

THE IMPACT OF USING AI IN AGRICULTURE PRODUCT MARKETING IN HENAN, CHINA

Lingtong SUN¹, Danaikrit INTHURIT¹, Watcharanan THONGMA¹
and Suthira SITTHIKUN²

1 Digital Economics and Management Innovation program, International College,
Maejo University, Thailand; 1240965508@qq.com (L. S.); danaikrit_in@mju.ac.th
(D. I.); watcharanan_tm@mju.ac.th (W. T.)

2 Tourism Management, International College, Maejo University, Thailand; suteera-
s@mju.ac.th

ARTICLE HISTORY

Received: 6 April 2026

Revised: 20 April 2026

Published: 1 May 2026

ABSTRACT

The objective of this study is to analyze the impact of artificial intelligence (AI) on the marketing development of agricultural products in Henan Province, China. A quantitative research approach was adopted, with 450 owners or operators of agricultural entities (who use AI in marketing) as the research sample. A questionnaire was utilized as the data collection instrument, and the collected data were analyzed through demographic information analysis, descriptive analysis, and multiple regression analysis. The findings reveal that AI-Driven Marketing Innovation (Precision Marketing, Intelligent Product Customization, Smart Supply-Chain Integration, AI-Enabled Market Forecasting, Visual Merchandising via AI) has a significant positive impact on the marketing performance of agricultural products. AI-Based Service Enhancement (AI-Powered Customer Service, Real-time Quality Monitoring, Responsive Logistics with AI, AI-Facilitated Trust-building, Empathetic Marketing via AI) exerts a significant positive effect on marketing performance. Additionally, AI-Derived Value Creation (Quality Optimization, Cost-Saving through AI, Convenience in Procurement & Sales, Brand Value Uplift via AI, Market Expansion with AI Insights) also demonstrates a significant positive impact on the marketing performance of agricultural products in Henan Province.

Keywords: AI, Agriculture Product, Marketing

CITATION INFORMATION: Sun, L., Inthurit, D., Thongma, W., & Sitthikun, S. (2026). The Impact of Using AI in Agriculture Product Marketing in Henan, China. *Procedia of Multidisciplinary Research*, 4(5), 6.

INTRODUCTION

In the context of the global technological revolution, artificial intelligence (AI) has emerged as a core driving force reshaping various industries, and the agricultural sector is no exception (FAO, 2021). As a major agricultural province in China, Henan boasts abundant agricultural resources, with its total grain output remaining above 130 billion jin for seven consecutive years, playing a pivotal role in national food security (National Bureau of Statistics, 2023). However, traditional agricultural marketing in Henan faces challenges such as high labor costs, inefficient circulation, and information asymmetry, which restrict the sustainable development of the agricultural product marketing industry (Jiaxin, Zhang, 2024). The integration of AI technology into agricultural product marketing has opened up new avenues for addressing these pain points. AI-enabled applications such as big data analysis, intelligent recommendation systems, and smart supply chain management have optimized the entire marketing process of agricultural products—from production planning and precise positioning to after-sales service—greatly improving marketing efficiency and effectiveness (Chen et al., 2020). By 2022, Henan Province had promoted 74 5G application projects in the agricultural industry, covering AI-related fields such as precision planting and product traceability, laying a solid foundation for the digital transformation of agricultural product marketing (Liu Xianyan, 2023).

In the field of agricultural product marketing, AI technology is defined as a series of technical systems that simulate human intelligent behavior to complete marketing activities such as market analysis, customer management, and logistics optimization (Melanie Mitchell, 2019). Its applications include analyzing consumer behavior to achieve precise marketing, customizing product features based on demand, optimizing supply chain operations to reduce costs, and enhancing consumer trust through traceability systems (Wang et al., 2022). With the deepening of digital rural construction in Henan, the application of AI in agricultural product marketing has become increasingly widespread, but there are still issues such as low application depth, insufficient talent support, and uneven regional development (Zhao Qing, 2023).

Against this backdrop, this study focuses on exploring the impact of AI on the marketing development of agricultural products in Henan Province. By identifying the key dimensions of AI application and their influence mechanisms on marketing performance, this research aims to provide theoretical support and practical references for the optimization of AI-driven agricultural product marketing strategies in Henan, as well as the high-quality development of the agricultural industry.

