Scholar Publishing Group
Academic Journal of Agricultural Sciences
https://doi.org/10.38007/AJAS.2022.030301
ISSN 2789-8415 Vol. 3, Issue 3: 1-15

Blockchain in Precision Poverty Alleviation and Poverty Alleviation in Agriculture

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Keywords: Rural Areas, Targeted Poverty Alleviation, Application of Blockchain, Scenario Applications, Rural Development

Abstract: Due to the severe situation of poverty alleviation, in some places people still do not know much about poverty alleviation in rural industries. However, the application of blockchain technology in the field of precision poverty alleviation and rural poverty alleviation is still relatively small. This article aims to study how to achieve targeted poverty alleviation and how to apply blockchain to rural areas, this experiment uses four different models of survey data, respectively, to investigate the application of blockchain scenarios for different villages, different ages, different populations, and the control group. The experimental data shows that different villages implement the blockchain for poverty alleviation. There has been a noticeable increase in efforts; different blockchain applications have been implemented at the age of 15-25, 26-35, 36-45, and 46-55 to reduce poverty, and financial services and supply chains in the range of 26-45 The effect of targeted poverty alleviation by management is most obvious; the happiness survey found that after the implementation of blockchain-based precision poverty alleviation in rural areas, farmers said they were happier than before. Experimental data shows that the development and application of blockchain in scene applications plays an important role in targeted rural poverty alleviation.

1. Introduction

China's poverty alleviation work has achieved famous results both at home and abroad. Hundreds of millions of people have truly escaped poverty. However, despite the declining poverty

population in China, more than 10 million people remain in poverty. China's rural poor will be lifted out of poverty in accordance with current standards, and all poor counties will be out of trouble. When the poverty alleviation work enters the sprint stage, targeted poverty alleviation is the basic strategy for fighting poverty in the new era. Financial poverty alleviation is a key period for poverty alleviation. Traditional financial poverty alleviation mainly relies on expanding the physical storefronts of financial institutions and improving them as recipients, as the layout of business networks that provide financial services. This financial poverty alleviation method has problems such as insufficient service accuracy, difficulty in supporting poverty alleviation funds, and inefficient financial services.

In retrospect, since the founding of the People's Republic of China, the Chinese government has attached great importance to eliminating poverty, constantly adjusting the poverty line and poverty alleviation policies [1]. Over time, the input of manpower, capital and resources into poverty alleviation has significantly improved the living conditions of the areas and people below the absolute poverty line, and changed the image of China as a backward and poor country. China has been contributing to global poverty reduction efforts. Still, despite progress in poverty alleviation programs, the latest figures show that more than 60 million people in China still live below the annual minimum wage per capita poverty line. Most of them live in special areas such as old revolutionary base areas dominated by ethnic minorities and remote mountain villages. That means their poverty crisis is more entrenched; Their lack of independence for development makes their task of rising out of poverty more challenging. In view of this, China still faces serious challenges on the road to poverty eradication. The goal is to ensure that all rural residents living below the current poverty line are lifted out of poverty and all counties and districts are lifted out of poverty by the year when China finally completes the building of a moderately prosperous society in all respects. Which has since become a basic part of the country's poverty alleviation work. Throughout the incubation process of targeted poverty alleviation strategy, some scholars have pointed out that the focus of poverty alleviation has shifted from poor counties and villages to specific poor population. "The poverty alleviation project with Chinese characteristics is the product of continuous strategic planning in the process of building the socialist system with Chinese characteristics. The targeted poverty alleviation strategy is a deepening of the original poverty alleviation policy and a guarantee for winning the battle against poverty." With the further analysis and expansion of the strategy, it puts forward more specific requirements. In recent years, relevant policies on block chain technology and its application have been constantly improved. In October 2016, the ministry of industry and information technology released the white paper on China's blockchain technology and application development, which for the first time proposed a roadmap for standardization of blockchain applications in China. In December of the same year, the state council incorporated blockchain into the 13th five-year national information plan. Five months later, the China institute of standardization of electronic technology released the blockchain reference architecture, and in the same month, the China academy of information and communications technology released the trusted blockchain standard. At the same time, local governments at all levels have also introduced policies to support the development of the blockchain industry. With the strong support of the government, block chain technology has developed rapidly in China, especially in rural areas and other fields, and has been widely applied, providing an opportunity to solve the rural poverty alleviation.

