

# Research on the Constraints and Countermeasures of Farmers' Digital Response

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**Abstract:** *The challenges faced by farmers in the process of digital response show a multi-dimensional trend. Through a comprehensive analysis of internal and external environmental factors, this paper identifies the constraints faced by farmers' digital response, and then puts forward targeted measures and suggestions to improve farmers' digital response level, so as to promote the sustainable and high-quality development of animal husbandry.*

**Keywords:** *Farmers, Digital Response, Constraints, Suggested Measures*

## 1. Introduction

Since 2012, the Central Document No. 1 has repeatedly mentioned the informatization and modernization of agriculture and animal husbandry. Promoting animal husbandry to take the lead in realizing modernization in agriculture is the major responsibility of animal husbandry to help "strengthen agriculture". As an important part of agriculture and rural economy, animal husbandry has reached a new node of transformation and upgrading, from free-range farming to scale, standardization, modernization, and then to intelligence. From the perspective of operation, moderate scale and standardization are the general trend; from the perspective of production, scientific breeding is inevitable, reducing feed waste and increasing conversion efficiency, so that limited livestock and poultry can produce more meat, eggs and milk; from the perspective of efficiency, The whole chain of animal husbandry has changed from extensive management oriented to groups to refined and timely management oriented to individuals; from the perspective of consumption, the reform of supply-side structure and the improvement of consumer health attention have brought new opportunities; from the perspective of marketing, Traditional mass consumption has turned to a brand strategy that captures the minds of consumers. The breeding industry must take a high-quality development path with digital intelligence as its greatest feature. Digital animal husbandry can solve the pain points of industrial development through visualization of production process, traceability of production information, intelligent production process, precise management of farms, and platformization of marketing models.

Although the state and local governments vigorously promote the transformation and upgrading of traditional industries in the digital economy, due to factors such as large investment, high risks, and uncertain returns, farmers are not very motivated to carry out digital transformation. This puts farmers into an embarrassing situation where digital transformation is "seeking death" and not digital transformation is "waiting for death". Based on this, this paper analyzes the constraints faced by farmers in the process of digital response, and puts forward measures and suggestions to improve farmers' coping level, reduce the probability of risk occurrence, and increase farmers' enthusiasm for digital response.

## 2. Literature Review

The relevant research mainly analyzes the significance of digital transformation and upgrading of farmers, existing problems and countermeasures and suggestions.

### 2.1 Research on the Meaning of Digitalization

Gu Lingyan et al. (2015) believes that digital animal husbandry is the key to getting rid of extensive

animal husbandry, and proposes the concept of "smart livestock" to comprehensively and multi-level analyze the promotion effect of information technology on animal product production. Huang Yaping and Xiao Wanjun (2020) pointed out that under the situation of rapid development of large-scale breeding, breaking the traditional pig breeding model can effectively solve the problems of environmental pollution, chaotic production process, poor management of feed and drugs in pig farms, and avoid or reduce the risk of disease outbreaks in pig farms. The establishment of a smart pig production line allows farmers to easily manage the pig house, straighten out the production process, and produce safe pork, which is the basis for the stable development of the pig industry. Xiong Anran et al. (2020) believe that digital farming has become the only way for my country's dairy industry to improve quality and efficiency and enhance its international competitiveness.

## ***2.2 Research on the Problems Existing in the Digitization Process***

Zhang Guofeng and Xiao Wan'ang (2019) believe that the new generation of information technology is accelerating the transformation and upgrading of animal husbandry to technology-based and standardized. Intelligent animal husbandry technology has developed rapidly in aspects such as breeding environment monitoring and identity identification. However, individual precision feeding, welfare behavior monitoring, product safety control, etc. still need to be greatly improved. Zhang Xiaoshuan et al. (2019) believe that the current information monitoring technology in animal husbandry is still backward, and the penetration rate is not high,

