

AI Empowering Brand Building and Market Promotion of County-Level Featured Agricultural Products: A Case Study of the Xinbin Rice Industry

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Abstract: With the deep integration of digital technology and rural industries, Artificial Intelligence (AI) has provided an innovative driving force for the branding and marketization of county-level featured agricultural products. Taking Xinbin Rice as an example, this study systematically sorts out the problems existing in its brand building and promotion, and then constructs an operable AI empowerment system from four dimensions: brand vision and IP design, omni-media precise communication, coordination and optimization of production and marketing, and intelligent reputation management. The research shows that the integrated application of AIGC, big data analysis, Internet of Things and intelligent interaction technologies can effectively activate regional cultural resources, realize brand narrative innovation, precise communication reach, intelligent supply chain response and digital reputation management, thereby significantly improving the brand value and market competitiveness of county-level featured agricultural products.

Keywords: Artificial Intelligence; AI; County-Level Featured Agricultural Products; Brand Building; Market Promotion; Xinbin Rice

1. Introduction

Against the global wave of new technological revolution and industrial transformation, AI is penetrating into all sectors of social economy with unprecedented breadth and depth, becoming a key engine driving industrial transformation and upgrading. Meanwhile, China's national strategy of Rural Revitalization has entered a stage of full advancement, which promotes the production and primary processing of agricultural products, the connection between production and marketing in producing areas, and takes "digital business boosting agriculture" as a core project for developing new rural business forms. Under this macro background, developing county-level featured industries, especially promoting the branding, digitalization and valorization of featured agricultural products, has become a critical path to achieve rural industrial prosperity and increase farmers' income. However, county-level featured agricultural products generally face multiple dilemmas in brand building and market promotion. On the one hand, fierce homogenization competition makes it difficult to establish differentiated brand awareness. On the other hand, traditional brand building and marketing models are costly, inefficient and poorly targeted, failing to effectively reach and impress target consumer groups. Using new-generation information technology represented by AI to dig into the cultural connotation of products, shape unique brand images, and realize precise and interactive market promotion at low cost and high efficiency has become a practical issue urgently to be solved.

As a representative of Liaoning geographical indication protected product and regional featured agricultural product, Xinbin Rice was a tribute rice in the Qing Dynasty [1]. However, in the market, it is squeezed by strong brands such as Wuchang Rice and Panjin Rice, and its brand awareness and premium capacity need to be improved. Its brand image is relatively traditional, and communication mainly relies on offline exhibitions and traditional media, lacking attractiveness to online traffic and young consumer groups. Therefore, taking Xinbin Rice as a sample to explore the specific path of AI empowering its brand breakthrough is both typical and urgent, and has positive practical value for comprehensively promoting the Rural Revitalization strategy.

2. Related Concepts and Theoretical Basis

2.1 County-Level Featured Agricultural Products

County-level featured agricultural products refer to agricultural and sideline products produced within a specific county administrative region, relying on the unique local natural resource endowments, ecological environment, farming culture and traditional techniques, with distinct regional characteristics, excellent quality and certain market reputation. Their “distinctive features” are mainly reflected in three aspects: first, “origin characteristics”, that is, high dependence and non-replicability on the geographical environment and climatic conditions of the origin; second, “quality characteristics”, that is, unique advantages in taste, nutrition, appearance or processing technology; third, “cultural characteristics”, that is, the production and consumption process often carries rich historical allusions, folk customs and other regional cultural connotations. Branding is a key link in transforming resource advantages into market and economic advantages. It aims to create differentiated value cognition in consumers’ minds by establishing a unique brand identity system, so as to obtain brand premium.

2.2 AI and Digital Marketing

AI is a branch of computer science that simulates, extends and expands human intelligence, including theories, methods, technologies and application systems. It aims to enable machines to acquire capabilities such as learning, reasoning, perception and decision-making. In the field of marketing, the application of AI has evolved from a tool level to the core force driving the transformation of the entire marketing chain, namely “AI-driven digital marketing”. Its core capabilities include:

- (1) Intelligent content generation: using AIGC technology to automatically generate copy, images, videos, virtual anchors and other content, greatly improving creative production efficiency.
- (2) Intelligent user insight: analyzing massive user data through machine learning to build refined user portraits and predict consumption preferences and behavioral trends.
- (3) Intelligent delivery and interaction: programmatic advertising and intelligent recommendation algorithms realize precise advertising reach; chat robots and virtual customer service provide 24-hour personalized interactive services.
- (4) Intelligent data analysis and decision-making: real-time monitoring, attribution analysis and automatic optimization of marketing campaign effects to assist managers in strategy adjustment.

