

Empowering Smallholder Farmers in Jinchuan County: Personalized Marketing Through Rural E-Commerce Platforms

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Abstract. This study explores how smallholder farmers in Jinchuan County can leverage rural e-commerce for personalized marketing, focusing on the snow pear industry. Facing fierce competition, high costs, weak branding, and logistical issues, Jinchuan's snow pear farmers need innovative income-boosting strategies. Through multi-method research, including literature review, case analysis, interviews, and quantitative modeling, key problems such as brand homogenization, poor e-commerce skills, inadequate market information, and cold-chain constraints are identified. Targeted solutions include culture-rooted brand storytelling, product differentiation, e-commerce training, cold-chain investment, platform-based traffic conversion, and big data-driven forecasting. By linking local cultural resources with differentiated product design and data-supported operations, these strategies can enhance product value, expand markets, increase farmer income, and promote sustainable agricultural development.

Keywords: Jinchuan County, rural e-commerce, personalized marketing, snow pear industry, smallholder farmers, brand building, logistics optimization, agricultural development.

1. Introduction

1.1 Research Background and Significance

Amid rural revitalization and digital economy growth, Jinchuan's snow pear industry - a local agricultural pillar - faces critical challenges. The county's snow pear cultivation is large-scale and diverse: Drumstick Pear (30,000 mu, 85% of output), Golden Flower Pear (8,000+ mu, 8%), and Emerald Pear (3,000 mu). However, fierce competition from Xinjiang Korla and Anhui Dangshan pears, evolving consumer demands for quality and cultural value, and high costs (3,900 yuan/mu for premium grades) hinder income growth. E-commerce and personalized marketing offer solutions to break geographical barriers, reduce intermediaries, and meet diverse consumer needs, making this study vital for rural revitalization [1].

1.2 Domestic and International Research Status

China's rural e-commerce is booming: 313 million rural internet users (28.2% of total) and 2.5 trillion yuan in rural online retail sales (2023) [2]. Existing studies on rural e-commerce at home and abroad provide comparative experience for assessing infrastructure, logistics, and talent gaps [3]. Yet, gaps remain in infrastructure (5G coverage <30% of cities), logistics (county costs 40% higher than cities), and talent (2 million+ shortage). Internationally, the U.S. uses CSA models, France employs cooperative-led branding, and Japan integrates agriculture with industry. Jinchuan can learn from these to address internal issues (aging orchards, weak branding) and external competition.

1.3 Research Methods and Innovation Points

Methods include literature review, case analysis, interviews, and quantitative modeling (cost-benefit, brand value assessment). Innovations lie in integrating local data, building professional analysis models, and proposing systematic personalized marketing strategies covering branding, product differentiation, and logistics [4].

