

New Network Technologies Empower the Value-Added and Efficiency Improvement of the Watermelon Industry Chain: Taking Tongyang Watermelon as an Example

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Abstract: As a geographical indication product of Shuyang County, Suqian City, Jiangsu Province, the Traditional Industry Chain Model of Tongyang Watermelon has some problems such as low efficiency, high loss and limited market in planting, transportation and sales. Taking Tongyang watermelon as an example, this paper analyzes the application and effect of new network technology in smart planting, logistics optimization, online sales and brand building, and discusses the future development potential. The results show that the optimization model of industrial chain empowered by new network technologies not only provides a practical way for farmers to increase their income and modernize their agriculture, but also provides a practical reference for the implementation of rural revitalization strategy.

Keywords: New Network Technology; Tongyang Watermelon; Industrial Chain Optimization; Intelligent Planting; Industry Chain Collaboration

1. Introduction

In recent years, with the all-round promotion of the rural revitalization strategy, the optimization and upgrading of the agricultural industrial chain has become an important way to realize the high-quality development of rural economy. As a characteristic agricultural product of Tongyang Town, Shuyang County, Suqian City, Jiangsu Province, Tongyang watermelon has become an important pillar of regional economy with its high quality and wide market recognition. However, under the traditional industrial chain mode, watermelon production and sales still face the problems of backward planting technology, high transportation loss and single sales channel.

These problems not only limit the development potential of industry, but also constrain farmers' income growth and regional economic development, affecting the overall improvement of agricultural efficiency.

With the rapid development of new network technology, Internet of Things, big data, e-commerce platform and other technologies provide new opportunities for the optimization of agricultural industry chain. The introduction of smart agricultural technology, logistics optimization scheme and online interactive platform can not only improve the production efficiency of Tongyang watermelon industry, but also expand the market coverage, enhance brand influence and promote the regional economy to modernize. Taking Tongyang watermelon as an example, this paper studies how the new network technology can enable the watermelon industry chain to increase value and increase efficiency, which not only helps to explore the traditional agricultural transformation and upgrading path, but also provides a practical reference model for rural revitalization. This paper aims to analyze the innovative development strategy and future potential of Tongyang watermelon industry chain from the perspective of technology application and practical results.

2. Current Situation and Problems of Traditional Watermelon Industry Chain

2.1 Current Situation Analysis

As a geographical indication product of Tongyang Town, Shuyang County, Suqian City, Jiangsu Province, Tongyang Watermelon has always been known for its excellent quality and market reputation. However, the production and sales of Tongyang watermelon is still relatively traditional, restricting its industrial development potential. In terms of production, most growers rely on experience

for planting, lack scientific guidance, and the planting process and management methods are relatively extensive. In sales, farmers sell watermelons mainly through two ways: One is to transport watermelons to the local market or farmers market direct sales, this way needs a lot of manpower and material resources, and the sales process is susceptible to weather, market demand and other external factors; The second is to send watermelon to the middlemen, although this way reduce the sales pressure of farmers, but the middlemen often lower the purchase price, resulting in lower economic returns to farmers. In addition, the watermelon industrial chain in Tongyang Town has not formed a systematic development mode, and there is no close connection between the production end, circulation end and consumption end, resulting in the potential value of each link of the industrial chain not being fully excavated [1].

2.2 Existing Problems

There are many problems in the traditional planting and sales model of Tongyang watermelon. In the planting process, the traditional artificial irrigation is the main irrigation method, lack of precise control, resulting in water resource waste and uneven irrigation, affecting the quality and yield of watermelon; The canopy facilities are crude and outdated, and the ventilation and humidity control capacity is insufficient, which further aggravates the occurrence of diseases in the planting process. In the transport link, the packaging and logistics input is insufficient, farmers need to purchase packaging materials to protect watermelon, but high cost and lack of technology to effectively reduce transport losses, watermelon loss rate remains high. In the sales link, Tongyang watermelon mainly depends on traditional channels, lack of diversified sales model, brand construction and insufficient publicity, resulting in low product premium capacity. At the same time, the information between upstream and downstream of the industrial chain is asymmetric, farmers lack of timely feedback channels to the market demand, production and consumption are disconnected. In addition, farmers are in a weak position in the industrial chain, the bargaining power is low, it is difficult to share the value-added income of the industrial chain. These problems have

seriously restricted the development of watermelon industry in Tongyang and the realization of increasing income of farmers.

3. Application of New Network Technology in Tongyang Watermelon Industry Chain

3.1 Technical Means and Scheme

3.1.1 Intelligent planting technology

The intelligent planting technology of Tongyang watermelon industry chain has significantly improved the planting efficiency and product quality by introducing modern agricultural equipment. Intelligent agricultural machinery based on VSLAM technology can realize high precision operation, such as precision seeding, field management and fertilization, which reduces the error of manual operation in traditional planting process. By monitoring the soil moisture and environmental conditions, the automatic irrigation device can accurately control the irrigation amount, avoid the waste of water resources, and effectively improve the growing environment of watermelon. The design of ventilation and dehumidification greenhouse not only optimizes the lighting conditions, but also reduces the incidence of diseases by intelligently adjusting the humidity and temperature inside the greenhouse, thus providing stable guarantee for the planting of high-quality watermelon.

