Technology Related to Agricultural Transformation and Development based on 5G Technology

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Abstract: The era of 5G comes quietly, along with the improvement of network operation speed, it also promotes the transformation and development of agriculture, which conforms to the development status of China's 5G technology and the objective law of agricultural development. Under the guidance of technology and concept, 5G is used to promote agricultural modernization. 5G technology will definitely build a new generation of high-speed, instantaneous and secure intelligent information infrastructure in an all-round way, which also means that the information transmission network built by 5G technology will have a comprehensive and profound impact on all aspects of social life. Starting from the current agricultural situation, policy support and development prospect, this paper analyzes the factors restricting China's agricultural development, and puts forward a series of technology-related studies by using the advanced and scientific nature of 5G technology. Results indicate that young people use the Internet accounted for the biggest is as high as 43.58%, young people can drive in the network platform to promote sales of agricultural products, helping new agricultural development pattern, in order to obtain the professional knowledge of agriculture, 31.47% of farmers are willing to use 5G technology, contribute to the intelligent agricultural technology update and the popularity of e-commerce of agricultural products, it also promoted the agricultural reform and transformation.

Keywords: 5G Technology; Agricultural Transformation; Technical Application; Development Trend

1. Introduction
Compared with 4G, 5G technology develops more rapidly and has a larger capacity, and the network speed is almost more than 10 times that of 4G. The speed of downloading videos or songs is greatly improved, which can be completed in a few seconds to avoid the bad situation of multi-user network speed [1]. When watching the video with the highest bit rate on each platform, there is no difference between dragging the progress bar and watching it after caching. The delay of playing games is also
stable below 60ms. The popularization of 5G will greatly optimize the current network experience [2]. After the upgrade, the speed will be faster and the delay will be lower, which is enough to see that 5G is better and enables people to enter the era of the Internet of everything [3]. The application of 5G technology in agricultural development and transformation will be a great move. The in-depth integration of the Internet and agricultural modernization will help revitalize the countryside and benefit farmers, not only from the planting and harvest of crops, but also by providing multiple sales channels to help farmers increase their income [4].

There are many limitations in the current agricultural development, such as producers' failure to obtain information in a timely manner and their inability to understand the changes in the current market needs, and the high cost of obtaining information [5]. The information of producers and consumers is not consistent with each other, so that the traditional agricultural production system is not consistent with the reality and cannot obtain higher income [6]. On the other hand, in most areas, farming is still carried out by families or paid by people, which makes the planting cost higher and the efficiency lower than that of agricultural machines. In addition, the use of agricultural fertilizers and industrial pollution cannot guarantee the quality and safety of agricultural products [7]. Therefore, the problems of low crop planting efficiency and low product quality restrict agricultural development [8].

With the application of 5G technology, many current problems can be solved [9]. By adopting the technology of sensor can acquire crops in different periods of data, can be efficient irrigation, reduce the waste of water resources, precision pesticide applying fertilizer to improve resource utilization greatly promoted the agricultural development, this study suggests that using big data analytics, cloud computing and Internet of things, and other advanced technology can effectively realize agricultural development and change [10].

2. 5G Applications in Agriculture

2.1 Shift from Traditional Agriculture to Modern Agriculture
(1) Promote the development of agricultural informatization
5G accelerates the dissemination and communication of information, enables people to obtain information in a more timely manner in life, and helps the establishment and improvement of information in the platform of agricultural industry informatization in agriculture. By using 5G technology to collect agricultural information on major agricultural information platforms and make detailed analysis of different departments, we can make them give play to their unique advantages and strengthen interaction among different departments to promote the spread of agricultural product information. Agricultural informatization can strengthen the connection between the secondary and tertiary industries, promote the rapid development of rural tourism, experience tourism and other new industries, improve the traditional agricultural structure, and promote the upgrading and transformation of agriculture.