2. Current Status of the Snow Pear Industry and E-Commerce Development in Jinchuan County

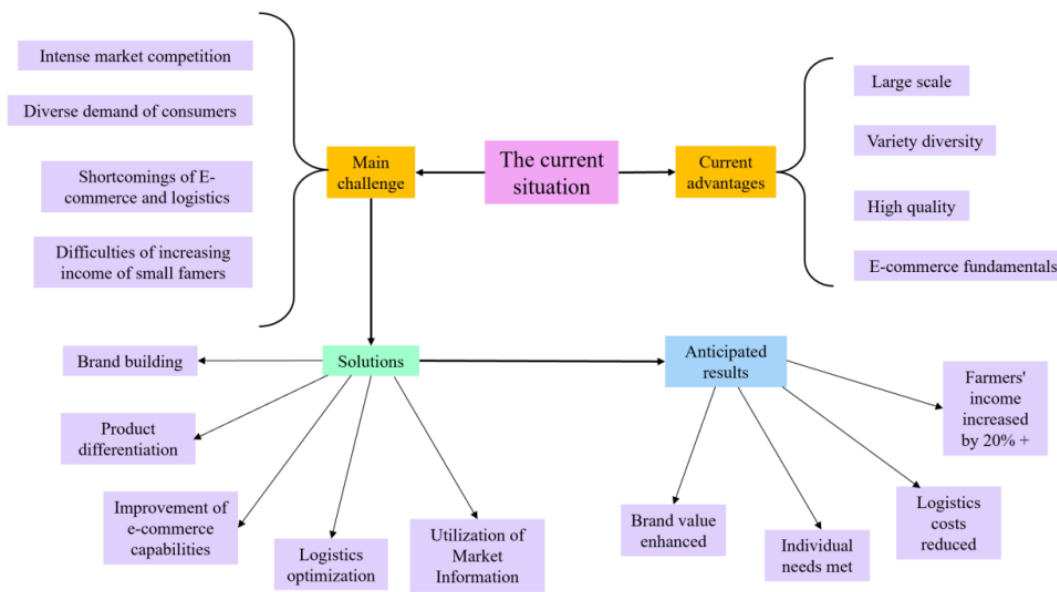


Figure 1. Jinchuan County Snow Pear Industry and E-Commerce Development Status Quo

2.1 Overview of the Snow Pear Industry in Jinchuan County

Jinchuan's snow pears boast unique quality (green food certification, medicinal benefits) and brand recognition (e.g., "Chinese Good Pear" awards). Government support totals 5,115 million yuan for standardized management, purchase subsidies, and quality improvement. Key projects (2024) include pear processing subsidies (900 million yuan) and packaging promotion (300 million yuan).

Table 1. The Project to Be Implemented

Project Name	Project Summary		Project Budget (10,000 CNY)	Implementing Agency	Method	Bidding Required	Planned Start Date	Planned Completion Date
Jinchuan County 2024 Pear Processing and Snow Pear Purchase Subsidy Project	All the towns and townships in the county that grow snow pears	Subsidy for purchasing approximately 10,000 tons of snow pears (actual quantity subject to purchase volume)	900	County Agriculture Bureau	Public Bidding	Yes	March 2024	December 2024
Jinchuan County 2024 Snow Pear Quality Improvement Project	Three townships and one town along the two rivers	Pruning, land deep plowing, pest control, and seedling replanting for snow pears in designated areas	2000	County Agriculture Bureau	Public Bidding	Yes	March 2024	December 2024
Jinchuan County 2024 Specialty Agricultural Product Packaging and Promotion Project	Villages and towns involved	Production of packaging for snow pears, peppercorns, sweet cherries, etc.; product promotion at trade fairs	300	County Agriculture Bureau	Public Bidding	Yes	March 2024	December 2024
Jinchuan County Small and Micro Industrial Park Snow Pear Processing Project	Yangjiawan Village, Lewu Town	Renovation of juice production line, new feed processing line, canned snow pear line, hard candy line, etc.	200	Hexi Township Government	Public Bidding	Yes	March 2024	December 2024
Jinchuan County Small and Micro Industrial Park Fragrant Snow Pear Processing Project	Yangjiawan Village, Lewu Town	Drying production line for snow pear tea and health soup packs; soft candy line with snow pear paste, ginseng, etc.	200	Hexi Township Government	Public Bidding	Yes	March 2024	December 2024
Total			3600					

Table 2. Government Support

Central Government Transition Funds	Total Subsidy Funds (10,000 CNY)	Funds Allocated for Snow Pears (10,000 CNY)	Purpose of Funds
First Batch	10792	4300	- 40 million CNY for standardized winter management of snow pears, construction of industrial demonstration zone roads, and agro-tourism integration in Sha'er Township, Qingning Township, and Ka'er Township. - 3 million CNY for snow pear purchase subsidies across the county.
Second Batch	1360	805	For snow pear cultivation
Third Batch	214	10	For snow pear development
Total	12366	5115	

2.2 Current Situation of Rural E-Commerce Development in Jinchuan County

Basic network coverage exists, but mountainous terrain causes high logistics costs (30-50% higher than plains) and long delivery times. The county's 1700 square meters e-commerce public service center hosts 10+ enterprises, driving success (e.g., 2024 sweet cherry online sales: 2 million yuan) [5].

2.3 E-Commerce Application Status of the Jinchuan County Snow Pear Industry

Online sales are growing: 13,000 tons of Drumstick Pears, 570 tons of Golden Flower Pears. Marketing innovations include pear blossom festivals (422,700 tourists, 317 million yuan tourism income) and live streaming (e.g., "Oriental Selection" sold 30,000 yuan of snow pear products in two days). Sixteen leading e-commerce enterprises drive 200+ farmer-led stores.