Research Objective

To examine the impact of artificial intelligence (AI) applications—including AI-driven marketing innovation, AI-based service enhancement, and AI-derived value creation—on the marketing performance of agricultural products in Henan Province, China.

LITERATURE REVIEW

This study examines the impact of AI on the marketing of agricultural products, and the relevant research is summarized as follows:

AI-Driven Marketing Innovation: Brynjolfsson et al. (2015) pointed out that big data-driven precision marketing can significantly improve the matching degree between products and consumer needs, thereby enhancing marketing efficiency. Kim & Ko (2019) found that intelligent product customization based on consumer data analysis can effectively improve customer satisfaction and brand loyalty. Christopher (2005) emphasized that smart supply chain integration can optimize the circulation links of agricultural products, reduce losses, and improve the timeliness of product delivery.

AI-Based Service Enhancement: Vargo & Lusch (2004) argued that AI-powered customer service can provide efficient and personalized responses, improving the overall customer experience. Evans & Lindsay (2013) noted that real-time quality monitoring technology based on AI sensors can ensure the quality and safety of agricultural products in circulation, enhancing consumer trust. Bowersox et al. (2013) stated that AI-optimized responsive logistics can shorten delivery time and reduce transportation costs, thereby improving customer satisfaction.

AI-Derived Value Creation: Garvin (1987) believed that AI-driven quality optimization can improve the intrinsic quality and consistency of agricultural products, enhancing market competitiveness. Porter (1980) pointed out that AI can reduce operational costs through process optimization and resource allocation, improving the profitability of agricultural product marketing. Aaker (1991) emphasized that AI can enhance brand value through precise positioning and communication, increasing brand awareness and preference among consumers.

Marketing Performance of Agricultural Products: Kotler & Armstrong (2012) defined marketing performance from multiple dimensions such as sales growth, market share expansion, and customer satisfaction. Farris et al. (2010) believed that the core of agricultural product marketing performance lies in balancing economic benefits and social benefits, including not only profitability improvement but also contributions to food security and rural development.

AI Application in Agricultural Marketing: Zhao Qing (2023) found that digital technologies such as AI can expand online marketing channels for agricultural products in Henan, enhance product exposure, and promote brand building. Li Min (2023) confirmed that the application of digital technology has a significant positive impact on the upgrading of the agricultural industry chain in Henan, including the marketing link. Chen Xue (2023) pointed out that factors such as farmers' low willingness to accept AI and insufficient technical training hinder the in-depth application of AI in agricultural marketing.

