan the picking route, shorten the walking time in the warehouse and improve the operation efficiency.In terms of hardware, enterprises can use fluent shelves to store goods in the slideway behind the picking surface to compress the picking surface, so as to greatly shorten the time spent in the walking process during order picking.Through the software, the order goods of multiple customers are combined into a batch, and the picker can pick the goods in batches at each picking position, so as to greatly improve the operation efficiency and system throughput of COFCO.

3. Overview of China Digital Agriculture Development

3.1. Digital Agriculture and its Characteristics

Digital agriculture is a part of the digital economy. Taking agricultural big data as the production factor and digital information technology as the new agricultural way to manage the agricultural object and environment, production, sales and operation of the whole process of agricultural production is an important measure to promote the full cycle transformation of the whole digital industrial chain in agriculture and rural areas.Traditional agriculture takes "people" and "land" as the core, the connection between agricultural production and operation and rural development is weak, and the systematization and scientization of agricultural industry are insufficient.Digital agriculture takes data as the core element, forming two new features: first, new data as the key production factor to promote the reform of production mode.Second, cover and expand the whole agricultural industrial chain.Compared with the production + marketing service system of traditional agriculture, the expansion of digital agriculture is to promote the further transformation of agriculture to commercialization and marketization.[7]

3.2. Specific Application of Digital Agriculture in Technology -- Taking COFCO as an Example

Under the influence of COFCO digital agricultural operation, Shihezi cooperates with scientific research institutions, taking Beidou system cotton precision operation as an example and referring to its digital practice and effectiveness.Through the application of Beidou System in cotton precision production.Using Beidou satellite signal receiving base station, Beidou tractor

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control system and production equipment to form a complete set of system for leveling operation, its leveling accuracy can reach about 5cm, which is much higher than the land leveling standard of traditional agriculture and current mechanized agriculture.This is also conducive to subsequent irrigation.[8]

COFCO group can calculate the number of agricultural factors currently invested by using the digital agricultural system, and the agricultural factors mainly include four aspects: biological factors, environmental factors, technical factors and socio-economic factors;Agricultural model refers to the internal laws and external relations between agricultural processes, such as crop growth law, the relationship between fertilization and yield, and the relationship between agricultural product yield and price. In traditional agricultural activities, farmers can only calculate by naked eye or experience. In order to prevent yield reduction, growers often overuse pesticides and chemical fertilizers,But also extensive use of water resources, resulting in a huge waste of resources and many environmental problems.Digital agriculture, on the other hand, carries out precise and intelligent agricultural control through digital transformation of agricultural elements and agricultural models.Under the command of this system, the waste of resource production will be greatly reduced.It will also reduce the social or environmental problems caused by land hardening, excessive pesticide residues, groundwater funnel and so on. For example, in the production and processing link, COFCO changed the extensive mode of grain processing in China through digital management, and carried out intensive production from the two directions of equipment and management, which not only achieved the goal of grain saving, but also improved product quality and reduced resource waste. For example, COFCO paid close attention to the spring ploughing time in agricultural production and planting, timely cooperated with banks to provide agricultural financial services to farmers, and accumulated nearly 5 million yuan of financing or providing agricultural materials in kind. And through the strategic cooperation of large chemical fertilizer enterprises, we can timely solve the farmers demand for high-quality fertilizer.

Deposit into agriculture and produce at the right time.

4. Analysis of Industrial Digital Development Strategy of COFCO Group Co., Ltd

COFCO Group Co., Ltd., as a leading agricultural grain and food enterprise in China and globally, actively strengthens the business docking and cooperation between agricultural production and operation and transportation entities, continuously optimizes the operation efficiency of the industrial chain, firmly builds a leading enterprise in the agricultural industry in the digital development, and gives full play to its leading role. Actively promote the deep integration of "science and technology + agriculture" and enable the transformation and upgrading of traditional industries with modern digital technology; Strengthen foreign cooperation and actively integrate into the global agricultural supply chain, industrial chain and value chain.Comply with the new development trend of China agricultural industry, fully grasp new opportunities, strive to strengthen the industrial foundation, actively promote the digital transformation and upgrading of industry, jointly build a new pattern of high-quality development of China agriculture at a higher level, more efficient and more sustainable in the internal and external dual cycle, strive to protect the happiness of the Chinese people on the table, and contribute to the maintenance of national food security and rural revitalization. Deepen agricultural supply side reform and make new contributions.This is particularly important under the current spread of COVID-19 in the world.[9]

