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# How Far Are Chinese Farmers from Adopting Digital Agriculture?

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## Summary

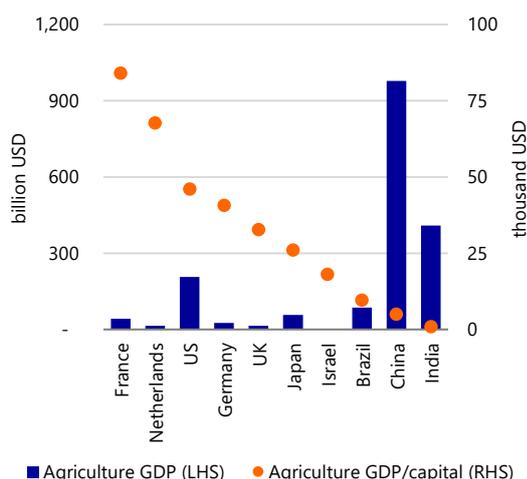
Digital agriculture, like many other innovations, is not instantly commercially available just because the advanced technology has been invented. This is especially the case in China, with its agriculture system dominated by smallholders. The value of digital agriculture value can be maximized only when the data models are implemented locally, and small farmers are integrated into the industrial chain.

## China's Digital Agriculture Has a Long Way to Go

Agriculture is facing increasing challenges in China, with a rapidly growing population, shrinking arable land and accelerating urbanization. Under the pressure of this contradiction between population and resources, digital agriculture becomes a powerful tool in achieving the goal of reducing input, improving production efficiency and improving the quality of agricultural products.

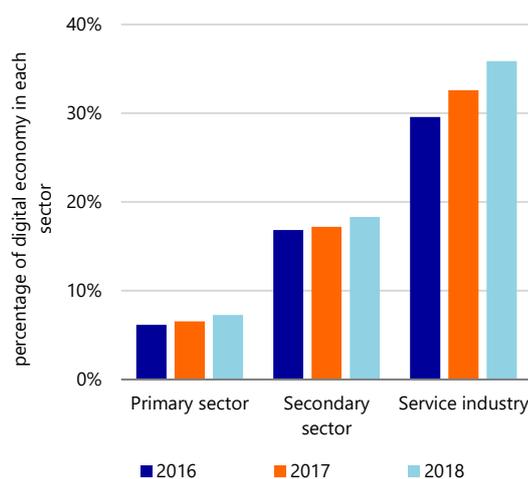
Successful examples of the use of digital architecture let manufacturers and farmers appreciate the charm of digital agriculture. At the same time, the central government has also released several documents to support its development. IT giants, like Alibaba, JD, Baidu and Tencent also embrace digital agriculture. Digital agriculture seems to be the lifeline for Chinese agriculture.

**Figure 1: Chinese agriculture is big, but not strong**



Source: FAO, National Bureau of Statistics, Rabobank 2020

**Figure 2: Digital economy development is slow in the agricultural industry**



Source: China Digital Economy Development and Employment White Paper 2019

Although the contribution of the digital economy to agriculture is increasing year-on-year, the digitization level within agriculture is relatively low and the speed of uptake is relatively slow, when compared with the secondary industries and the services industry. In 2018, China's digital economy reached CNY 31.3 trillion, up 20.9% YOY. It accounts for 34.8% of GDP. However, the digital economy accounts for only 7.3% of agriculture, while this proportion is 18.30% in the secondary industry and 35.90% in the service industry. At the same time, farmers' income has not seen a substantial increase, which affects the purchasing intention of farm inputs products and thus impacts the supply-demand balance of the entire farm inputs industry. Although China's digital agriculture is in rapid development, it still has a long way to go before true value is created.