3. Theoretical Basis and Practical Needs of Personalized Marketing for Small Farmers

3.1 Theoretical Basis for Personalized Marketing for Small Farmers

Table 3. Personalized Needs and Marketing Strategies

Hierarchy of Needs	Specific Manifestations	Personalized Marketing Strategies
Physiological Needs	The basic functional requirements for eating snow pears, such as texture and moisture content.	Highlight the advantages of Sydney's taste, such as crispness, sweetness, and juiciness; ensure product freshness and quality stability.
Safety Requirements	Concerns about food safety and pesticide residues in Sydney	Emphasize green cultivation and no or low pesticide use; provide product testing reports and traceability information.
Social Needs	When giving snow pears as gifts, pay attention to packaging and brand image.	Design exquisite gift packaging with regional cultural characteristics; create a brand with both popularity and reputation.
Respect for Needs	Pursuing unique, high-quality Sydney products that reflect identity and taste	Launch limited edition, customized Sydney products; host high-end tasting events.
Self-Actualization Needs	Participate in the process of growing and harvesting snowberries, and experience the fun.	Organize snow pear picking experiences; offer customized planting services, allowing consumers to participate in the snow pear growing process.

Consumer demand theory (Maslow's hierarchy) and precision marketing theory guide personalized strategies. For example, health-focused consumers value lung-moistening benefits, while premium buyers prefer customized packaging (see table 3).

Table 4. Price of the Snow Pear

Variety	Offline retail price (yuan/jin)	Online sales price (yuan/jin)	Place of origin
Jade Dew Fragrant Pear	17.8 - 30	JD Yulu Pear 12-piece gift box, 4kg, individual fruit 250g + 212 yuan, 26.5 yuan per jin	Linfen and Jinzhong, Shanxi (organic)
Autumn Moon Pear	11.5 - 37	JD.com Shandong Autumn Moon Pear Fresh Fruit 9 jin Luxury Extra Large Fruit 388 yuan, 43 yuan per jin	Laiyang, Shandong (organic)
Kuerle Fragrant Pear	8.5 - 22	JD.com's premium whole pears are priced at 22 yuan per box, while Meituan Youxuan offers them at 19.8 yuan per kilogram.	Kuerle and Aksu, Xinjiang
Jinchuan Snow Pear	5 - 20 (retail), 2 - 10 (wholesale)		Jinchuan County, Sichuan Province

3.2 Practical Needs for Personalized Marketing

The practical need for personalized marketing is reflected in market competition, changing consumer demand, and the income pressure faced by small farmers.

3.2.1 Market Competition Pressure

Jinchuan County's snow pears face intense market competition from other major pear-producing regions in China (e.g., Xinjiang, Anhui, Shandong). Key competitors like Xinjiang's Korla Fragrant Pear (high-end market leader) and Anhui's Dangshan Crisp Pear (mid-to-low-end powerhouse) outperform Jinchuan snow pears in brand recognition and market positioning. Additional pressures include potential new entrants with advanced technologies, substitute fruits (apples, peaches), supplier/buyer bargaining power imbalances, and Jinchuan's own shortcomings: no significant price advantage, weak brand value (far below Korla's 15.867 billion yuan), and low market recognition. Thus, personalized marketing is urgently needed to boost competitiveness.

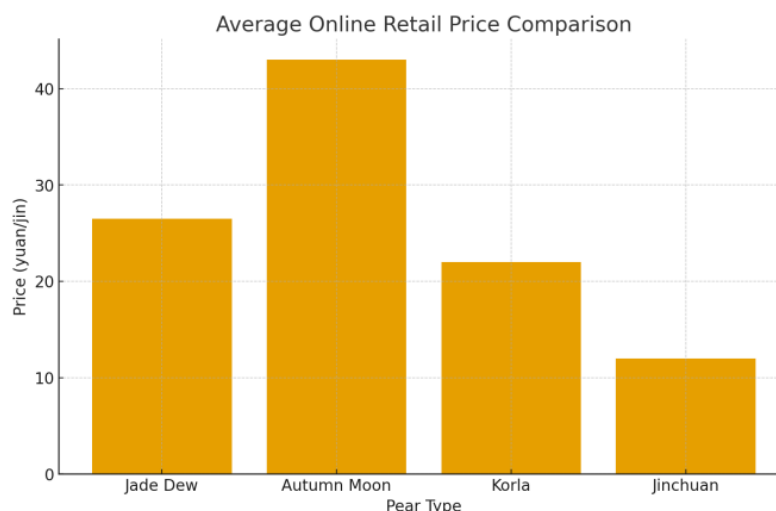


Figure 2. Average Online Retail Price Comparison

3.2.2 Changes in Consumer Demand

As living standards improve, consumers' demands for snow pears have evolved: they prioritize quality (crispness, sweetness, nutrition), value elegant packaging, and seek products with unique cultural connotations (e.g., regional history, red culture like Jinchuan's Red Army heritage). To meet these diverse needs, Jinchuan's smallholder farmers must adopt personalized marketing. Factor