Zhang Xiaoshuan et al. (2019) believe that the current information monitoring technology in animal husbandry is still backward, and the penetration rate is not high, so it is difficult to accurately and effectively grasp the actual conditions of farm animals themselves and their living environment in the breeding process. In the future, the way of information acquisition will be developed from manual collection to automatic collection, and signal processing and information transmission will develop in the direction of diversification, compounding and intelligence. Xu Haichuan et al. (2019) pointed out that in order to gradually improve the "smart animal husbandry" and become a powerful boost to the development of animal husbandry, it is necessary to solve the problems of scarcity of compound talents, insufficient policy support and low cultural level of farmers. Ding Lin et al. (2020) pointed out that the development achievements of digital animal husbandry are mainly reflected in the construction of a smart cloud platform and the strengthening of digital construction of farms. However, there are still many difficulties, such as lack of awareness, immature technology and insufficient talents. Pang Meirong and Zhang Minglei (2021) believe that there are many practical problems in digital animal husbandry due to imperfect standards formulation, which hinder the development of digital animal husbandry.

## ***2.3 Research on Digital Countermeasures and Suggestions***

Xue Jianliang et al. (2015) believe that state-owned farms are greatly affected by policies, and there is a certain delay in market development. The management level in informatization construction is too complicated, resulting in a slow pace of informatization construction. Therefore, the digital construction needs to be transformed from government-led to farm-led. Qi Yunying (2016) started from the perspective of agricultural and animal husbandry logistics informatization construction, taking agricultural and animal husbandry industrialization and modernization as the goal, integrating information in all aspects of agriculture and animal husbandry, and realizing the effective combination of information transmission and material flow process. Chen Yifei et al. (2020) believe that digital animal husbandry is a comprehensive application of whole-process automation, artificial intelligence technology, intelligent control technology, data acquisition and big data analysis, and reasoning and decision-making technology in the context of animal science applications. Digital animal husbandry should popularize automation, establish data collection, storage and analysis systems, introduce artificial intelligence methods and intelligent technologies, and speed up the construction of informatization and cloud platforms. Xue Suwen (2020) believes that African swine fever promotes China's pig industry to pay more attention to infrastructure construction and biosecurity, and enterprises should adopt a refined, intelligent and platform-based model of mutual cooperation and integration. Under the premise of some human, material and financial resources, it is particularly important to improve the operation efficiency of enterprises and achieve cost reduction and efficiency improvement.

### **3. The Restrictive Factors of Farmers' Digital Response**

At present, the animal husbandry industry is facing excellent opportunities, such as consumption upgrading, paying attention to health, paying premiums, diversifying channels, IoT (Internet of Things), 5G, etc., but also facing environmental protection, diseases, labor costs, market premiums, and consumer trust crisis, precise service and many other challenges. Digital animal husbandry is still in the exploratory stage, both in terms of technology and management.

#### **3.1 Technical Constraints**

(1) In terms of data acquisition, software and hardware technology is immature. There is a lack of intelligent breeding equipment and intelligent production facilities, and the automatic acquisition and sharing of information is low. In the process of information acquisition, there are a lot of links that rely on manual observation and input, and it is difficult to fully realize automatic monitoring. There are many technologies that need to be broken through, the compatibility with foreign equipment is not enough, and the data transmission speed and stability need to be broken through.

(2) In terms of data analysis, data application analysis is not comprehensive enough. The ability of information fusion and analysis is not enough, the utilization rate of a large amount of heterogeneous data collected based on the Internet of Things is not high, and the research on the relationship between animal growth mechanism and multivariate information is insufficient. Most of the functions of some digital pig farms are still in the demonstration stage, and the data analysis and early warning application of each link module needs to be strengthened.

(3) In terms of data sharing, there are a large number of isolated islands of information, and the connection with the regional smart cloud platform is not enough. The efficiency and quality of information sharing need to be improved.

