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# Research on precision marketing of geographical indication agricultural products based on big data technology

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***Abstract:*** *With the rapid development of China's social economy, emerging technologies such as big data not only bring opportunities to enterprise marketing, but also bring new challenges. This paper makes an in-depth analysis of product marketing environment and precision marketing management mode, and constructs a product and precision marketing management mode which is formed by data collection, analysis and mining, precision marketing management model, precision marketing implementation and implementation, and effect assessment and feedback. It also analyzes that the global electronic payment system based on block chain realizes trust interaction between transaction parties under block chain digital signature technology, and forms new business trust relationship with smart contract instead of traditional contract, in order to provide some reference for the promotion of enterprise marketing strategy under the background of big data.*

***Keywords:*** *Big data; Precision marketing; Block chain; Smart contracts; Electronic payment*

## 1. Introduction

In recent years, with the improvement of people's material and spiritual living standards, consumers begin to pay more and more attention to the experience of product purchase and use when choosing agricultural products and services. The most prominent feature of new marketing means is the application of new technology, especially big data technology. It enables enterprises to develop corresponding marketing strategies and programs and various personalized and targeted services according to the needs and characteristics of each consumer, so as to create a refined marketing model in line with their own culture.

In the process of marketing, a large amount of data such as user personal information will be generated. As an important resource, data opening, sharing, circulation and privacy protection become difficult problems in the process of development and use. The emergence of blockchain technology provides solutions to many pain points in the field of big data with its characteristics of decentralization, importability, anonymity and traceability. Applying blockchain technology to the production and sales mode of agricultural products will bring a new idea to the development of supply chain. By analyzing the research results in related fields, it can be seen that the current research on Blockchain technology presents the characteristics of gradual deepening from theoretical discussion to concrete application and implementation. He Haiwu et al. (2018) introduced the main basic concepts, categories, architectures and key technologies of the new generation of intelligent contract technology based on blockchain, and discussed the practical application scenarios, possible problems and challenges in the future development of blockchain technology. [1] In terms of the specific implementation of blockchain intelligent contract, Li Jia (2018) studied the issue of electronic payment in all intelligent contract system of blockchain and proposed an electronic payment system based on blockchain. [2]

It can be seen that in the current exploration of building an intelligent system for product marketing system, contracts based on blockchain technology to realize intelligent product sales can combine blockchain technology with the retail industry, and this trend will be regarded as a focus and direction of the development of product sales industry in the future. And blockchain technology will ensure that trade can still be conducted efficiently and reliably without a central certification body. It not only reduces transaction cost and expense, but also improves the information reliability of transaction.

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## 2. Product marketing model from the perspective of big data

Marketing innovation based on big data mainly includes product marketing based on "Internet +" and product transaction chain based on blockchain smart contract technology. Enterprises trade agricultural products and share information through the transaction chain and other intelligent contracts deployed on the chain.

Consumers provide relevant product information, which can effectively reduce the time consumers spend searching on the Internet.

1) Precise marketing, positioning target market and target customers

First of all, the popularity of smart mobile terminal devices has made WeChat, Weibo and other platforms more widely used. Marketing can use these platforms to promote agricultural products, maintain customer relations and achieve accurate marketing positioning. Secondly, innovate video marketing model. Brands take advantage of potential consumers' attention to short videos

Habit, the product advertising in the way of video play image and intuitive display, more easy to gain the favor of consumers.

It will be more beneficial for product sales to use the diversified platform of the Internet to carry out propaganda with rich and diverse advertisements and broaden the communication channels of product information. Compared with traditional marketing activities, new media marketing activities in the context of big data can be directly monitored and improved by data-based means. For example, users' behaviors can be analyzed through browsing records, purchase records and search records, so as to tap more potential customers and promote the product to gain a wider marketing market.

2) Focus on user engagement

In addition to the agricultural products sold by precision marketing, keeping customers interested in agricultural products or enterprises is conducive to turning them into long-term users and accumulating reputation of enterprises. Whether it is to attract users through activities such as sending lottery messages on the platform, or to record the consumption stories of users for a whole year, it can show that businesses pay attention to users' emotional needs. In this way, users will be more inclined to use this shopping channel to purchase marketed agricultural products after comparing similar agricultural products. [3]

3) Promotion methods in the Internet environment

One is holiday promotion. In order to attract consumers, enterprises can carry out various promotional activities during the holiday. Every year, there is an e-commerce shopping carnival season, physical stores can take advantage of this shopping atmosphere to launch discounts, on the basis of ensuring their own profits, give certain discounts to agricultural products, small profits and large sales.