analysis can identify key purchasing drivers (quality, appearance, culture) to segment consumers, enabling targeted strategies for different preference groups.

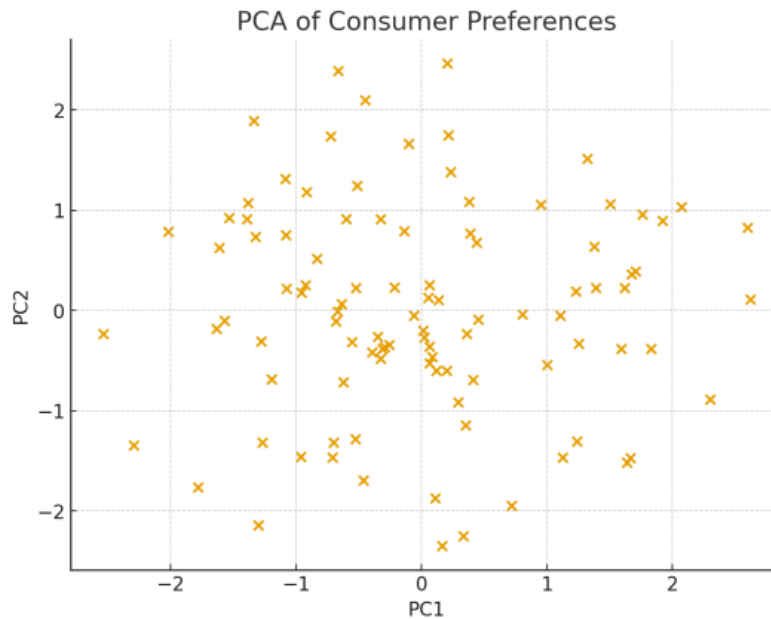


Figure 3. PCA of Consumer Preferences

3.2.3 Small Farmers' Demand for Increased Income

The cost of growing snow pears in Jinchuan County is relatively high, and there are differences in the cost of growing snow pears of different grades (as shown in Table 5):

Table 5. Cultivation Costs of Different Varieties of Pears

Grade	Fertilizer (yuan/mu)	Pesticides (yuan/mu)	Paper bags (yuan/mu)	Harvesting (yuan/mu)	Deep plowing of soil (yuan/mu)	Total (yuan/mu)
Special Grade, First Grade	1620	380	800	700	400	3900
Intermediate	600	260	640	960	200	2760
Ordinary	100	200	-	400	-	

As shown in Table 5, the cultivation costs for premium and first-grade snow pears reach as high as 3,820 yuan per mu, with the high cultivation costs squeezing the profit margins of small-scale farmers. In terms of sales prices, while Jinchuan snow pears have a certain price range, the price differentials between farmgate prices, wholesale prices, and retail prices are limited, and prices are subject to significant fluctuations influenced by market supply and demand dynamics and competition from rival products. Taking 2024 as an example, the farmgate price for some pear varieties ranges from 2 to 6 yuan per kilogram, the wholesale price from 4 to 6 yuan per kilogram, and the retail price from 5 to 20 yuan per kilogram. Small-scale farmers relying solely on traditional sales methods and ordinary products find it difficult to achieve significant income growth. By implementing personalized marketing strategies to enhance the value of snow pears - such as developing customized products and building distinctive brands - it is possible to increase product sales prices and market volume, thereby boosting the income of small-scale farmers.