Yermack D found that blockchain is a novel application of encryption technology in financial preservation [2]. Many major players in the financial sector have begun investing in the new technology, and stock exchanges have proposed using blockchain as a new way to trade companies'

shares and track their ownership. In order to accelerate the development and revolution of energy interconnection application, an-ping proposed to build the market structure and market system of effective competition in China, studied energy interconnection and block chain technology, and studied the application scenario and business model of block chain in the energy field [3]. An-ping analysis, including energy generation, transmission, distribution, utilization, storage, etc. From the perspective of foreign energy application cases, blockchain has a broad application prospect in the energy field. Finally, an-ping puts forward the problems faced in the development of China's energy blockchain and the Suggestions for solving these problems.

This paper aims to study how to achieve targeted poverty alleviation and how to apply blockchain in rural areas, four different modes of survey data were used to investigate the application of block chain scenario in different villages, different age groups, different populations and control groups.

2. Programs Method

2.1. Overview of Blockchain

(1) Definition of blockchain

What is a blockchain? From the perspective of science and technology, blockchain involves mathematics, cryptography, Internet, computer programming and many other scientific and technological issues. The term "blockchain" was not used in the English version of the original bitcoin white paper. We use Chainofblocks instead. Chainofblocks is translated as blockchain [4]. This is the earliest time that Chinese "block chain" appeared. The cyberspace administration of China issued the regulation on blockchain information services early last year, which took effect the following month.

(2) Block chain classification

1) Public blockchain

Public Block Chains means that any individual or group in the world can send transactions, and the transactions can be effectively confirmed by the Block chain. In this way, anyone can participate. All virtual Bitcoin digital currencies (the most widely used blockchain) are based on public blockchains, and there is only one blockchain that supports this currency.

2) Joint (industry) blockchain

Joint chain Block: to specify multiple nodes inside is mainly composed of a group of people to an account, the production of each piece of decided to participate in the process of the consensus jointly by all the master node (primary), and other access nodes can be involved in the transaction, how to determine the accounting of each Block is a piece of chain main risk points), anyone can be limited by chain Block open API queries.

3) Private blockchain

Private blockchain: Only use general blockchain technology for accounting. It can be a company or individual with only blockchain registration rights. Blockchain is not much different from other distributed storage solutions. Public chain applications such as Bitcoin have been industrialized, while private chain application products are still under study.

(3) Characteristics of blockchain

1) Decentralization. Without the control of a central system, and without relying on third-party regulatory agencies or hardware facilities, the autonomous block chain becomes a system, through fractional accounting and storage, to complete the automatic verification, transmission and management of information at each port. Decentralization is the most central and outstanding

feature of blockchain.

2) Openness. Openness is a synonym of block chain technology. In addition to encryption of individual private information, all data in the block chain are open to the public. Anyone can query relevant information and data of the block chain at any time and on any port, thus greatly improving the credibility of the system.

3)Anonymous. In addition to the requirements of laws and regulations, from a technical point of view, the identity information of each node block does not need to be disclosed or verified, and the information can be transmitted anonymously.

2.2. Overview of Target Poverty Alleviation

(1) Definition of targeted poverty alleviation

According to the guidelines on promoting rural poverty alleviation and development through innovative mechanisms issued by the general office of the state council. All provinces (autonomous regions and municipalities directly under the central government) should, on the basis of their current work, develop effective links between poverty alleviation and the rural subsistence allowance system. In accordance with the principles of county units, size control, accountability at different levels, accurate identification and dynamic management. "Special measures for poverty alleviation should be in line with the results of poverty identification, in-depth analysis of the causes of poverty, and specific measures for poverty alleviation should be specified according to the circumstances of each family and collective in the village, so as to effectively help the poor and alleviate poverty and ensure that the goal of poverty alleviation is achieved within the specified time frame." [5] to put it simply, targeted poverty alleviation means accurately identifying, helping and managing the objects of poverty alleviation through scientific and effective procedures in accordance with different environments in poor areas and different situations of poor farmers. Generally speaking, targeted poverty alleviation mainly refers to the poor population. If they are poor, they should be supported, while those in deeper poverty should receive more support.