## What is Blocking Business Value Realization

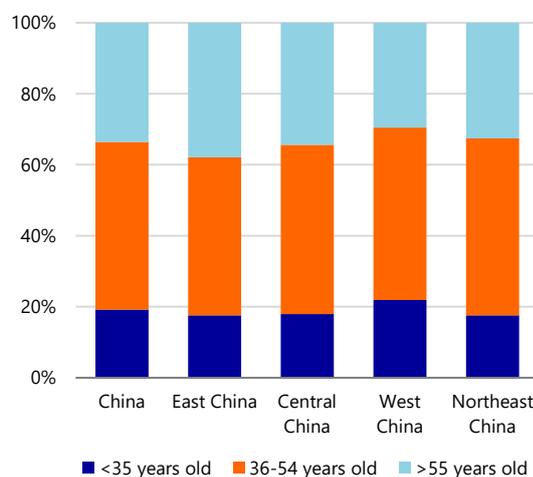
### Decentralized operation model

Small and medium-sized farmers are still the mainstay of Chinese agriculture. According to the data from the third agricultural census, small farmers make up more than 98% of the agricultural sector in China. For individual farmers, the input costs of smart agricultural infrastructure and technology cultivation are high.

### Talent shortage

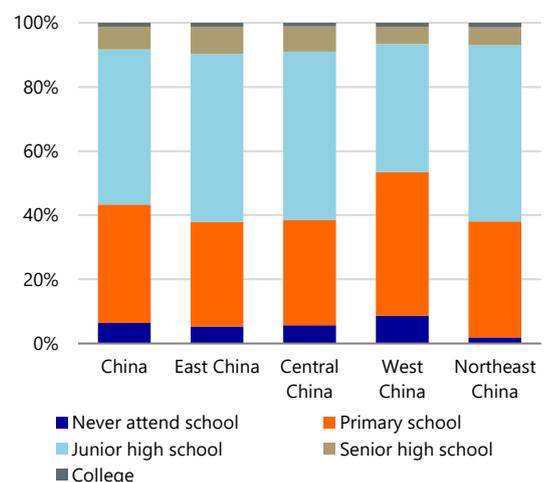
Digital agriculture is a technology-based industry. China's rural workforce is often poorly educated, and current production depends largely on experience. In addition, urbanization has led to the continuous inflow of young and strong labor into cities, resulting in an increasing proportion of aging farmers in rural areas. Most farmers have not realized the value of digital agriculture. And they are not willing to invest, or unable to apply this technology.

Figure 3: The rural population is aging



Source: Chinese National Bureau of Statistics, Rabobank 2020

Figure 4: Poorly educated farmers unable to master key technologies



Source: Chinese National Bureau of Statistics, Rabobank 2020

### Data collection and analysis difficult

Digital agriculture brings high requirements with regard to the real-time response of network and mass data accumulation. However, at present, China's rural information service network is not perfect, and agricultural machinery cannot be successfully applied due to the lack of qualified farmland, water conservation facilities and the social service system. More importantly, there is a shortage of special chips for digital agricultural equipment, which leads to difficulties in data acquisition.

## Discontinuous industry chain and information flow

The discontinuity of the agricultural industry chain is one of the persistent problems of Chinese agriculture. The data required for digital agriculture is multi-dimensional, involving the production of agricultural inputs upstream, the growth of crops in the middle reaches, as well as the demand changes and logistics control capacity of the downstream. Without the consistent coordination of the industrial chain, it is impossible to collect, and make use of, data correctly.

## Growth Potential

China's digital agriculture certainly has great growth potential, especially as the central government is pushing ahead with land reform and 5G technology, which has laid the foundation for efficient data transmission and access. Expanding databases will also help to guide agricultural production more efficiently.

Global giants are taking the lead in digital agriculture, but haven't found a good way to land in China yet. At the same time, with the intensification of technological competition among major countries, the barriers to the introduction of technology are constantly increasing. Moreover, due to the large differences in agriculture between China and other countries, foreign models cannot be directly applied. This provides opportunities for domestic enterprises to develop the local data model.

Chinese agriculture production is transforming, with increasingly more scale, standardization and intensity. Big farmers are more likely to rely on technology, knowledge, resources and financial services. But in order to promote reform, digital agriculture implementation should also try to embed technologies such as IoT, big data and artificial intelligence into individual industrial operations. This is a fundamental change in the digital agriculture profit model – moving from selling equipment and hardware to realizing business value through an integrated industrial chain. This can help small farmers improve agricultural production efficiency and be able to compete with international agricultural giants.

# Imprint

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