China covid-19 is China international grain trade group, which is committed to the construction of China agri food industry chain. It is actively leading the Chinese agri food industry to the global food market and unblocking the global food supply chain.In the test of fighting the

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epidemic, through the construction of digital network information and digital communication platform, COFCO group released the performance sheet for 2020: the annual operating revenue of COFCO group exceeded 500 billion yuan and the total profit exceeded 20 billion yuan in 2020, of which the profit of the core main business of agricultural grain exceeded 10 billion yuan for the first time, exceeding the same period, budget and history.The year-on-year increase in the net profit of COFCO group ranks in the forefront of central enterprises, which fully proves that COFCO has faith and is more capable of taking China grain development path under the new pattern of the epidemic.

In the face of the new pattern of "epidemic normalization", COFCO group timely adjusted its import policies according to the changes of market supply and demand, increased the import of foreign food resources by using the digital information system, and quickly alleviated the short-term supply shortage in the domestic market by actively aggregating global high-quality food sources. In the face of the continuous spread of the epidemic in foreign countries and other places, COFCO group timely took comprehensive and perfect epidemic prevention and control measures locally, so as to effectively control the epidemic risk, so as to realize the "rise against the trend" of performance. In international grain trade, COFCO has effectively ensured the stability of grain and oil procurement and trade volume by using digital information platform and digital management. At the same time, the total amount of grain and oil products exported through its own terminals has increased year by year by taking advantage of the digital advantages brought by new technologies abroad. Under the guidance of the new international trade pattern, COFCO group has further promoted the integrated and effective development of the international grain supply chain through the integrated and standardized development of the international grain trade, so as to further reduce the risk of the international grain industry.[10]

The fifth chapter is the Enlightenment of COFCO digital development strategy.

From the development process and strategy of COFCO, it is not difficult to see that its essence is the reaction of the development of production relations to productivity in the face of the new market economic environment. Nowadays, the agricultural development direction represented by COFCO is agricultural modernization, and the essence of agricultural modernization is industrial digitization.

Therefore, we must further draw inspiration for industrial development through the analysis of COFCO, so as to take advantage of digital first mover advantage to gain a leading position in the competition.

To develop digital agriculture is to build an agricultural management system supported by digital technology, promote the integration of digital technology and industrial links such as agricultural product production, processing, logistics, sales and service, and realize the short chain of agricultural pre production, mid production and post production links and the optimization of agricultural industrial governance structure. Promote the application of big data, blockchain and other technologies in agricultural and rural business management and science, use systematic means such as analysis and early warning, safety supervision and quality traceability to promote the collection, analysis and application of core data in all links of the whole industrial chain of agricultural products and agricultural inputs, and build a grass-roots digital regulatory traceability and data collection mechanism.

Gradually realize the monitoring and early warning of the whole industrial chain of important agricultural products and inputs in the province.[11]

Through the research and analysis of COFCO, it is found that the reason why digital agriculture can effectively solve the sales problems of traditional agriculture is that the new digital platform can provide intelligent matching scheme between production and consumption, promote farmers to connect with consumers directly, and solve the problems of market segmentation

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and information asymmetry;Demand changes can be transmitted to producers in time to reduce the blindness of production.Modern agriculture must use digital technology to promote agricultural standardized production and intelligent management, and constantly reduce agricultural costs and improve product quality and output.At present, a major problem in the development of digital agriculture is that the scale of agricultural products sold through the Internet is relatively small, and the digital level of traditional offline wholesale and retail channels is not high.On the one hand, this is because the main units of agricultural production in China are mainly families and cooperatives, with a low degree of industrialization and low degree of standardization of agricultural products.On the other hand, because the special agricultural logistics system is relatively backward, the relevant cold storage and cold chain logistics on the whole chain are insufficient, the matching is insufficient, and the regional development is quite different.In order to realize the further development of agricultural digitization, we should pay attention to supporting the collaboration between e-commerce platforms and scientific and educational institutions, strengthen the cultivation project of intelligent agricultural talents in the construction of digital agriculture, give full play to the advantages of scientific research institutions and high-tech enterprises inside and outside the province in technology and talents, and promote the R & D of key applicable technologies such as artificial intelligence and 5g in the field of agricultural production,Carry out research on smart agricultural technology, make targeted breakthroughs in core technologies, and constantly strengthen the efficiency of the transformation and application of scientific and technological achievements. Make use of various forms of training resources, strengthen the training of smart agricultural skills, focus on strengthening the training of new professional farmers and rural informants, and train a number of smart agricultural application experts through the provision of digital talents.