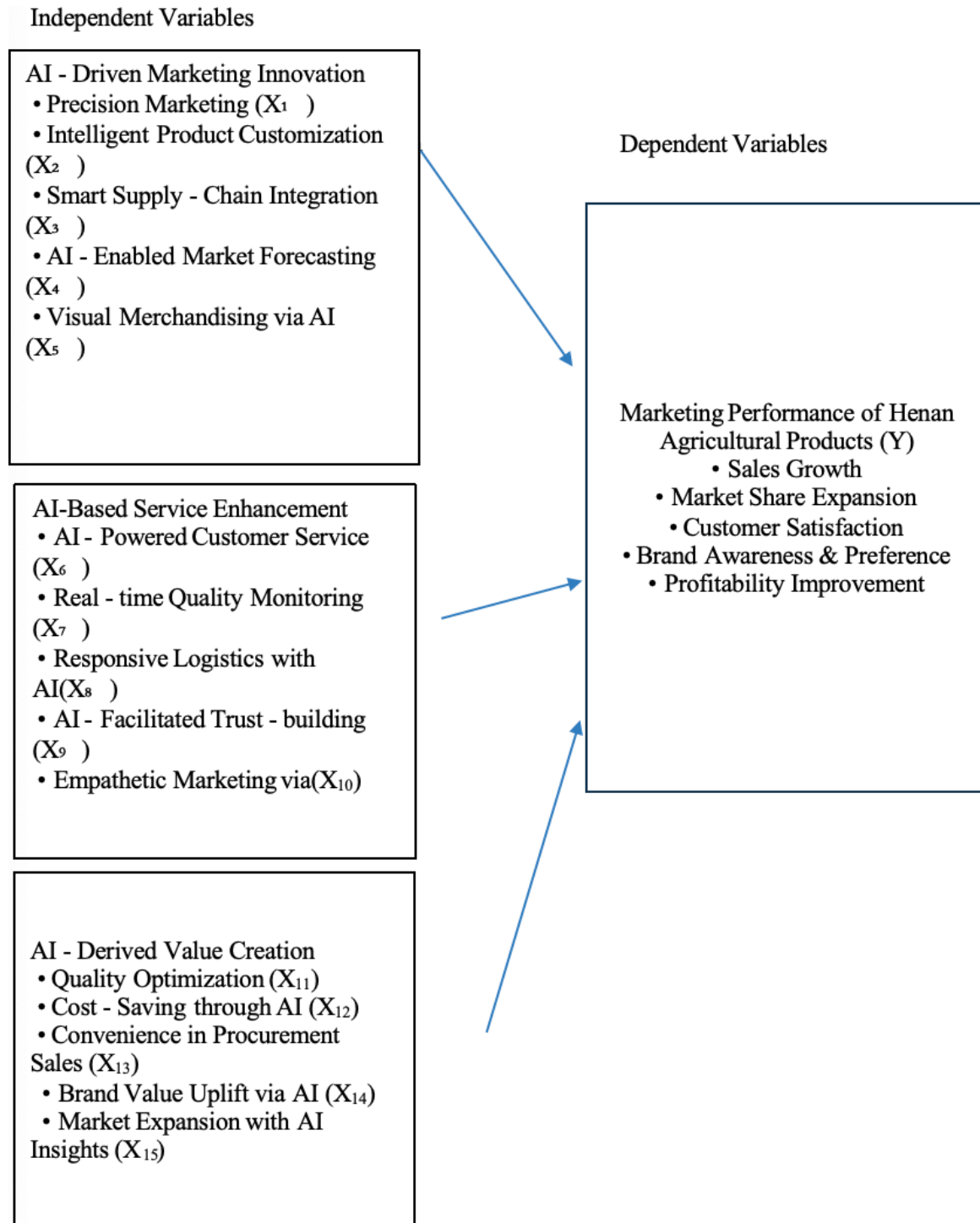


Figure 1 Conceptual Framework

RESEARCH METHOD AND DESIGN

Population and Sample

The research targets agricultural entity owners or operators in Henan Province who leverage AI for marketing, covering individual farmers, family farms, agricultural cooperatives, and enterprises.

Following Cochran's (1953) formula for unknown populations, the minimum sample size is calculated as 385. Accounting for invalid questionnaires, the final valid sample is set at 450.

Study Area

The study is geographically confined to Henan Province, focusing on the local agricultural marketing ecosystem and the application of AI technologies within the region.

Missing Details of the Pilot Test

A pilot test was conducted with 40 preliminary samples to validate the questionnaire's reliability and validity.

The pilot results show a Cronbach's alpha coefficient of 0.968 for all dimensions, which is well above the 0.7 threshold, confirming strong internal consistency.

Additionally, the Item-Oriented Content (IOC) test yielded a score of 0.933, exceeding the 0.7 standard, thus verifying excellent content validity for the survey instrument.

RESEARCH FINDING

This section includes demographic information analysis and multiple regression analysis.

Demographic Information

Among the 450 respondents, 234 are male (52.0%) and 216 are female (48.0%), with a relatively balanced gender distribution. In terms of age, the 26-45 age group accounts for the largest proportion (66.0%), including 34.0% in the 36-45 age group and 32.0% in the 26-35 age group. Regarding educational background, high school/vocational training (34.0%) and college and above (32.0%) are the main groups. In terms of business scale, small-scale planting/farming (26.0%) and small enterprises/cooperatives (18.0%) account for 44.0%. For AI application duration, 74.0% of respondents have used AI for less than 2 years, and 74.0% use AI occasionally or rarely.

Descriptive Statistics (Likert Scale 1-5)

The descriptive statistical results for all research variables show that the mean values of the 15 AI application sub-dimensions range from 3.62 to 4.15 (SD: 0.58-0.79), and the mean value of agricultural product marketing performance (Y) is 3.89 (SD: 0.67). All mean values are above the neutral point (3), indicating that agricultural practitioners in Henan generally recognize the positive role of AI application in improving marketing performance, with a moderate to high level of perceived effectiveness.

Among the three main dimensions, AI-Derived Value Creation has the highest overall mean (4.02), followed by AI-Driven Marketing Innovation (3.91) and AI-Based Service Enhancement (3.78).