Two is the gift promotion promotion. Giveaway promotion can effectively enhance their brand and website awareness in the market, so that customers feel the sincerity of sellers. For example, tea sellers can offer a sample package with the genuine product, so that consumers can taste the sample before deciding whether to confirm receipt. In this way, the product can play a better marketing role.

Third, limited-time promotion. Seckill is when online sellers advertise certain agricultural products at a low price for a certain period of time to attract consumers' attention. This kind of promotion method causes the scarcity of the instant kill product and increases the consumer demand for the product.

## 3. Path analysis of improving sales cost based on blockchain technology

1) Blockchain technology

Blockchain is essentially a decentralized network database. Blockchain refers to an information technology that allows people on the chain to participate in transactions and bookkeeping. In the current whole blockchain transaction and billing management system, each user of the system will have an independent opportunity to participate in the system billing. The system will be evaluated in a certain period of time the fastest, the most accurate content into the account book, and will be compiled into the content are sent to all users in the system, at the same time for its data backup, so that every service customer on the service system can set up and list a complete account book.

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Blockchain aims to create value by physically allowing businesses and individuals to exchange any type of asset without relying on a third party to manage the transaction. Traditional trading is uncertain in some operational characteristics, such as bullwhip effect. Blockchain can ensure the security and trustworthiness of suppliers and transactions by reducing two significant costs across all supply chains, namely the cost of verifying transaction attributes and the cost of exchanging value without trusting intermediaries. [4]

2) Smart contracts

Smart contracts are trustworthy contracts described by computer network language and executed by computer system, which can be effectively contacted and executed without the trust of a third party. Blockchain provides a decentralized and trusted environment for the realization of smart contracts. Compared with traditional contracts, smart contracts have the following characteristics: First, contracts are automatically and formally generated. It is an automatic expression of the meaning of a contract without any direct negotiation, competition or contracting, offer or commitment between the parties to the contract. Second, the contract can be signed and executed automatically as long as all the password and program requirements are met. Third, the contract process is decentralized without the intervention of a third party center. [5] The principle of smart contracts is shown in Figure 1:

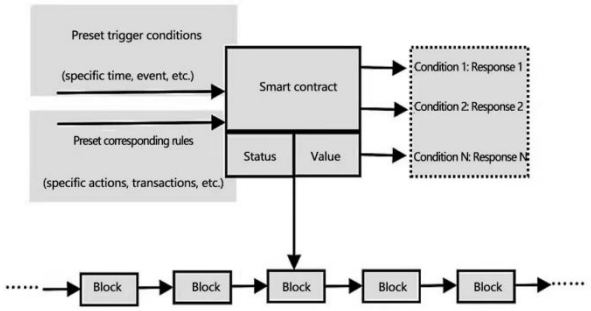


*Figure 1: Schematic diagram of a smart contract*

3) Construction of the basic framework for selling smart contracts

After marketing the product in the above way, the specific transaction between the buyer and the seller is carried out through the smart contract deployed in the transaction chain. The transaction smart contract manages and records the information in the transaction process through the verification of the transaction information of both parties, the management of the transaction funds and the judgment of the transaction results. In addition, banks and other financial institutions will be added to the transaction chain, and smart contracts will be used to provide loans and financing for small and medium-sized enterprises

In the blockchain-based smart contract marketing model, data resource information becomes more open, efficient, interconnected and rationalized, forming a new trust relationship in the industry. The block chain diversified logistics and transportation structure makes the quality of goods traceable, the distribution path more intelligent, the safety responsibility more clear, the distribution integrity is more guaranteed.

(1) Design of smart contract

The life of intelligent contract can be divided into three dimensions: contract generation stage, contract release stage and contract implementation stage.

①Introduction Develop and generate smart contracts

One is that after a user registers as a blockchain user, the blockchain will provide a public key and password to all users who log in. The public key is the address of the account, and the private key is the unique password of the account. In the transaction system based on block chain, merchants, customers, banks and other parties are all nodes stored in the block chain, and each node has its own public and private keys. When a user logs in, the client uses a private key to encrypt the login information and sends it to the server. The server uses the public key of the client to decrypt the received information. After the login information is authenticated, the user can log in successfully, ensuring node security and privacy.