(2) The status quo of rural poverty alleviation and development

1) Farmers lack awareness of poverty alleviation

The identification of poor families plays an important role in the precise work of poverty alleviation. Only by ensuring the accuracy of the recognition can the blockchain application play its role and help farmers in need. At present, China's poverty alleviation work is to use accurate identification measures to properly identify and register poverty alleviation targets. Input the information of farmers meeting the standards for assistance, but under the pressure of investigation environment, farmers themselves fill in personal economic information subjectively in the process of poverty relief registration. The fundamental reason is that farmers lack the understanding of targeted poverty alleviation.

2) Precise assistance cannot be specifically implemented

The main function of targeted poverty alleviation is to formulate corresponding relief measures to help farmers get rid of poverty according to the individual differences among farmers that cause poverty. Through the analysis of previous poverty alleviation work, we can find that the general poverty alleviation needs include industrial assistance, education assistance, medical assistance and housing renovation assistance. The lack of targeted poverty alleviation will not only cause a lot of economic losses, but also affect the final poverty alleviation effect.

3) It is difficult to implement poverty alleviation projects at the grassroots level

To vigorously carry out poverty alleviation work, in the final analysis, requires a large amount of

capital input, and once the capital chain problems, poverty alleviation work will be a serious blow. However, at the present stage, China is faced with various funding problems in the work of poverty eradication, which has become a key problem hindering targeted poverty alleviation. Although the financial department has invested a large amount of funds for poverty alleviation, the problem of rural poverty alleviation cannot be solved fundamentally due to the large number of poor people in China and the small amount of funds actually allocated to each family. Therefore, the realization of a well-off society has brought great obstacles.

4) The common people are dependent on the idea of help

The reason why achieving a well-off society in all respects has become an important goal of China's development lies in the rapid development of the people and the national economy. Therefore, narrowing the gap between the urban and rural rich and poor has become the top priority to realize targeted poverty alleviation and alleviation in rural areas. In fact, although the government has made great efforts to alleviate poverty and improve the quality of life of the rural population, it is precisely because a small number of farmers want to rely on policies to benefit the people that a negative and lazy attitude is generated. Relying solely on financial poverty alleviation as economic income would be contrary to communist goals.

3. Experiments

3.1. Experimental Settings

(1) Experimental background

Poverty has always been a worldwide problem, and China, as a large agricultural country, also has serious poverty in the countryside. Although China has been committed to improving the disadvantages of poverty since the reform and opening up, there are still a lot of gaps and loopholes, so the block chain came into being to improve the rural economy, education, medical care and other poverty problems. China's poverty problem is facing imminent challenges, mainly due to the unclear and opaque identification of the poor population in the process of targeted poverty alleviation and alleviation, and the unreasonable allocation of resources and supply and demand. Supervision is not strong enough to help the effect is not obvious. Blockchain is just an important response to the rural poverty alleviation defects, achieving information transparency and self-governance, so that rural areas can truly get rid of poverty and become rich.

(2) Experiment setting process

This paper adopts the method of investigation and research to investigate the rural financial status of a certain rural sector in 2019 using block chain. Through comparative analysis, investigation and research experiments, experimental comparative data are obtained.

1) Investigate the application of block chain scenario in 5 adjacent villages, set the same block chain direction respectively, and collect the influence of block chain on the application of targeted poverty alleviation and alleviation in agricultural field.

2) Investigate the application of blockchain scenario to different age groups in the same village. Investigate the 15-25 years old, 26-35 years old, 36-45 years old, and 46-55 years old of the five adjacent villages to see the effect of blockchain on poverty alleviation application of different age groups.