Personalized marketing can also expand sales channels, reduce intermediaries, and enable small farmers to earn more profits. To this end, a cost-benefit model was used to analyze the impact of personalized marketing on small farmers' income. Let be the total cost (including planting costs, marketing costs, etc.), be the sales volume, be the sales price, and profit be $\pi = P \cdot Q - TC$. Assuming that before personalized marketing is implemented, the initial sales price is P_1 , the initial sales volume is Q_1 , and the initial total cost is TC_1 ; after personalized marketing is implemented, due to the increase in product value-added, the sales price increases to P_2 , the sales volume increases to Q_2 ,

Increased marketing costs have caused total costs to become TC_2 . Through comparison $\pi_1 = P_1 * Q_1 - TC_1$ and $\pi_2 = P_2 * Q_2 - TC_2$, assess the impact of personalized marketing on profits. If $\pi_2 - \pi_1 > 0$, It shows that personalized marketing helps small farmers increase their income. Through research on the current situation and issues of small farmers in Jinchuan County using e-commerce platforms for personalized marketing, it can be seen that by increasing the proportion of various factors, the participation of small farmers in e-commerce can be significantly improved.

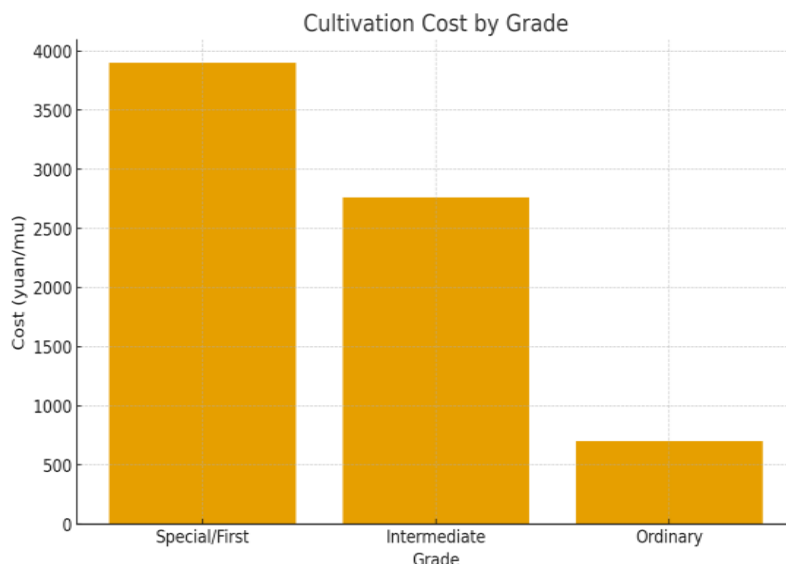


Figure 4. Cultivation Cost by Grade

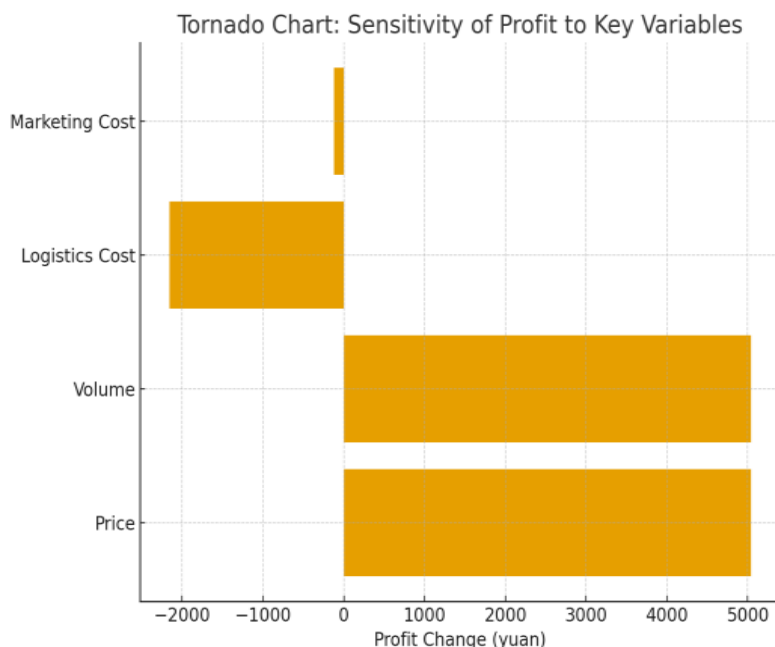


Figure 5. Impact Chart: Sensitivity of Profit to Key Variables

4. Current Situation and Issues in Small Farmers' Personalized Marketing Through E-Commerce Platforms in Jinchuan County

4.1 Personalized Marketing Methods and Effectiveness Evaluation

Farmers use e-commerce platforms to showcase product features and promote via events like the Pear Blossom Festival. Effectiveness is evaluated by traffic, conversion rate, and loyalty.