Second, the buyer and the seller negotiate on the rights and obligations of the contract, draft a

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preliminary contract agreement after reaching an agreement, and then the software engineer converts the preliminary contract agreement into a smart contract written in the program language.

Third, as a functional department with credibility in the electronic payment system, the bank needs to store its identity information in the public key and share it in the whole blockchain.

② Transmit and publish intelligent protocols

After a transaction is agreed between the buyer and the seller, a verified smart contract is deployed on the blockchain platform, and the parties to the blockchain can obtain the contract. In addition, the digital assets of the buyer and the seller involved in the smart contract are mainly frozen

③ Enforce smart contracts

First, smart contracts automatically check the trigger conditions in each contract. Transactions that meet the criteria will be pushed to the queue awaiting validation, while those that do not meet the trigger criteria will continue to be stored in the blockchain.

Second, for transactions in the queue to be validated, their data will be diffused to each node being validated. To ensure the validity of the data, the data is first verified by signature. When each node reaches agreement on verification, the transaction can be executed, and then the transaction parties are notified.

Third, after the execution of the smart contract, the status of all relevant parties will be updated and stored in the blockchain. At this point, digital assets have been transferred from one party to the other, and information interaction is realized among the three parties of the payment system through digital signature technology. [6]

(2) Design of transaction chain based on smart contract

As shown in Figure 2, the transaction process based on smart contract is roughly as follows: The first step is that the supplier sends a product catalog to the blockchain network, including product attributes, quantity, price and availability, from which the buyer can obtain product information and verify the credit of the supplier. In the second step, the smart contract is verified successfully and the conditions agreed by both parties are met before the transaction can be carried out. When the transaction is finalized, the financial institution provides a margin (including cryptocurrency) for the transaction, and the financial institution pays the transaction fee of the credit card online via blockchain in real time. The third step, after the payment is completed, the shipping party will mail the goods

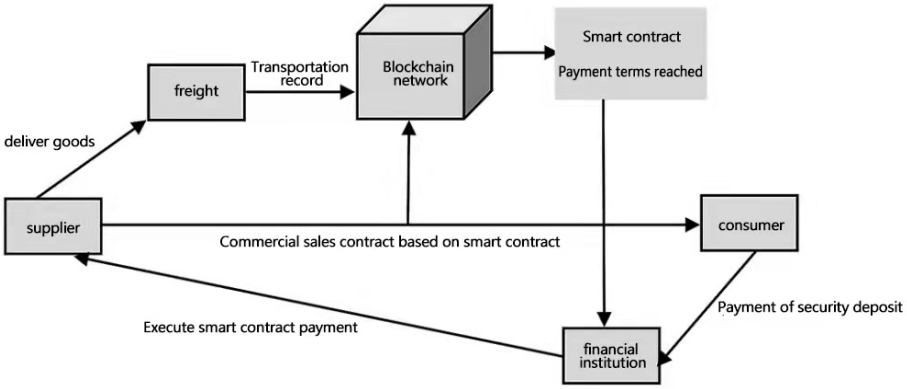


*Figure 2: Overall architecture of the trading chain*

The information is uploaded to the blockchain network to conduct an approval process for its transactions via email. The operator of the blockchain will confirm the transaction and provide a smart transaction contract with a release notice. Fourth step, after confirming that the transaction has met the payment terms consistent with the transaction contract, the customer sends a payment order to the financial institution, and the fund settlement is submitted by the buyer to the provider via cryptocurrency. In the whole process, all participants can solve the transportation progress before the time through the point-to-point connection of the supply chain. [7]

To sum up, smart contracts have the following advantages over traditional contracts:

First, reduce risks. First, the information stored in the blockchain network is traceable and supervised by all parties, thus greatly reducing malicious acts such as financial fraud. Secondly, due to

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the existence of the third-party payment platform, the current transaction will bring great information security risks. Third-party platforms serve as commodity information intermediaries, storing private information of merchants and customers. In blockchain-based electronic trading systems, transaction information and transfer records of parties to a transaction are public information and shared across the system. Their account information is controlled by users in real time, so that the security of transactions can be effectively guaranteed.