3) A comparative experiment was conducted on the same village to test the effect of blockchain and non-blockchain on targeted poverty alleviation and alleviation in the village.

4) Conduct application of blockchain in different directions in a village, and investigate which blockchain direction is more beneficial to precise rural poverty alleviation and alleviation

5) In the rural areas where the block chain application experiment has been conducted, the dependent variable is the happiness of rural families, and the independent variable is the income factor. The data of the dependent variable is derived from the questionnaire survey titled "do you feel happy" (one point means no happiness, and 10 points means the peak of happiness). First, the self-rating of each respondent is directly recorded, and then the happiness score of each family is calculated based on the standardized proportion of each family member. In order to overcome the low reliability caused by subjective self-rating, it is necessary to use this standardized method to correct the survey. Basic flow first ask the self-reported happiness scores, measured the participants' self sense of happiness, and then ask the "you to define a few minutes of above is happiness? (points said no happiness to speak of, ten points are expressed as the peak of happiness)", to calibrate the objective score of happiness, that all the respondents score is objective and comparable. In addition to investigating the happiness degree of rural families, the independent variables of income factors were also set, including absolute income and relative income compared horizontally and vertically.

3.2. Experimental Steps

(1) Randomly select 5 adjacent and similar poor villages as research objects;

(2) In the survey of age groups, 300 people were selected for each age group;

(3) Iinancial services, supply chain management, social welfare, culture and entertainment, education and employment are selected as the direction of block chain application;

(4) According to experimental phenomena, Excel software is used to record data such as low overall cost of poverty alleviation funds, rural management efficiency, information security, fast and accurate services, data reliability and data value, and the computer has data statistics functions.

3.3. Matters Needing Attention in the Experiment

(1) The principle of contrast

In setting up the experiment, usually create two group, one is to use a chain block group, there is no use a chain block of the control group, and then through the intervention or control block chain applications in order to eliminate or reduce experiment error, can be more clear, more see block chain applications for the rural areas of comparative poverty alleviation of poverty. Among them, the use of a lot of control methods.

(2) Randomness principle

The randomness principle of block chain experiment means that samples are randomly and arbitrarily selected within the scope of the experiment. The significance of the block chain experiment can be guaranteed, the unnecessary result error brought by the experimental system can be reduced.

(3) The principle of parallel repetition

That is, the variation range of one of the application data of the block chain is shown, and the variable of the same village or the same time is repeated in the block chain experiment to observe the influence degree of this factor on the block chain experiment results. Of course, this cannot guarantee the complete elimination of all the influences caused by unnecessary factors. The parallel repetition principle is the answer to this puzzle.

(4) Principle of single factor variable

That is, control variables, highlighting a block chain application data. It is because we are prone to forget some basic principles when doing experiments, which can lead to errors when solving or

designing experiments. Therefore, in the block chain experiment, we must attach importance to the necessity and criticality of the basic principle of the experiment.

4. The Discussion

4.1. Investigation on the Use of Blockchain

(1) Data show that in the same direction of the block chain applications, the application of financial services range of 39% - 47%, the application of 35% - 39% of supply chain management, the application of social public welfare increased by 20% to 24%, the application of cultural entertainment increased by 23% - 28%, education employment applications increased by 30% to 35%, in the same project data and there is no obvious difference, are relatively average, the data are shown in table 1.