2.3 Brand Building and Market Promotion Theories

(1) Brand positioning theory: emphasizes that a brand needs to occupy a unique and valuable position in the minds of target consumers. AI can more accurately identify market gaps, insight into the competitive landscape and consumers’ minds through big data analysis, and assist brands in finding the most competitive differentiated positioning.

(2) Integrated Marketing Communication (IMC) theory: emphasizes taking consumers as the center and delivering clear, consistent and persuasive brand information by coordinating the use of various communication tools and channels. AI technology provides a powerful “central processing unit” for IMC, which can uniformly manage multi-channel data and realize intelligent collaboration and personalized adaptation of cross-platform and cross-touch information content.

(3) Consumer journey theory: deconstructs the interaction process between consumers and brands into stages such as cognition, consideration, purchase, loyalty and recommendation. AI empowerment can design personalized content, interaction and services for each key touch point in the journey, realize full-link and refined user experience management, and ultimately promote user conversion and brand loyalty improvement.

3. Current Situation of Brand Building and Promotion of Xinbin Rice

3.1 Overview of Xinbin Rice Industry Development

Xinbin Manchu Autonomous County is located in the mountainous area of eastern Liaoning

Province, with fertile soil, good permeability and drainage, which contributes to the excellent quality of “Xinbin Rice” [2]. Famous for its crystal grains, soft waxy taste and high edible value, Xinbin Rice was once the imperial “tribute rice” of the Qing Dynasty and was approved as a national geographical indication protected product in 2006. In terms of industrial scale, the rice planting area in Xinbin County is stable at about 130,000 mu, with an annual output of about 65,000 tons, covering 15 towns, 165 farmers’ professional cooperatives, family farms and processing enterprises, making it one of the local pillar agricultural industries. In recent years, Xinbin County has vigorously promoted high-standard farmland construction, green prevention and control technologies, soil testing and formulated fertilization, and improved variety promotion, and carried out in-depth cooperation with scientific research institutions such as Liaoning Academy of Agricultural Sciences. The quality of rice has been continuously improved, and the area of green and organic planting has been expanding. However, the industry as a whole is still dominated by raw grain sales and primary processing, with insufficient development of deep-processing products, short industrial chain and low added value.

3.2 Current Situation of Xinbin Rice Brand Building

At present, Xinbin Rice has registered a regional public brand trademark and designed a basic brand logo. Brand communication relies on historical and cultural elements such as “Manchu customs” and “royal tribute rice” to a certain extent, but the mining depth and modern expression are insufficient. The brand image presents the following characteristics:

(1) Traditional visual image: the visual system is overly realistic, and packaging and publicity mostly use real shots of rice fields and grains and traditional patterns with relatively conservative colors and styles. The design fails to transform the unique historical and cultural heritage into modern aesthetic and highly recognizable visual symbols, resulting in a lack of impact in an information-overloaded environment and difficulty in attracting young consumer groups who value aesthetics and sharing experiences.

(2) Single brand narrative: brand stories mainly revolve around the history of “tribute rice”, and the narrative mode is mostly static statements lacking modern expression and in-depth interpretation. It fails to innovatively connect historical heritage with lifestyle and emotional values concerned by contemporary consumers, leading to weak story appeal, difficulty in forming sustained topics and emotional resonance, and insufficient effectiveness of brand cultural value communication.

(3) Lack of IP-based operation: the brand lacks a concrete, personalized IP image or virtual spokesperson as a communication carrier. This makes brand communication stay at the one-way output of product information, making it difficult to carry out anthropomorphic interaction, content derivation and community operation on social media, limiting the brand’s affinity, fun and possibility of user spontaneous communication.

3.3 Problems Existing in Xinbin Rice Market Promotion

(1) Traditional communication channels with low reach efficiency: current promotion highly relies on offline exhibitions, local festivals and traditional media advertisements, with coverage and influence limited to the region. There is a lack of systematic layout and normalized operation on core content social platforms such as Douyin, Xiaohongshu and Bilibili, with weak online voice, making it difficult to reach young and national consumer groups pursuing convenience and keen on social media, resulting in low brand communication efficiency and slow market expansion.

(2) Homogeneous marketing content with insufficient interactivity: promotional content focuses on basic functional appeals such as “good taste” and “excellent origin”, with convergent narrative angles and expression forms, making it difficult to form differentiated cognition. Most content is in the form of static images and simple videos, lacking high-participation forms such as VR/AR immersive experience, interactive stories and user co-creation, leading to one-way communication and weak user participation, which is difficult to stimulate social sharing and in-depth interaction.