Second, reduce management and service costs. The blockchain transaction system does not require third-party agents or intermediaries, so the administrative and service costs caused by third-party intervention can be greatly reduced. The current third-party payment does not consider the time value of funds, because both parties have lost the short-term interest income of these funds when they are delivered to the third-party platform. Since there is no third party platform, direct transactions between buyers and sellers in blockchain-based electronic payments avoid the loss of short-term interest on funds. At present, the payment cost of the third-party payment system is high, while the electronic payment based on blockchain technology only charges 1% of the transaction cost for each transaction, and the transaction cost may gradually decrease with the increase of the number of users.

The third is to improve the efficiency of business processes. First of all, in order to determine whether a transaction can be carried out, the smart contract will read the credit information of both sides of the transaction to ensure that the users who enter the transaction program have the basis of trust, thus reducing the risk of default. Second, funds between customers and banks are automatically transferred through smart contracts, thus decentralizing the process of transaction activity.

## 4. Improve after-sales service and create brand value

After the completion of the sale of goods, after-sales service is also an important link concerned by consumers. We can establish after-sales archives after consumers' consumption in various ways to improve consumers' satisfaction and stickiness.

The core of modern product sales management is very different from other traditional sales management models. The core feature of the traditional product sales management model is to improve the sales level as the main purpose, price reduction promotion is a common means. Modern product sales management is to timely meet and respond to consumer demand and change, so that consumers have a better shopping experience. The establishment of a sound pre-sale and after-sales service system helps to timely understand and grasp more consumer dynamics, greatly enhance the competitiveness of enterprises and commodities in domestic and foreign markets. With the rapid development and progress of the Internet, businesses have many ways to establish close contact with customers. For example, merchants make regular telephone return visits to deeply understand customers' use experience, analyze the advantages and disadvantages of agricultural products, and timely solve their after-sales problems; Enterprises conduct market research through their own apps or wechat public accounts and analyze the data so as to accurately understand the needs and dynamics of consumers. Enterprises provide high-quality services, so that the agricultural products can quickly form brand effect in the society, so that consumers in the process of product purchase to promote the enterprise agricultural products, and then form a continuous sales.

## 5. Conclusion

The wide application of enterprise information-based big data has brought enterprise precision marketing into a new era and injected new momentum into the survival and development of enterprises.

With the massive growth of data, the challenge is how to ensure the privacy and security of data when sharing information. This paper proposes a transaction system based on block chain technology. When data is stored on block chain, multi-signature private key and encryption technology can not only protect the privacy of data, but also safely realize information sharing. Through smart contracts, trading information, trading funds and trading results can be managed. At present, smart contract technology is bound to face new technical challenges. In the face of a series of possible practical problems, all parties are making continuous efforts and improvements. Smart contracts based on blockchain technology have broad application and development prospects, but the development of smart contracts may need to go through a long road of development, which is a long way to go for different fields and industries, and requires all parties to jointly deal with the challenges they face.

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**References**

*[1] Chen X, Gong J. Research on Precision Marketing Model of Beijing Agricultural Products under Big Data Environment[C]//International Conference on Intelligent and Interactive Systems and Applications. Springer, Cham, 2018.DOI:10.1007/978-3-030-02804-6_105.*
*[2] Li Jia. Transformation and prospect of electronic payment based on block chain [J]. China circulation economy, 2018, 32 (10): 16-25.*
*[3] Wang H , Wang J , Zhong Z .Research on Precision Marketing Strategy Based on Cluster Analysis Algorithm[C]//2020 International Conference on E-Commerce and Internet Technology (ECIT).2020.DOI:10.1109/ECIT50008.2020.00054.*
*[4] Zhang Yanjun. Research on blockchain technology, Development and Prospect [J]. China Market, 2020 (23): 166-168.*
*[5] Li Jie, Chai Yanming, Yang Yan, et al. Principle and application of blockchain smart contract technology [J]. Yunnan electric power technology, 2018, 46 (6): 12-18.*
*[6] Fang Y U .Research on Precision Marketing of E-commerce of Agricultural Products in Anhui Province under the Background of Big data[J].Computer Knowledge and Technology, 2018.*
*[7] Hong W Q, Wang Q N. Construction and analysis of smart contract framework for shipping industry based on block chain [J]. Logistics science and technology, 2020, 43 (5): 97-101.*