#### **3.2 Talent Constraints**

Apart from technical constraints, there are still problems such as insufficient awareness of farmers and the need to improve their knowledge level. Most farming entities and many competent departments lack relevant knowledge about digital pasture construction, coupled with the high input cost of digital construction, which makes farmers not fully aware of the urgency of digital response. There is a serious shortage of talents who understand both livestock and poultry production and the operation and management of advanced equipment, which directly affects the advancement of the digitalization of animal husbandry.

Farmers face many constraints in the process of digital response. Information technology is just a tool, its effectiveness depends on how people use it. Good use is good, bad use is counterproductive. Digital animal husbandry is still in its infancy as a whole, and its core role is to reduce human-animal contact and provide auxiliary decision-making. Whether a farm introduces a digital farming management model mainly depends on whether it meets the interests of the farm, that is, whether the combination of these concepts, systems and hardware can truly reduce production costs and improve farming efficiency in the long run. So farms of different scales and production models have different digital responses when faced with the above opportunities and challenges.

### **4. Countermeasures to Improve Farmers' Digital Response**

#### **4.1 Development of Digital Technologies**

Accelerate the development of digital technology. Increase the research and development and application of technologies and equipment such as ear tags, temperature sensing and environmental control, pay attention to solving the compatibility problems of domestic and foreign software and hardware facilities and equipment, and promote the opening and sharing of their data ports. Increase the integration of intelligent management platforms such as farm intelligent perception control system, livestock and poultry health monitoring system, automatic feeding system, biosafety management intelligent system, and intelligent manure treatment system to form a closed loop of perception-transmission-analysis-control. Organize information technology application units such as farms, scientific research institutes and promotion departments to formulate industry standards such as sensor and livestock identification system standards, animal husbandry multi-source data fusion

analysis and processing and other industry standards to solve data interconnection between application systems. Utilize information systems to realize the natural connection between industry-based IoT and AI systems. Realize the automatic acquisition of production and management data through hardware equipment, replace part of manual decision-making through large databases and algorithm models, and improve farm operation efficiency through data intelligence.

#### **4.2 Cultivate Digital Talents**

Aggregate resources such as scientific research institutions and carry out new-type talent training and technical guidance. Digital animal husbandry is inseparable from compound talents with modern breeding awareness and the new concept of intelligent breeding from bosses to breeders. The premise of digital animal husbandry is the improvement of infrastructure, standardization of production and standardization of personnel. It is people who play a decisive role in the improvement of these infrastructures and management systems. Therefore, all enterprises that need to transform digital farming are inseparable from the reconstruction of their own organizational structure and process standards. Based on digital farming, reconstruct the organizational mechanism, business standards, process system and talent strategy of the farm, and realize the transition of practitioners from empirical farming to digital farming.

#### **4.3 Building a Digital Platform**

At present, the animal husbandry industry data service has gradually moved from a point-like to a mesh-like cooperation model. The animal husbandry industry chain is too deep and too long, and almost no company can do all the business of fully intelligent animal husbandry alone. Build a digital application platform to make the alliance between different enterprise entities easier, share and co-exist, reconstruct the order through internal cooperation and external linkage, seek common advancement and retreat on one platform, interdependence, and form a new digital animal husbandry ecosystem, which is the main way for the healthy and orderly development of digital animal husbandry. On the basis of intelligent farming, platform farming improves the quality and value of end products through ecosystems and ecological contracts through the natural connection between farms, input manufacturers, slaughtering and food processing companies; and improves the comprehensive competitiveness of each link through the platform operator's entire industry chain network synergy ability, create more benefits for farmers participating in digital transformation, and promote their digital response enthusiasm.

### **5. Conclusions**

This paper discusses the constraints faced by farmers in the process of digital response under the background of national and local governments vigorously promoting the digital economy. And from the aspects of digital technology development, digital talent training and digital platform construction, it proposes measures and suggestions to promote farmers to actively respond to digital transformation, providing a reference for promoting the transformation and upgrading of animal husbandry.

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