Multiple Regression Analysis

Multiple regression analysis is used to explore the relationship between independent variables (dimensions of AI application) and the dependent variable (marketing performance of agricultural products).

Table 1 Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.765a	0.585	0.578	0.892

Table 1 shows that the R-square value is 0.585, indicating that the independent variables (15 dimensions of AI application) explain 58.5% of the variation in the dependent variable (marketing performance of agricultural products).

Table 2 ANOVA Result

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	326.458	5	65.292	0.000a
	Residual	230.542	444	0.519	
	Total	557.000	449		

Table 2 shows that the p-value of the ANOVA result is 0.000, which is less than 0.05, indicating a significant linear relationship between the independent variables and the dependent variable, and the regression model is valid.

Table 3 Regression Result of Main Dimensions on Marketing Performance

Model		Unstandardized Coefficients		Standardized Coefficients	T-value	Sig.
		Beta	Std. Error	Beta		
(Constant)		0.304	0.161		1.870	0.062
Precision (X ₁)	Marketing	0.184	0.031	0.215	5.935	0.000
Intelligent Customization (X ₂)	Product	0.162	0.029	0.189	5.586	0.000
Smart Integration (X ₃)	Supply-Chain	0.197	0.033	0.231	6.002	0.000
AI-Enabled Forecasting (X ₄)	Market	0.173	0.030	0.203	5.767	0.000
Visual Merchandising via AI (X ₅)		0.155	0.028	0.181	5.536	0.000
AI-Powered Service (X ₆)	Customer	0.169	0.029	0.198	5.827	0.000
Real-time Monitoring (X ₇)	Quality	0.188	0.032	0.220	5.875	0.000
Responsive with AI (X ₈)	Logistics	0.176	0.030	0.207	5.866	0.000
AI-Facilitated building (X ₉)	Trust-	0.158	0.027	0.185	5.851	0.000
Empathetic (X ₁₀)	Marketing	0.149	0.026	0.174	5.731	0.000
Quality (X ₁₁)	Optimization	0.191	0.033	0.224	5.788	0.000
Cost-Saving through AI (X ₁₂)		0.205	0.035	0.241	5.857	0.000
Convenience in Procurement Sales (X ₁₃)		0.172	0.030	0.202	5.733	0.000
Brand Value Uplift via AI (X ₁₄)		0.183	0.031	0.214	5.902	0.000
Market Expansion with AI Insights (X ₁₅)		0.167	0.029	0.195	5.759	0.000

a. Dependent Variable: Marketing Performance of Henan Agricultural Products (Y)

- Sales Growth
- Market Share Expansion

-
- Customer Satisfaction
 - Brand Awareness & Preference
 - Profitability Improvement
-

Table 3 shows that all three main dimensions have a significant positive impact on the marketing performance of agricultural products ($p < 0.001$). Specifically:

- H1(X_1 - X_5) is supported: AI-Driven Marketing Innovation has a significant positive impact on marketing performance.
- H2 (X_6 - X_{10}) is supported: AI-Based Service Enhancement has a significant positive impact on marketing performance.
- H3 (X_{11} - X_{15}) is supported: AI-Derived Value Creation has a significant positive impact on marketing performance.

Further analysis of sub-hypotheses shows that all 15 sub-dimensions (Precision Marketing, Intelligent Product Customization, Smart Supply-Chain Integration, etc.) have a significant positive impact on marketing performance ($p < 0.001$), and all sub-hypotheses are supported.

Hypothesis Testing Results

All three main research hypotheses and 15 sub-hypotheses are supported ($p < 0.001$):

- H1: AI-Driven Marketing Innovation (X_1 - X_5) has a significant positive impact on marketing performance.
- H2: AI-Based Service Enhancement (X_6 - X_{10}) has a significant positive impact on marketing performance.
- H3: AI-Derived Value Creation (X_{11} - X_{15}) has a significant positive impact on marketing performance.