(2) Intelligent agricultural production and processing
Under the environment of 5G, bioinformatics can be used to predict the natural enemies of crop pests, and insecticidal microorganisms can be used to effectively reduce environmental pollution caused by pesticides, precisely prevent or kill pests, and at the same time reduce production costs. The use of 5G technology in agriculture can also accelerate the intelligent development and upgrading of agricultural equipment. A complete monitoring system has been established in China's grain producing areas, with advanced equipment such as sensors, cameras and controllers to collect data on soil ph, soil fertility and drought conditions. After 5G, it can be transmitted to the cloud platform quickly and stably. All the information of crops can be known through big data analysis and cloud computing, and it can be fed back to the administrator in a timely and effective manner, so that the planting means can be changed and updated accordingly. In addition, 5G network can be used to conduct live visits on major platforms and explain various technologies and planting processes in detail, so that other planting farmers can learn relevant knowledge and experience.
2.2 Promote Ecological Development of Agriculture

Now the living standard gradually improves, people no longer pursue to have food to eat, eat full, but eat more healthy and safe. According to this feature, 5G technology can establish a development model integrating ecological protection and agricultural production. For example, create a two-dimensional code, scan the two-dimensional code can watch the production of agricultural products in each link of the video. In addition, 5G technology can be used to integrate aquaculture and crop production, so as to monitor changes in water quality data and the health status of fish and shrimp. The material exchange between them is conducive to the development of agricultural ecology.

3. 5G Technology and Agricultural Industry Chain

In the context of 5G, the agricultural industry chain has a three-level increasing property, as shown in Figure 1. Namely, the production and processing intelligence, management service information and overall management intelligence information. Level-1 intelligence is automatically collecting CO2 concentration, illumination, soil temperature and humidity under big data, artificial intelligence and other technologies. Second level informatization refers to the logistics transportation and agriculture related information publicity and promotion more quickly. The three-level intelligent informatization is to coordinate the first-level and second-level management, reduce the manual control, and realize the modernization and intelligentization of the agricultural industry chain. The development and use of 5G will combine agricultural production and processing with the entire management team to create the Internet of everything. 5G technology can not only improve the quality of agricultural products, but also control the quality of products. Only by ensuring the high quality of agricultural products and accelerating the transformation and upgrading of agriculture can we get truly pollution-free green products. In addition, the detection of agricultural environment and the construction of personalized services of the Internet of things should be strengthened to promote the use of the Internet of things in crop processing, that is, the drying of grain, storage of vegetables, transportation of agricultural products and other problems can be effectively solved.

![Figure 1. Three-level increasing attributes of modern agricultural industry chain in the era of 5G](image)

4. Application and Discussion of 5G Technology in Modern Agriculture

In the era of 5G, young people are the main force of the agricultural management service platform. According to the China Internet network information center's 2020 report, as of December 2019, Internet users aged 10-39 accounted for 57.68 percent of all Internet users, with those aged 20-29 accounting for a peak of 43.58 percent. Chinese young people, especially those born in the 1990s and 1980s, love online social networking and are the mainstays of the Internet in China, as shown in Figure 2 below. Most Internet users are college students or treasure mom, have free time to dominate, and agricultural products sales also cannot leave the support of the Internet, each big operation platform live with goods, such as taobao, a lot of spelling, jingdong APP is in full swing to broadcast live sales, greatly promote the marketing of agricultural products, solve the problem of offline sales difficulties. Not only that, but also led to the path of prosperity in poor rural areas, the arrangement of physical disability or literacy groups re-employment. Therefore, we should actively build an e-commerce platform with the attributes of agricultural products. In addition, college students should make full use of the characteristics of the Internet to combine the two. Besides, short videos are particularly popular in the era of 5G.
Table 1. 5G helps the intelligent system of rural agricultural production and marketing

| 5G technology platform | Agricultural production base | Marketing |
|------------------------|-----------------------------|----------|
| Mobile terminal        | Agricultural production system | Agricultural product marketing system |
|                        | Rural information service system | Rural social governance system |
|                        | Quality and safety supervision system for agricultural products |

