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Digital Empowerment and Scenario Reconstruction: Innovative Practices of the Maoming Tilapia Industry in China's Agricultural Live-E-Commerce

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Abstract

Driven by the dual forces of the digital economy and the rural revitalization strategy, China's agricultural live-stream e-commerce has become the core engine for reconfiguring the agricultural value chain. This article takes the tilapia industry in Maoming City, Guangdong Province as the research object. By analyzing its "live-streaming + industry" integration model, it reveals how the digitalized scenario reconstruction promotes the transformation of characteristic agricultural products from traditional sales to branding and globalization. The research finds that the Maoming tilapia industry achieved an average annual output value growth of 21% from 2020 to 2024 and an export volume exceeding 300 million US dollars in 2024 through three innovative strategies: "dual-scenario linked live-streaming", "full-chain data monitoring", and "geographical indication brand building". The research proposes a "technology-scenario-ecology" tripartite development framework, providing a Chinese solution for the digital transformation of the global tropical aquaculture industry.

Keywords: Agricultural, Live-Stream, E-Commerce.

INTRODUCTION

As of June 2025, the online retail sales of agricultural products in China reached 3.2 trillion yuan, with live-streaming e-commerce accounting for 41% of this figure. This "real-time interactive" model of "seeing is believing" has broken through the long chain of traditional agriculture - "production - wholesale - retail", and constructed a short path of "origin directly connected to the table". The practice of Jiangsu Agricultural Colony Yuntai Farm shows that the dual-scenario interactive live-streaming can increase the conversion rate of corn products by 28%, which is 15 percentage points higher than the conventional e-commerce channels.

As the largest tilapia farming base in the world, Maoming City produced 1.89 million tons of tilapia in 2024, accounting for 52% of the national total output. However, the industry faces three major challenges:

1) Lack of brand premium: Although "Maonan Crispy Tilapia" has been recognized as a "Guangdong Brand" hundred-county hundred-product, it is currently working on the application for national geographical indication certification, and the average product price is still 63% lower than that of Norwegian salmon;
2) Value chain gap: The proportion of primary processed products is 78%, while the proportion of deep processed products is less than 22%;
3) Market fluctuation risk: In 2023, due to a 50% decrease in the import volume of fish meal from Peru, the production cost increased by 18%.

Theoretical Framework

Drawing on Goffman's dramaturgical theory, this study decomposes the live-streaming scenario into a binary structure of "front-stage performance" (real scene display) and "backstage control" (data monitoring). This theory emphasizes the "constructive role of scene symbol interaction in building user trust", which is highly compatible with the "consumer's trust anxiety caused by information asymmetry" in agricultural product live-streaming - especially for aquatic products like tilapia that require visual proof of quality (such as freshness and breeding environment), the dramaturgical theory can precisely explain how the "front-stage reality" reduces the information gap and how the "backstage data" strengthens credibility.

The Maoming tilapia industry has integrated outdoor live-streaming (of the breeding base and processing workshop) and indoor analytical live-streaming (of nutritional evaluation and cooking instruction) to establish a new paradigm of "transparent production + visual sales". This is the concrete

application of dramaturgy theory in the field of aquaculture.

METHOD

A mixed research method was adopted, and the specific procedures are as follows:

1. Quantitative analysis: Collect the live sales data of Maoming tilapia from 2018 to 2024 (sample size n = 12,437). The data comes from the e-commerce monitoring platform of Maoming Municipal Agriculture and Rural Affairs Bureau and the data exported from major e-commerce platforms such as JD and Meituan. It covers 8 core indicators including sales volume, repeat purchase rate, and average order value;
2. Qualitative research: Conduct in-depth interviews with 32 breeding enterprises (including 2 national-level leading enterprises, 5 provincial-level leading enterprises, and 25 small and medium-sized individual enterprises), and 15 live-streamers (including 3 platform-leading live-streamers and 12 local county-level live-streamers). Each interview lasts for 60-90 minutes. The data is analyzed using Nvivo12 software for coding;
3. Case comparison: Select Hainan Wenchang chicken (a typical example of poultry live-streaming) and Jiangsu Yangcheng Lake crabs (a typical example of aquatic products with high premium) as reference cases. Compare the differences in scene design and brand building among the three, and extract the unique path of the tilapia industry.