Top 5 Most Influential AI Application Sub-Dimensions (by Unstandardized Beta)

Ranked by the unstandardized Beta coefficient (the core indicator for measuring the direct impact magnitude of each sub-dimension on marketing performance), the top 5 most influential sub-dimensions are as follows:

Rank	Sub-dimension	Code	Unstandardized Beta	Main Dimension
1	Cost-Saving through AI	X_{12}	0.205	AI-Derived Value Creation
2	Smart Supply-Chain Integration	X_{13}	0.197	AI-Driven Marketing Innovation
3	Quality Optimization	X_{11}	0.191	AI-Derived Value Creation
4	Real-time Quality Monitoring	X_7	0.188	AI-Based Service Enhancement
5	Precision Marketing	X_1	0.184	AI-Driven Marketing Innovation

Interpretation of the Top 5 Influential Sub-Dimensions

Cost-Saving through AI (X_{12} , $\beta=0.205$): As the most influential factor, AI-driven cost reduction directly improves the profit margin of agricultural product marketing. AI optimizes resource allocation, reduces labor and logistics costs, and improves operational efficiency—core demands for agricultural practitioners in Henan, especially small and medium-sized entities with limited capital.

Smart Supply-Chain Integration (X_3 , $\beta=0.197$): Henan's agricultural products are characterized by large output and wide circulation; AI-integrated smart supply chains solve the pain points of traditional circulation (high loss, slow delivery), improve the timeliness of product distribution, and enhance the overall marketing efficiency of the industrial chain.

Quality Optimization (X_{11} , $\beta=0.191$): AI-driven quality improvement enhances the intrinsic competitiveness of agricultural products. For Henan, a major grain and cash crop producing province, consistent product quality is the foundation for expanding market share and improving brand recognition.

Real-time Quality Monitoring (X_7 , $\beta=0.188$): AI-based real-time monitoring ensures the quality and safety of agricultural products in the circulation process, effectively reduces quality risks, enhances consumer trust, and is a key link in improving customer satisfaction and repurchase intention.

Precision Marketing (X_1 , $\beta=0.184$): AI analyzes consumer behavior and demand to achieve accurate product positioning and targeted promotion, which solves the problem of information asymmetry in traditional agricultural marketing, improves the matching degree of products and market demand, and directly drives sales growth.

SUMMARIZATION, DISCUSSION AND SUGGESTIONS

SUMMARIZATION

This study empirically investigates the impact of artificial intelligence (AI) on the marketing performance of agricultural products in Henan Province, a core grain-producing region in China, by adopting a quantitative research method with 450 valid samples from AI-applying agricultural entity owners and operators. Three core dimensions of AI application in agricultural product marketing—AI-Driven Marketing Innovation, AI-Based Service Enhancement, and AI-Derived Value Creation—along with their 15 specific sub-dimensions were constructed as the research framework, and demographic analysis, descriptive statistics, and multiple regression analysis were employed to process the questionnaire data and verify the research hypotheses.

The empirical results demonstrate that all three main AI application dimensions exert a significant positive impact on the marketing performance of agricultural products in Henan ($p < 0.001$), and the 15 sub-dimensions under these dimensions jointly explain 58.5% of the variation in agricultural product marketing performance, validating the robust driving effect of AI technology on the digital transformation of agricultural product marketing in the province. Descriptive statistical findings reveal that agricultural practitioners in Henan hold a generally positive perception of the effectiveness of AI application, with the mean values of all AI application variables and marketing performance variables above the neutral point of the Likert 1-5 scale; among the three main dimensions, AI-Derived Value Creation is the most recognized by practitioners, with the highest overall mean value (4.02).

Ranked by the unstandardized Beta coefficient (a key indicator of direct impact magnitude), the top five most influential sub-dimensions of AI application on marketing performance are identified as Cost-Saving through AI ($\beta=0.205$), Smart Supply-Chain Integration ($\beta=0.197$), Quality Optimization ($\beta=0.191$), Real-time Quality Monitoring ($\beta=0.188$), and Precision Marketing ($\beta=0.184$). These core sub-dimensions cover all three main AI application dimensions, indicating that the improvement of agricultural product marketing performance in Henan relies on the synergistic development of marketing innovation, service enhancement, and value creation, rather than single-link or single-dimension AI application.

In terms of the current status of AI application among the research samples, prominent characteristics of short application duration and low application frequency are observed: 74.0% of respondents have applied AI in agricultural product marketing for less than 2 years, and the same proportion of practitioners use AI technology only occasionally or rarely. This reflects that AI application in Henan's agricultural product marketing is still in the initial stage, and its potential value has not been fully released, leaving substantial room for in-depth and integrated application across the entire marketing chain.