The construction of agricultural information infrastructure is to transform the 5G network into the material basis and technical support for agriculture, namely the construction of an intelligent system for agricultural production and marketing (see Table 1). The use of 5G technology can enhance the scientific controllability of agricultural production and transportation, and promote the effective connection between agricultural products and consumer demand. In terms of agricultural production, 5G technology will be used to complete environmental testing of agricultural products, effectively apply fertilizer and reduce the use of pesticides, so as to reduce production costs and improve efficiency. It can also be used for weather analysis and natural disaster prevention based on big data, and precise management can be realized by using sensors, detectors and other tools, so as to effectively save labor costs. In agricultural product marketing, through the 5G big data can be real-time understand the status of supply and demand of agricultural products, make the agricultural production control science, greatly promoted the agricultural industrial chain scientific and visualization, information feedback, adjust the production program, to avoid excess supply is not enough to produce products supply, and under the supervision of the Internet of things, timely feedback of consumers and food safety can be guaranteed. On this basis, we will build an agricultural information platform for the integrated development of primary, secondary and tertiary industries, realize the organic connection between small farmers and the development of modern informationized agriculture, and form a new agricultural production and marketing model that integrates the whole industrial chain of "production + processing + science and technology".

Table 2. Questionnaire of farmers' intention to apply 5G technology

| Application purpose | Number | Proportion |
|---------------------|--------|------------|

Figure 2. Survey results of age structure of netizens
As shown in Table 2, 31.47% of the farmers are willing to use 5G technology in order to acquire professional knowledge related to agriculture, which is conducive to the better development and planting of agriculture. 19.58% of farmers are good at using advanced technology to achieve precision agriculture in order to save costs and gain more benefits. For example, the advantages of 5G network sharing, remoteness and convenience can be used to create the mode of agricultural information entering villages and households, and new media methods such as live broadcast training, remote teaching and electronic version of pictures and texts can be used to enable farmers to accept new knowledge without leaving their homes. First, the concept of 5G to help farmers; Secondly, we should intensify the publicity and popularization of new agricultural varieties and technologies, teach farmers how to use 5G information technology to provide technology, sales, supply and demand information and other services for agricultural development, and how to obtain agricultural product sales through 5G network to realize farmers' early prosperity. In the circulation link, e-commerce of agricultural products and agricultural products traceability system are widely used, and e-commerce of agricultural products is the most important content that Internet technology is applied in the circulation link of agricultural products. In the consumption segment, Internet applications are used in leisure agriculture and daily consumption, and there is site navigation in leisure agriculture, such as cooperative marketing and promotion between agritainment and map APP. At the same time, we also need to draw on outstanding agricultural talents from home and abroad to conduct vocational and popular science education in rural areas and share experience in 5G agricultural modernization. The training is not a one-way process, but needs two-way interaction and feedback. The government should guide farmers to make use of 5G technology, summarize the experience and lessons of agricultural production, and evaluate the effect. This paper summarizes the characteristics of 5G technology and its application scenarios, and looks forward to the application of 5G technology in agriculture and rural areas.

5G technology shortens the time of data acquisition and transmission and expands the space of data collection. At present, many greenhouses have begun to use intelligent equipment, such as the placement of various probes or sensors. On the one hand, managers of greenhouses can collect massive data of atmosphere, crops, pests and diseases, etc., and then transmit these data to the data center by virtue of the advantages of 5G network in real time, remote and fast. Through big data analysis, they can quickly judge the growth situation of crops and give appropriate solutions. On the other hand, for agricultural mechanization operation, such as unmanned tractor with 5G high reliable and low latency communications features, can be real-time data, provide the administrator with obstacles with the help of artificial intelligence algorithms to redirect paths, each field were collected using unmanned aerial vehicle (UAV), the information such as the image data, the late can be realized based on precision agriculture big data management, implementation of less labor and more effective efficiency of planting, higher yield and higher profits.

5. Conclusion
Nowadays, with the continuous improvement and improvement of 5G technology, the development and transformation of agriculture and other related technologies are also becoming increasingly intelligent and optimized, promoting the "5G+ agriculture" strategy and promoting the modernization of China's agricultural development. Artificial intelligence can detect the growth of crops and timely
irrigate and kill insects, which is conducive to increasing the crop harvest. The development of e-commerce and the Internet of things has greatly enriched the sales channels and modes of agricultural products, so that farmers are no longer worried about the sales, and consumers can buy more fresh and satisfied agricultural products, thus bringing benefits to those engaged in agriculture and achieving a win-win situation. In order to realize the modern agriculture escort, speeds up the agricultural transformation and the development speed.

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