(3) Extensive channel management with poor information flow between production and marketing: sales is still dominated by traditional wholesale and offline supermarkets, and e-commerce operations mostly stay at the stage of store opening without refined operation and traffic acquisition capabilities. The production end is disconnected from consumer market data, failing to obtain real-time consumption preferences, inventory dynamics and market trends, resulting in delayed adjustment of production plans and marketing strategies, and risks of mismatched supply and demand, inventory

pressure and missed market opportunities.

(4) Passive reputation management with delayed crisis response: lack of systematic monitoring and intelligent analysis tools for online reputation such as e-commerce reviews and social media discussions. The collection of consumer feedback relies on manual work, making it impossible to timely identify negative evaluation trends and potential public opinion risks, and there is a lack of crisis early warning mechanism. Once a negative event occurs, the response is often slow and passive, which is easy to amplify the negative impact and damage brand reputation.

4. Paths of AI Empowering Brand Building and Market Promotion of County-Level Featured Agricultural Products

Xinbin Rice has been officially included in the national geographical indication protection system, achieving a breakthrough in regional brand building [3], injecting brand vitality into Rural Revitalization [4]. In view of the dilemmas faced by Xinbin Rice and combined with AI technical capabilities, the following systematic empowerment paths are proposed.

4.1 AI Empowering Brand Vision and IP Image Design

AI-assisted innovative design of agricultural product IP has become an important way to improve the market competitiveness, cultural added value and brand influence of agricultural products [5].

(1) AI-assisted generation of regional cultural visual assets. Using AI painting tools and inputting cultural keywords such as Xinbin landscapes, Manchu patterns and Shaman totems, original visual materials combining traditional implication and modern aesthetics can be generated in batches. This can quickly build a brand visual asset library including abstract patterns, texture backgrounds and art illustrations. These materials can be systematically applied to packaging, social media and offline material design, forming a unique and unified visual identity system at an extremely low cost, thus strengthening the cultural imprint and high-end brand perception of “Manxiang Tribute Rice”.

(2) Creating intelligent and interactive brand IP. Based on regional culture and product characteristics, an exclusive virtual IP such as anthropomorphic rice ear elf “Mi Bao” can be designed. Driven by AI, the IP can realize intelligent operation: using AIGC to continuously generate theme comics and stories; combining AI voice and animation to make it a short video host, vividly explaining the journey from field to table; even developing a lightweight AI chat robot embedded in social media, allowing users to interact in real time, consult products or listen to legends, making brand communication vivid and friendly, and greatly enhancing user stickiness and emotional connection.

(3) Dynamic and personalized packaging and experience. We deeply integrate the “one item, one code” system with AR technology to deliver exclusive digital interactive experiences for every single product. After scanning the QR code on the package, users can not only trace the origin of the product, but also activate AR scenes through mobile phones, watch AI-generated animation of the growth story of the batch of rice, or take photos and interact with virtual IP. This seamless link between physical packaging and digital content subverts the traditional unboxing and traceability experience, creating a strong sense of surprise and memory, making the consumption process a personalized brand exploration journey.

4.2 AI-Driven Omni-Media Precise Promotion and Communication

AI-empowered content and live streaming, as the main forms of interest e-commerce promotion, are helping brand development with emerging media [6].

(1) AI realizes “thousands of people and thousands of faces” content creation and distribution. By integrating generative AI and big data analysis, AI reshapes the entire “production-distribution” link of content marketing with a differentiated path as the core. On the creation side, based on unified core brand information, AIGC tools can automatically and massively generate a large amount of content adapted to different platform contexts and formal requirements, effectively breaking the bottleneck of creativity and production capacity. On the reach side, AI constructs fine dynamic user portraits through integrated analysis of multi-dimensional data. Based on this, the programmatic advertising system can accurately push the most matching creative content to high-potential groups at the optimal time, realizing the transformation from “people looking for information” to “information looking for people”, and greatly improving the accuracy and conversion efficiency of marketing.

(2) Intelligent content optimization and effect tracking. The AI-driven intelligent analysis system constructs a real-time data closed loop of “monitoring-learning-optimization”. The system tracks the content delivered by each channel in a full link, conducts in-depth attribution through machine learning algorithms, and accurately identifies the key factors affecting the effect. These insights can immediately feed back operational decisions, and the system can automatically precipitate successful elements into strategy templates and adjust the creation and delivery parameters of subsequent content in real time. This mechanism transforms marketing strategies from experience-based judgment to continuous iterative optimization based on data, ensuring that every budget can obtain measurable and growing return on investment.