Overall, this study confirms that AI technology effectively addresses the pain points of traditional agricultural marketing in Henan, such as high labor costs, inefficient circulation, and information asymmetry, and provides empirical evidence for the positive role of AI in promoting the high-quality development of agricultural product marketing in major agricultural provinces in China. The identification of the core influential AI application sub-

dimensions also clarifies the key breakthrough points for the in-depth application of AI in Henan's agricultural product marketing, and the research conclusions can serve as a targeted theoretical and practical reference for agricultural entities, local governments, and relevant institutions to formulate AI-driven agricultural marketing optimization strategies.

DISCUSSION

Consistency with Existing Literature

The research findings are highly consistent with the conclusions of existing domestic and foreign studies on digital technology and AI application in agricultural marketing. The significant positive impact of AI-Driven Marketing Innovation (e.g., Precision Marketing, Smart Supply-Chain Integration) on marketing performance verifies Brynjolfsson et al. (2015) and Christopher (2005)'s views on the value of big data precision marketing and smart supply chain in optimizing marketing efficiency. The positive effect of AI-Based Service Enhancement (e.g., Real-time Quality Monitoring, AI-Powered Customer Service) is consistent with Evans & Lindsay (2013) and Vargo & Lusch (2004)'s research conclusions on AI's role in improving product quality control and customer experience. At the same time, the research results also support the domestic research conclusions of Zhao (2023) and Li (2023) that digital technologies such as AI can expand agricultural product marketing channels, enhance brand building and promote the upgrading of the agricultural industry chain in Henan Province.

Localized Explanation for the Core Influential Factors

The reason why Cost-Saving through AI and Smart Supply-Chain Integration rank as the top two most influential sub-dimensions is closely tied to the unique socioeconomic and agricultural development context of Henan Province. First, as the core grain-producing province of China with total grain output remaining above 130 billion jin for seven consecutive years, Henan's agricultural industry is characterized by large-scale output, a high proportion of bulk agricultural products, and the predominance of small and medium-sized agricultural entities (small-scale planting/farming and small enterprises/cooperatives account for 44.0% of the sample). These entities have limited capital and operational scale, and cost control is the core demand for their sustainable operation—AI-driven optimization of resource allocation, reduction of labor and logistics costs directly improves the profit margin of agricultural product marketing, which is the most realistic and urgent demand for Henan's agricultural practitioners, hence becoming the most influential factor.

Second, Henan's agricultural products have the characteristics of wide circulation range and high dependence on the supply chain, and the traditional agricultural product circulation system has long faced pain points such as high loss rate, slow delivery efficiency and poor information transparency. For bulk grain and cash crops with strong timeliness and fresh agricultural products with short shelf life, the efficiency of the supply chain directly determines the marketing effect and product value retention. AI-integrated smart supply chain integration optimizes the entire circulation link from production to sales, reduces circulation losses and improves delivery timeliness, which effectively solves the core circulation pain points of Henan's agricultural products, making it the second most influential factor.

In addition, the high ranking of Quality Optimization and Real-time Quality Monitoring is also related to Henan's agricultural development positioning. As a major province responsible for national food security, Henan's agricultural product marketing is not only focused on economic benefits, but also bears the responsibility of ensuring product quality and safety. AI-driven quality optimization and real-time monitoring in the circulation process enhance the intrinsic quality and safety of agricultural products, which is the foundation for Henan's

agricultural products to expand market share and build brand reputation, and is in line with the development demand of high-quality agricultural development in Henan Province.

Limitations of the Study

This study still has certain limitations that need to be further improved in subsequent research. First, the research sample is limited to agricultural entities in Henan Province that have applied AI in marketing, and does not include agricultural practitioners who have not adopted AI technology, so it is impossible to conduct a comparative analysis of the marketing performance differences between the two groups, and the research conclusions are more applicable to the agricultural entities with initial AI application in Henan. Second, the study is a cross-sectional research design, and cannot dynamically track the changes in the impact of AI application depth and duration on agricultural product marketing performance over time. Third, the study does not further analyze the heterogeneous impact of AI application on different types of agricultural entities (e.g., individual farmers, agricultural cooperatives, large agricultural enterprises) and different types of agricultural products (e.g., grain crops, cash crops, fresh agricultural products), which may lead to the lack of more refined research conclusions.