4.2 Existing Problems

At present, the industry of Jinchuan snow pear still faces multiple prominent problems in the practice of personalized marketing: in terms of brand construction, compared with famous brands such as Korla Pear, the brand value of Jinchuan Sydney is low, and the promotion efforts of the local government are insufficient, and the brand effect is not fully played; The degree of product differentiation is insufficient, the variety is relatively fixed, the homogenization phenomenon is serious, and there is a lack of innovative varieties, which makes it difficult to meet the diverse needs of consumers; Farmers have weak e-commerce operation capabilities, not only lacking relevant knowledge and skills such as platform operation and marketing promotion, but also facing a serious shortage of e-commerce professionals, resulting in obvious shortcomings in store operation, product promotion, and customer service; The pain points in the logistics and distribution process are significant, with logistics costs accounting for 32.2% of sales revenue and a timely delivery rate of only 74%. The problems of high costs and low efficiency are prominent; The ability to obtain and utilize market information is weak, and there is a lack of a sound market information monitoring mechanism. On average, farmers only have three channels to obtain information, and information updates are lagging behind with insufficient accuracy. The efficiency of information utilization is only 46%, making it difficult to adjust marketing strategies in a timely manner according to market dynamics.

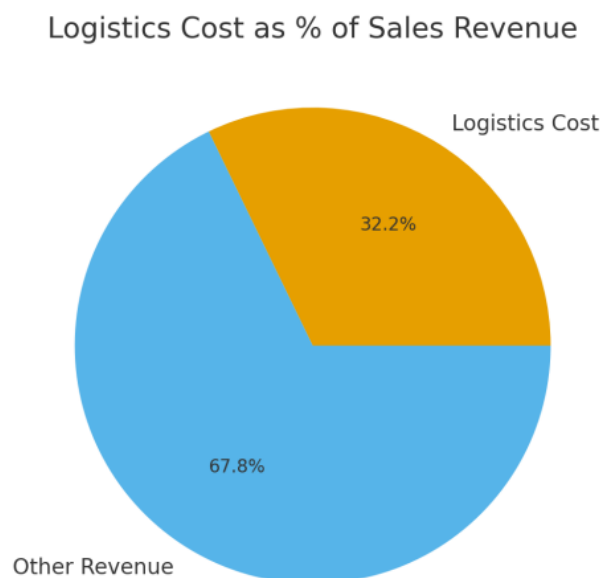


Figure 6. Logistics Cost as a Percentage of Sales Revenue

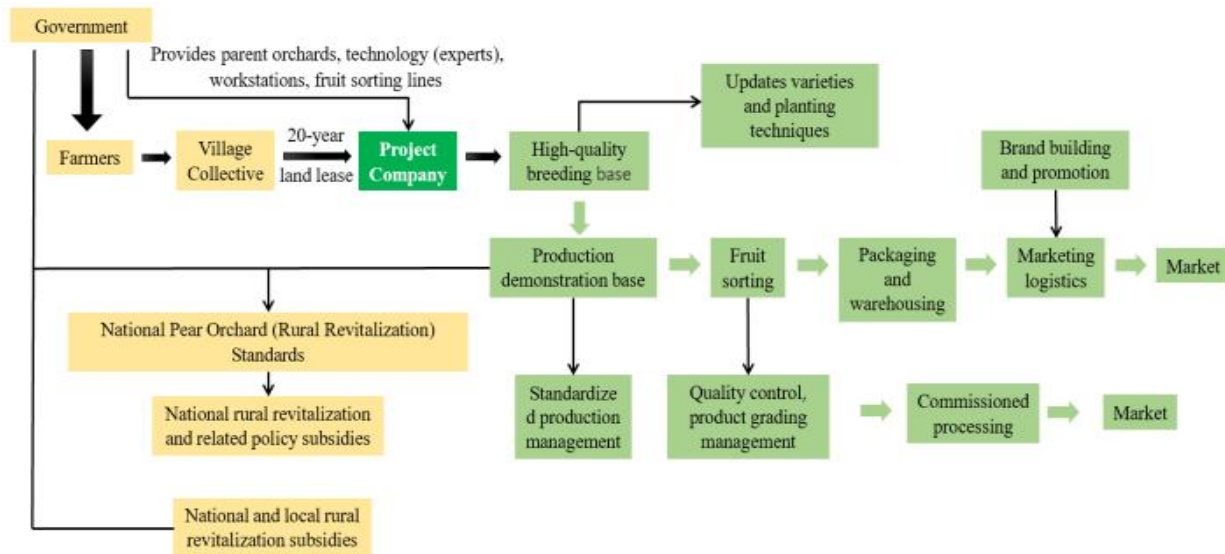


Figure 7. Personalized Marketing Strategy Framework

5. Strategies and Recommendations for Small Farmers in Jinchuan County to Achieve Personalized Marketing Through E-Commerce Platforms

5.1 Strengthen Brand Building and Highlight the Unique Characteristics of Snow Pear

County Party Secretary Guo Suimei proposed strengthening the brand strategy and deeply integrating the Snow Pear industry with the county's economic development. Deputy Secretary Liu Zhipeng suggested strengthening Snow Pear orchard research through school-enterprise cooperation to promote product updates and iterations.

In terms of brand construction, it is necessary to deeply tap the local red cultural resources in Jinchuan, take the Red Army University site and other red heritage as the core material, carefully create a snow pear brand story with both historical details and emotional temperature, and convey the unique brand cultural connotation; At the same time, we will design a unified brand identity that integrates the local regional characteristics and snow pear's morphological characteristics, and develop differentiated packaging with unified style and different characteristics for different consumer markets and scenarios, so as to strengthen brand recognition; In addition, big data technology can be used to analyze consumer behavior and preferences, achieve precise brand promotion, and use the Analytic Hierarchy Process (AHP) to construct a brand value evaluation model, regularly quantifying the effectiveness of brand building and providing scientific basis for optimizing brand strategies.