3.1.2 Logistics and packaging optimization

Technical innovation of logistics and packaging is an important link to reduce transportation loss. Many patented technologies, such as anti-seismic design and temperature and humidity control, are adopted in the special logistics fresh-keeping transport box of e-commerce platform, which effectively solves the problem that watermelon is easily damaged during long-distance transportation. Through this patented packaging technology, the transport loss rate is reduced from the traditional 10 %-20% to less than five%, which significantly improves the logistics efficiency and product freshness. In addition, the cost of batch transportation is effectively controlled, providing farmers and enterprises with cost-effective solutions, while ensuring consumers receive high-quality watermelon.

3.1.3 Online sales and interaction

The sales channel of Tongyang watermelon

has been greatly expanded through the application of e-commerce platforms such as Tiktok and applets. The mode not only improves sales volume, but also strengthens consumers' brand awareness of Tongyang watermelon. Melon selection platform provides consumers with personalized services, such as 3D display function, so that users can intuitively understand the quality and internal structure of watermelon; The encyclopedia of watermelon knowledge popularizes information on selection techniques and nutritional values; The customized service function meets the user's personalized needs for watermelon gift boxes or hors d'oeuvres. These innovative features effectively enhance the user experience and inject new energy into traditional watermelon sales.

3.1.4 User participation in innovation

The introduction of the user selection planting function further enhances the consumer's sense of participation and purchase viscosity. Through melon selection platform, users can select specific watermelon seeds online, which are planted and managed by farmers according to users' needs. When watermelons mature, farmers will directly mail the freshly picked watermelons to users. This mode not only increases the fun of consumers' participation, but also effectively strengthens the consumption relationship, and wins the wider user support and market attention for Tongyang watermelon brand. The innovative way of individualized planting service helps to enhance the added value of products and promote the further optimization of watermelon industry chain.

3.2 Synergetic Development of Industrial Chain

The application of new network technology plays an important role in promoting the synergistic development of Tongyang watermelon industry chain. Through the deep integration of e-commerce platform and logistics network, the information barriers in the upstream and downstream of the industrial chain are opened up, and efficient cooperation among farmers, logistics companies and sales platforms is realized. Specifically, the supply and demand analysis system based on real-time data can help farmers to adjust the planting scale and variety structure accurately and avoid the imbalance of market supply and

demand. At the same time, the e-commerce platform provides market trend analysis and consumption behavior prediction by using big data technology, and provides scientific decision-making basis for planting, transportation and sales links.

In addition, the order-driven industrial chain operation mode is built on the melon selection platform to realize the visualization of the whole process from production to sales through the pre-sale mechanism, so as to ensure a high match between watermelon production and market demand. This mode reduces the loss and cost of the intermediate links, and improves the synergistic efficiency of each link. Industrial chain synergy not only improves the overall economic benefits, but also provides a guarantee for farmers to obtain more benefits in the industrial chain.

3.3 Brand Construction and Promotion

Brand construction is the key to the development of watermelon industry in Tongyang. Geographical indications play an important role in the formation of agricultural products brand [2]. At the same time, the adoption of new media technology, social media marketing, event marketing is helpful to improve the marketing effect of agricultural products brand [3]. By holding watermelon cultural festival and other offline activities, the regional characteristics and cultural connotation of Tongyang watermelon are combined to attract more consumers and media attention. live commerce has become an important channel for brand promotion, and the market influence of Tongyang watermelon has been further expanded with the help of the traffic advantages of platforms such as Tiktok and Kuaishou. In addition, the cooperation with local celebrities or Internet Red to disseminate the planting stories and product advantages of Tongyang Watermelon through short videos and social media has also significantly improved the brand identity of consumers [4].

Innovation in visual design and packaging solutions is also critical in the branding process [5]. Through unified design of brand LOGO and packaging style, the quality advantage of Tongyang watermelon is directly transmitted to consumers. At the same time, melon selection platform provides personalized gift box customization service,

which combines brand image with consumer's personalized demand and further strengthens the brand's premium ability. With the help of social media interaction and communication speed, Tongyang watermelon gradually become synonymous with high-quality watermelon, providing a lasting impetus for brand building and market expansion.

4. Actual Effect and Future Potential of Tongyang Watermelon as An Example

4.1 The Outcome of the Project

Through the practical application of patent and technology, Tongyang Watermelon Project has achieved remarkable results in planting, transportation and sales. The automatic irrigation device and ventilation and dehumidification greenhouse introduced by planting link not only improved the irrigation efficiency, but also effectively reduced the incidence of diseases and insect pests, and significantly improved the quality and yield of watermelon. The logistics link adopts the special logistics fresh-keeping transport box for e-commerce platform, greatly reduces the transportation loss and packaging cost through temperature control and anti-seismic technology, and provides the farmers and merchants with a cost-effective transport scheme. In the sales link, the use of e-commerce platform became a highlight. Through channels such as Tiktok and applets, Tongyang Watermelon achieved the milestone of annual sales exceeding RMB 600000, which not only significantly increased the income of farmers, but also formed the regional demonstration effect.