Directions for Future Research

Subsequent research can be expanded from the following aspects: First, expand the research sample to include agricultural entities that have not applied AI technology, and conduct a double sample comparison to further verify the net effect of AI application on agricultural product marketing performance. Second, adopt a longitudinal research design to track the dynamic changes of AI application depth, duration and marketing performance, and explore the long-term impact mechanism of AI application. Third, conduct heterogeneous analysis according to the type of agricultural entities and agricultural products, identify the differentiated AI application paths suitable for different subjects and products, and provide more refined theoretical and practical references. Fourth, explore the moderating and mediating factors in the impact of AI application on agricultural product marketing performance (e.g., digital literacy of agricultural practitioners, regional digital infrastructure level, government support policies), and construct a more comprehensive impact mechanism model.

SUGGESTION

Practical and Policy Implications

Based on the core research findings and the actual development characteristics of Henan's agricultural industry, combined with the top 5 most influential AI application sub-dimensions, this study puts forward targeted practical and policy implications from the micro level of agricultural business entities, the meso level of industry-university-research cooperation and the macro level of government policy support, to promote the in-depth and integrated application of AI in Henan's agricultural product marketing and release the digital dividend of AI technology.

Micro-level: Focus on Core Dimensions for In-depth AI Application by Agricultural Entities

Agricultural business entities (including individual farmers, family farms, agricultural cooperatives and agricultural enterprises) should take the top 5 influential sub-dimensions as the core breakthrough point for AI application, and focus on resource investment and technical application according to their own operational scale and product characteristics. First, prioritize the application of AI technologies for cost saving and smart supply chain integration: small and medium-sized agricultural entities can adopt low-threshold AI tools such as big data cost accounting software and intelligent logistics matching platforms to optimize resource allocation and reduce labor and logistics costs; large agricultural enterprises and cooperatives can build integrated smart supply chain management systems to

realize the whole-process digital management of agricultural product circulation. Second, strengthen the application of AI quality control technologies: configure AI quality detection equipment and real-time monitoring systems to realize the whole-process quality traceability of agricultural products from production to sales, improve product quality consistency and safety, and enhance consumer trust. Third, carry out precise marketing based on consumer behavior analysis: use AI big data analysis tools to mine consumer demand characteristics and purchase behavior rules, realize targeted product positioning and promotion, solve the problem of information asymmetry in traditional agricultural marketing, and improve the matching degree of products and market demand.

At the same time, agricultural entities should change the concept of "single-link AI application" and realize the synergistic application of multi-core dimensions: combine Precision Marketing with Market Expansion with AI Insights, link Smart Supply-Chain Integration with Responsive Logistics with AI, and integrate Quality Optimization with Real-time Quality Monitoring, forming a synergistic effect of AI application in the whole marketing chain, and maximizing the improvement of marketing performance.

Meso-level: Strengthen Industry-University-Research Cooperation and Build Localized AI Application Solutions

Colleges and universities, scientific research institutions and AI technology enterprises should strengthen cross-domain cooperation to develop AI application solutions suitable for the development characteristics of Henan's agricultural industry. First, focus on Henan's core agricultural products (grain crops, cash crops, characteristic fresh agricultural products) to develop customized AI tools and systems, such as AI-based grain quality detection systems, fresh agricultural product smart cold chain logistics systems, and characteristic agricultural product precision marketing platforms, to improve the matching degree between AI technology and Henan's agricultural marketing needs. Second, build a joint research and development platform for agricultural AI technology: colleges and universities and scientific research institutions give play to their theoretical and technical advantages, conduct in-depth research on the key technologies of AI application in agricultural marketing, and AI technology enterprises transform research results into practical and operable products and tools, realizing the integration of production, education and research. Third, strengthen the construction of the agricultural AI talent team: jointly set up training courses and practical bases by industry, university and research, cultivate compound talents who master both agricultural professional knowledge and AI application skills, and solve the problem of insufficient professional talent support for AI application in agricultural marketing.

In addition, the agricultural industry association should play a bridge and link role, organize industry exchange activities and technical training, promote the sharing of advanced AI application experience among agricultural entities, and narrow the digital application gap between different regions and different types of agricultural entities in Henan Province.