DISCUSSION

1. The Efficiency Enhancement Mechanism of Dual-Scenario Interconnection

Case 3-1: Transplantation of the YunTai Farm Model

Maoming has drawn on the experience of Jiangsu Province and deployed 5G + Internet of Things devices in the tilapia breeding base to transmit real-time data such as water quality (dissolved oxygen ≥ 5mg/L) and water temperature (28 - 32℃) to the live-streaming platform. In the first half of 2025, this "data traceability + real scene display" model increased the repeat purchase rate of crispy meat tilapia to 35%, which was 12 percentage points higher than that of traditional e-commerce.

Case 3-2: Immersive Live Streaming in the Processing Workshop

Guangdong Jingtang Agriculture installed 360° panoramic cameras on its pre-cooked food processing line. Consumers can watch key processes such as live fish water-hanging treatment (7-15 days of purification) and liquid nitrogen rapid freezing (-196℃ to preserve freshness). This model has increased the average selling price of grilled fish pre-cooked food from 49 yuan to 89 yuan, with a price increase rate of 81%.

2. Digitalization of Geographical Indication Brands

- Symbol system construction:
  1) Visual symbols: Designed a dynamic LOGO featuring "Roughy fish leaping over the dragon gate", which received 1.24 billion views in the Douyin challenge competition;
  2) Discourse symbols: Created a series of short videos titled "3 Minutes to Understand the Nutrition of Roughy Fish", which was included as a development case by the Food and Agriculture Organization of the United Nations (FAO);
  3) Ritual symbols: Organized an "Online Opening Fishing Festival", and during the 2025 live broadcast, 2.3 million portions of pre-prepared fish products were sold.

- **Innovation in the Certification System:**

Developed a blockchain traceability system. Consumers can scan the code to view 18 indicators such as fish breeding (Giolofry hybrid strain), feed formula (plant protein content ≥ 35%), etc. This system has increased the product's premium value by 18% and reduced the export return rate to 0.7%.

3. Decision Support for Full Chain Data Monitoring

Case 3-3: Chanmao Industrial Big Data Platform

The industrial service platform jointly established by Chancheng District and Maonan District in Foshan integrates:

1. The production end: 2,300 IoT data from fish ponds;
2. The market end: sales data from platforms such as JD and Meituan;
3. The policy end: subsidy distribution data from the Ministry of Agriculture and Rural Affairs.

During the flood season in 2025, the platform used the fish disease early warning model to predict the risk of streptococcal disease outbreak 14 days in advance, thereby reducing losses for farmers by 230 million yuan.

CONCLUSION

1. Theoretical Contributions

1) The concept of "digital scene intensity" was proposed, with quantitative indicators including live streaming duration (≥ 4 hours per day), data dimensions (≥ 8 items), and interaction frequency (≥ 15 times per minute). The indicator settings were determined based on the median of the interview data from 32 enterprises.
2) The "TSE model" for agricultural product live streaming (Technology empowerment - Scene reconstruction - Ecosystem co-construction) was constructed.

2. Practical Insights

1. Technical layer: It is suggested that small and medium-sized farmers adopt "lightweight" digital tools, such as mobile water quality detection apps (cost ≤ 500 yuan per year);
2. Model layer: Promote the "company + cooperative + digital service station" linkage mechanism to lower the threshold for individual farmers' live streaming;
3. Policy layer: Call for including live streaming infrastructure in the subsidy scope for new agricultural business entities, such as a 30% subsidy for 5G base station construction.

3. Research Limitations and Future Directions

This study has sample limitations (only covering the South China region). In the future, it is necessary to expand to global major production areas such as the Nile River in Egypt and the Amazon in Brazil. With the emergence of new technologies like AI hosts and virtual reality exhibitions, how to balance technical efficiency and humanistic warmth will become a key issue.

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