5.2 Strengthen Product Differentiation and Meet Individual Needs

To enhance product differentiation, it is necessary to cooperate with agricultural research institutions to cultivate new snow pear varieties with unique taste and quality characteristics; meanwhile, develop customized gift boxes tailored to different consumption scenarios such as holiday gifting and corporate bulk purchases, and provide personalized services that allow consumers to choose pear varieties, packaging styles and customized messages. In addition, we should expand the range of deep-processed products, such as snow pear preserves, snow pear wine and snow pear masks, and use cost-benefit models to analyze the cost composition and market returns of different deep-processed products, so as to determine the optimal production scale and pricing strategy and improve product added value.



Figure 8. Designed Brand Logo



Figure 9. Consumer Segmentation Based on K-Means Clusters

5.3 Enhance Small Farmers' E-Commerce Operation Capabilities

To enhance small farmers' e-commerce operation capabilities, training should focus on platform operation, online promotion, customer service, data analysis, and live-streaming sales, while cooperative organizations can provide shared services and connect farmers with foreign rural e-commerce development experience [6].

5.4 Improve the Logistics Distribution System

To address logistics challenges, we should construct cold-chain facilities and optimize delivery routes using logistics models, while establishing an information-sharing platform to enable real-time tracking of shipments.

5.5 Enhance Market Information Acquisition and Utilization

In terms of enhancing market information acquisition and utilization, it is necessary to establish comprehensive market information monitoring indicators covering market demand, price fluctuations, and competitor dynamics, while collecting data from multiple sources such as e-commerce platforms, industry reports, and government statistical data to ensure the comprehensiveness and accuracy of information. Additionally, regular market research should be conducted through questionnaires and interviews, and historical market data should be utilized to forecast market trends, so as to timely adjust planting plans and marketing strategies, achieving precise marketing oriented by market demand.

6. Conclusion and Outlook

6.1 Conclusion

Jinchuan's snow pear industry has scale and quality advantages but faces brand, product, e-commerce, logistics, and market information issues. Targeted strategies (brand building, product differentiation, e-commerce training, logistics optimization, market information utilization) can enhance competitiveness and farmers' income.

6.2 Research Outlook

Future development includes brand linkage with local specialties (yaks, cordyceps), AI for precise marketing, big data for forecasting, blockchain for traceability, and cross-regional cooperation to expand market influence.

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