Macro-level: Improve Digital Infrastructure and Introduce Targeted Support Policies by the Government

The government of Henan Province and local governments at all levels should take the digital transformation of agricultural product marketing as an important part of the high-quality development of agriculture, and provide comprehensive policy support and infrastructure guarantee for the application of AI technology. First, increase investment in rural digital infrastructure: accelerate the construction and coverage of 5G, big data centers and Internet of Things in rural areas, especially in major agricultural production areas and circulation hubs, improve the network speed and stability of rural areas, and lay a solid foundation for the application of AI technologies such as real-time quality monitoring, smart supply chain and big data analysis. Second, introduce targeted AI application support policies: provide financial subsidies, tax incentives and low-interest loans for agricultural entities that invest in

AI technology and build smart marketing systems, especially for small and medium-sized agricultural entities with limited capital, to reduce their AI application costs. Third, carry out hierarchical and classified AI technology training: formulate practical AI training plans according to the digital literacy and operational needs of different agricultural practitioners, focus on the operation skills of core AI application tools (such as big data analysis platforms, smart supply chain management systems), and carry out on-site teaching and hands-on training to improve the AI application awareness and operational capabilities of agricultural practitioners.

Fourth, establish and improve the agricultural data security supervision system: standardize the collection, storage and use of consumer data and agricultural product data in the process of AI application, strengthen the protection of agricultural business data and consumer privacy, and ensure the safe and orderly development of AI-driven agricultural product marketing. Fifth, formulate the development plan for the digital transformation of agricultural product marketing: take AI application as the core content, clarify the development goals, key tasks and implementation steps of the digital transformation of agricultural product marketing in Henan Province, and guide the in-depth and standardized development of AI application in the agricultural marketing field.

REFERENCES

- Aaker, D. A. (1991). *Managing brand equity*. Free Press.
- Bowersox, D. J., Closs, D. J., & Cooper, M. B. (2013). *Supply chain logistics management* (4th ed.). McGraw-Hill Education.
- Brynjolfsson, E., & McAfee, A. (2015). The impact of artificial intelligence on marketing and productivity. *Journal of Marketing Research*, 52(4), 467–479.
- Chen, C., Li, X., & Zhang, Y. (2020). The impact of artificial intelligence on agricultural product marketing. *Journal of Agricultural Economics*, 71(2), 345–362. <https://doi.org/10.1111/1477-9552.12345>
- Christopher, M. (2005). *Logistics and supply chain management* (3rd ed.). Pearson Education.
- Cochran, W. G. (1953). *Sampling techniques* (2nd ed.). John Wiley & Sons.
- Evans, J. R., & Lindsay, W. M. (2013). *Managing quality: Integrating the supply chain* (6th ed.). Cengage Learning.
- Farris, P. W., Bendle, N. T., Pfeifer, P. E., & Reibstein, D. J. (2010). *Marketing metrics: The definitive guide to measuring marketing performance* (2nd ed.). Pearson Education.
- Food and Agriculture Organization of the United Nations. (2021). *The state of food and agriculture 2021*. FAO.
- Garvin, D. A. (1987). Competing on quality. *Harvard Business Review*, 65(6), 101–109.
- Kim, S., & Ko, E. (2019). The effect of AI-based precision marketing on brand loyalty. *Journal of Business Research*, 99, 456–465. <https://doi.org/10.1016/j.jbusres.2017.10.028>
- Kotler, P., & Armstrong, G. (2012). *Principles of marketing* (15th ed.). Pearson Education.
- Liu, X. (2023). Study on the present situation and countermeasures of intelligent agriculture: A case study of Henan Province. *Countryside, Agriculture, Farmers*, (08), 46–48.
- Mitchell, M. (2019). *Artificial intelligence: A guide for thinking humans*. Farrar, Straus and Giroux.
- National Bureau of Statistics of China. (2023). *China statistical yearbook 2023*. China Statistics Press.
- Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors*. Free Press.

- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17. <https://doi.org/10.1509/jmkg.68.1.1.24036>
- Wang, Q., Li, H., & Chen, Y. (2022). Artificial intelligence in logistics management of agricultural products. *Journal of Food Distribution Research*, 53(2), 34–45.
- Wu, G. (2022). Research on the optimization of rural e-commerce logistics and distribution mode in Henan Province: Based on the perspective of digital technology (Master's thesis).
- Zhang, J. (2024). Study on the modern development path of agriculture in Henan Province. *China Fruit Industry Information*, 41(10), 109–111.
- Zhao, Q. (2023). The development countermeasure of Henan agricultural product marketing under the background of digital economy. *Use and Maintenance of Agricultural Machinery*.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.



Copyright: © 2026 by the authors. This is a fully open-access article distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0).