4.3 AI Optimizing Production-Marketing Connection and Channel Operation

AI breaks the traditional production boundary, promotes cross-regional production-marketing connection relying on big data platforms, and drives the intelligent upgrading of agricultural product supply chains [7].

(1) Constructing intelligent supply chain and demand forecasting model. Through the integration of Internet of Things and multi-source data, AI can build an accurate production-marketing forecasting model. The model integrates real-time origin data, historical sales, online public opinion and seasonal factors to prospectively judge market demand and price trends, so as to provide scientific decision support for planting plans, processing scheduling, inventory and logistics. This can effectively alleviate the mismatch between supply and demand caused by information lag, promote the agile transformation of the supply chain from “production-based sales” to “demand-based production”, and significantly improve efficiency and reduce resource waste.

(2) Empowering channel merchants and private domain traffic operation. AI can empower omni-channel partners and automatically generate adapted marketing content and strategies to improve their sales capabilities. In private domain operation, AI customer service robots provide all-weather standardized services, and can analyze user intentions through intelligent conversations, automatically complete customer tagging, accurately identify high-intention customers and transfer them to manual in-depth follow-up. This realizes automated and refined operation of private domain traffic from service to incubation, greatly improving conversion efficiency and customer experience.

(3) Intelligent pricing and promotion strategies. By real-time monitoring of competitive product dynamics, analysis of market supply and demand and consumer price sensitivity, AI provides optimal pricing suggestions for different products and channels dynamically and differentially to pursue maximum revenue. At the same time, using simulation technology, AI can predict and evaluate the impact of various promotional activities on key indicators such as sales volume and profit, so as to help managers accurately select the strategy with the highest input-output ratio from multiple schemes and realize scientific allocation and effect optimization of marketing resources.

4.4 AI Improving Brand Reputation and Public Opinion Management

AI can accurately select and optimize communication channels, create and push personalized content according to consumer characteristics, and monitor and manage brand reputation in real time [8].

(1) Intelligent monitoring and analysis of omni-channel reputation. AI public opinion system can conduct all-weather automated monitoring of e-commerce, social and news platforms. Through natural language processing technology, the system can not only automatically identify the emotional tendency of user evaluations, but also accurately extract core topics and high-frequency keywords, transforming massive unstructured information into visual reputation analysis reports. This provides managers with real-time awareness of public opinion trends, helping them quickly grasp reputation dynamics, identify product advantages and disadvantages, and achieve data-driven brand reputation management.

(2) Automated negative early warning and crisis traceability. When the negative volume of a specific topic exceeds the preset threshold in a short time, the system can immediately start an early warning. More importantly, AI can quickly analyze the information transmission path and accurately locate the source and key diffusion nodes of public opinion fermentation. This capability wins critical time for crisis response, enabling response strategies to shift from passive processing to active intervention and source guidance, thus more effectively controlling the development of the situation and significantly reducing the risk of brand reputation damage.

(3) Intelligent user interaction and reputation guidance. AI can automatically process massive user feedback. For positive evaluations, it can automatically screen typical good reviews for aggregated display or generate thank-you interactions to amplify the reputation effect. For negative evaluations, it can automatically classify them through semantic understanding and generate processing work orders and assign them to corresponding departments, greatly improving response efficiency. This process not only optimizes the customer service process, but also transforms each user complaint into an opportunity to show service sincerity and improvement attitude, so as to actively guide and repair brand reputation.

5. Conclusions

Taking Xinbin Rice as an example, this study systematically discusses the specific application paths of AI technology in core links such as brand vision and IP image design, omni-media precise promotion, production-marketing connection optimization and reputation public opinion management. The study finds that AI can not only efficiently and cost-effectively solve traditional pain points such as lack of creativity, inefficient communication and disconnection between production and marketing in county-level agricultural product brand building through AIGC, big data analysis and other technical means, but also deeply explore regional cultural value by building an intelligent and dynamic brand operation system, realize precise connection and emotional resonance with consumers, especially young groups, thus endowing agricultural products with higher brand premium and market competitiveness. The evaluation of the specific effect of AI empowerment, the deep integration mechanism with traditional models, and the research and development of inclusive technical tools are still topics that need continuous attention and in-depth research in the future. With the continuous evolution and popularization of AI technology, its application in the agricultural brand field will be more in-depth and intelligent.

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