At the same time, in the construction of agricultural digitization, we should strengthen the construction of cold storage and storage in the field, guide the integration of new digital platforms, optimize the special logistics system for agricultural products, stimulate scale effect and model innovation, continuously reduce logistics costs, and solve the key blocking point of direct access to the dining table in the field. Use the brand effect to improve the standardization of agricultural products, stimulate the potential demand of consumers, and better solve the problem of "difficult sales" of agricultural products. Select advantageous agricultural product regions and leading enterprises, cooperatives and large-scale family farms, establish and expand the national digital agriculture demonstration base, promote fine and standardized production according to the digital path of sales and logistics, explore the modes of order agriculture, cooperative agriculture and remote agriculture, and improve agricultural efficiency and product quality. Build China "digital production" agricultural highland.[12]

In order to promote agricultural modernization, we should also strengthen the construction of new business forms of smart agriculture in rural areas, promote the integrated application of artificial intelligence, big data and other technologies in new business forms based on the Internet, such as adoptive agriculture, sightseeing agriculture, urban agriculture, shared agriculture and cloud farm, and pay attention to the intelligent development of planting, animal husbandry, fishery and other fields.According to local conditions, carry out digital construction covering key fields such as facility agriculture, animal husbandry, agricultural machinery operation and pest detection, and gradually complete the sharing of data by stages by using big data technology, so as to realize the digitization of agricultural historical data, the automation of data collection, the intellectualization of data use and the convenience of data sharing,To further promote the construction of smart agriculture big data project.Focus on key areas, key fields and important agricultural products, and emphasize the need to strengthen the innovative application of intelligent agricultural science and technology such as intelligent

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perception, intelligent control and model simulation, so as to realize the organic combination of original innovation, integrated innovation, introduction, absorption and re innovation.

5. Conclusion

COFCO group, as one of the representatives of China agricultural enterprises, has greatly promoted the process of China agricultural modernization. It takes advantage of the opportunity of the new era to vigorously promote the development of modern digital agriculture and promote the progress of agricultural digitization in China. Compared with traditional agriculture and mechanized agriculture, modern agriculture in the new era relies more on digitization. Since the birth of information technology, many industrial products and tertiary industry services have received a lot of attention and promoted their further development by using the high computing power of computers and the sinking role of the Internet. With the progress of technology, traditional agricultural methods can not adapt to the development of current technology. Therefore, we should promote the systematization of modern digital agriculture and promote the adaptation of productivity and production relations.

References

[1] Anonymity COFCO group: be loyal to the national plan, promote circulation and improve people livelihood [EB / OL].

[2] Anonymity COFCO group: give full play to the strategic supporting role of state-owned economy [EB / OL].

[3] China Daily: food security under the epidemic: COFCO power to hold China rice bowl [EB / OL]Anonymity.

[4] Huo Xuexi Accelerating the digital transformation of traditional agriculture (political suggestions) [n / OL].

[5] Anonymity Hubei Daily: building an important node of domestic circulation and a strategic link of domestic and international double circulation [n / OL].

[6] Liu Haiqi Accelerate the digital transformation of modern agriculture by driving agricultural modernization with precision agriculture [M]Agricultural resources and Regionalization in China2019, (01) page 1-6 + 73.

[7] PermissionYang HanjunLV Zhenyan Prospects for the development of digital agriculture in the 14th five year plan [D / OL].

[8] Huo PengWang Sangui Agricultural and rural digital transformation: realistic representation, impact mechanism and promotion strategy [J]. 2020-12:48-56.

[9] Chen JindanWang Jingjing Industrial digitization, local market scale and technological innovation [D]Nanjing University of Posts and telecommunications. June 2020.

[10] Anonymity Xinhuanet: COFCO road to internationalization [n / OL].

[11] Anonymity State owned assets report COFCO group: to rebuild itself with COFCO Group [J / OL].

[12] Anonymity Xinhuanet: industry helps agriculture COFCO escorts spring ploughing [EB / OL].