At the same time, the successful application of the platform interaction function significantly improves the user viscosity. For example, the 3D display and customized services of the melon selection platform make users' perception of products more intuitive and further enhance consumers' trust and identity to the brand. These practical experiences have fully proved the great potential of the new network technology in optimizing the whole agricultural industrial chain and laid a solid foundation for the sustainable development of Tongyang watermelon industry.

4.2 Social and Economic Benefits

The implementation of Tongyang Watermelon

Project has had a positive impact in the social and economic fields. First, farmers' incomes have been significantly increased. By introducing modern technology and expanding sales channels, farmers' bargaining power has been enhanced, their position in the industrial chain has been elevated, and the problem of uneven distribution of benefits under traditional models has been effectively improved. The organizational form of cooperatives further guarantees the income of farmers and enables them to share more dividends in the value-added industrial chain. Secondly, the project promotes the deep integration of local agriculture, e-commerce and logistics, and promotes the overall competitiveness of regional economy. Through cooperation with logistics enterprises, an efficient transportation system is constructed, and the whole chain from farm to fork is optimized. E-commerce platform not only drives the market coverage of local watermelon, but also indirectly promotes the coordinated development of related industries. At the social level, the promotion of brand effect increases the local popularity and injects new vitality into the regional economy. The successful experience of Tongyang Town is providing reference for other areas, and has contributed valuable practice samples for rural revitalization and agricultural modernization.

4.3 Future Potential

Tongyang watermelon industry chain has broad development potential in the future. On the one hand, the existing experience can be extended to other agricultural products, such as red soil watermelon and peanuts and other regional products. This can not only enrich the local agricultural products, but also drive more farmers to participate, and achieve a larger range of industrial value-added benefits. On the other hand, the development of planting experience base and picking tourism has great market prospects. Relying on the brand effect of Tongyang watermelon, it can create characteristic farms, provide consumers with leisure activities such as picking and planting experience, and combine agriculture with tourism in depth.

In addition, the further combination of new network technology and agricultural industry will promote the overall improvement of production efficiency and industrial efficiency

[6]. For example, the deep application of artificial intelligence technology in planting can be explored to achieve more accurate environmental monitoring and planting management. By perfecting the online interaction function, optimizing the user participation mode, constantly improving the consumer experience and brand loyalty, the sustainable development of Tongyang watermelon industry chain is injected with continuous power. These innovative practices and extended development will bring more development opportunities for local economy and provide more valuable path reference for agricultural modernization.

5. Strategic Recommendations

5.1 Policy Support

Local governments should strengthen policy support for the development of smart agricultural technologies and e-commerce platforms, provide financial support and technical training, and help farmers adapt to and master modern planting and marketing patterns. At the same time, by improving the rural logistics network and infrastructure, promote the efficient operation of the agricultural industrial chain, to ensure that Tongyang watermelon and other featured agricultural products more extensive market [7].

5.2 Technology Promotion

The application of network technology helps to improve the competitive advantage of agricultural products brand [8]. Expand the application of intelligent irrigation system, ventilation and dehumidification greenhouse and logistics fresh-keeping transport box, so that more farmers can benefit from the technology upgrade. Through the establishment of regional demonstration base, promote intelligent agricultural machinery and digital management means, improve planting and management level. At the same time, the data analysis function of e-commerce platform is used to provide accurate market guidance and planting suggestions for farmers.

5.3 Brand Operation

We will continue to strengthen the construction and promotion of Tongyang watermelon brand and build a brand image

with high recognition around its geographical indication characteristics. In combination with online and offline activities, such as watermelon cultural festival, brand live broadcasting, etc., further enhance the brand influence [9]. At the same time, through the design of high-quality packaging, unified brand logo and other ways, to increase the market premium for Tongyang watermelon, forming a stronger market competitiveness.

5.4 User Interaction

Optimize the user interaction design, enhance the consumer to Tongyang watermelon brand participation and loyalty. Provide more customized services through applets or platforms, such as seed planting, customized packaging, etc., to enhance the consumer experience. At the same time, establish a membership points system to encourage users to accumulate points by purchasing and sharing, exchange relevant gifts or discounts, and further expand the brand's user group and market influence [10].

6. Conclusion

The practice of Tongyang watermelon industrial chain shows that the new network technology has important value in optimizing the efficiency of agricultural industrial chain. By introducing intelligent planting technology, the precision and yield of production management are improved significantly. The innovation of logistics and packaging technology greatly reduces the loss of transportation; The application of online sales platform and interactive function has expanded the product market coverage and improved the consumer's sense of participation and brand recognition. The success of Tongyang Watermelon Project has provided a feasible path for rural agricultural modernization and formed a demonstration effect to promote rural economic development.

This case not only shows the potential of network new technology to empower traditional agriculture, but also shows the possibility of realizing the value-added of agricultural industry and the increase of farmers' income through technical means, which provides a useful reference for realizing the goal of rural revitalization.

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