Table 1. Application of blockchain (Unit:%)

Project	Financial	Supply Chain	Public Welfare	Entertainment	Education
Village 1	44	35.62	20.55	27.54	30.25
Village 2	43.2	37.60	22.85	23.65	32.45
Village 3	39.89	39.21	23.76	25.34	32.91
Village 4	46.12	36.32	20.38	23.83	33.28
Village 5	44.67	35.46	22.23	26.45	35.36

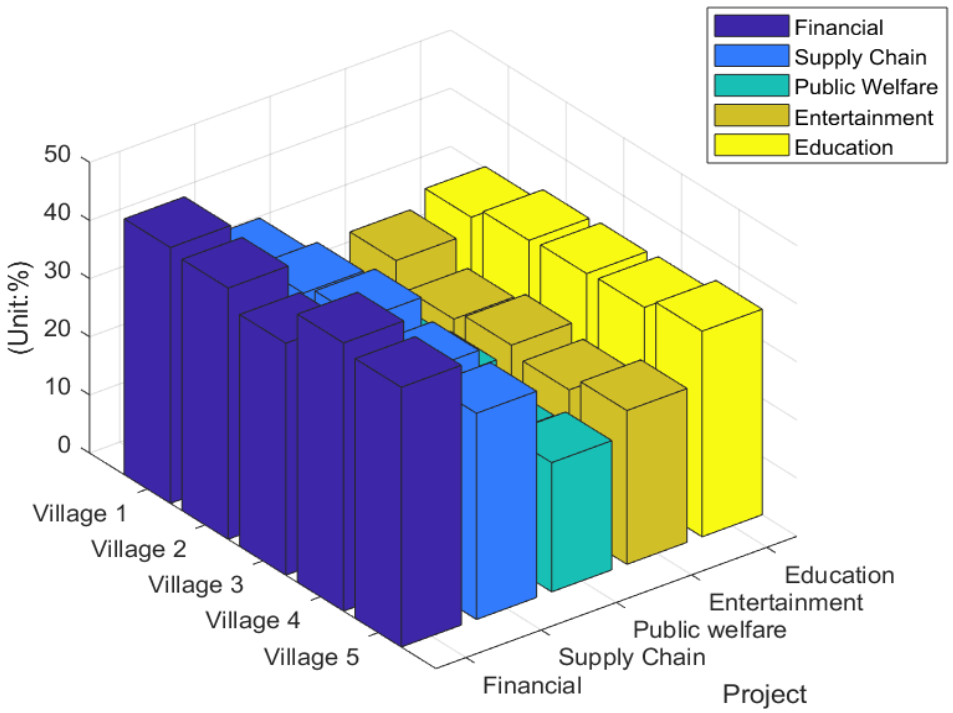

Figure 1. Application of blockchain (Unit:%)

(2) Data show that the most obvious poverty alleviation effect in the age group of 15-35 is education and employment; In the age group of 26 to 35, the effect of poverty alleviation is most obvious in the direction of financial services and employment; Financial services and supply chain management are the most effective in reducing poverty in the 36-45 age group. In the age group of 46-55, the poverty alleviation effect is most obvious in the direction of social welfare and cultural entertainment. The data are shown in table 2-5.

Table 2. 15-25year-old poverty alleviation effect (Unit:%)

	Financial	Supply Chain	Public Welfare	Entertainment	Education
Village 1	15.45	3.57	5.25	14.53	25.23
Village 2	15.38	4.67	7.73	15.63	24.37
Village 3	16.29	3.93	6.54	12.53	28.73
Village 4	14.47	3.36	8.73	15.24	27.46
Village 5	14.68	4.67	6.56	13.62	26.28

Table 3. 26-35year-old poverty alleviation effect (Unit:%)

	Financial	Supply Chain	Public Welfare	Entertainment	Education
Village 1	37.85	29.62	24.84	22.26	33.20
Village 2	33.68	28.14	22.63	23.66	35.45
Village 3	36.29	31.92	23.64	23.73	34.56
Village 4	36.87	30.30	24.34	22.43	33.23
Village 5	33.28	31.63	24.20	25.45	35.62

Table 4. 36-45 year-old poverty alleviation effect(Unit:%)

	Financial	Supply Chain	Public Welfare	Entertainment	Education
Village 1	33.23	35.22	23.34	23.34	13.45
Village 2	35.80	36.35	24.32	22.66	15.24
Village 3	37.21	36.23	23.24	24.36	13.29
Village 4	34.87	35.30	24.63	26.43	14.42
Village 5	37.32	34.74	22.27	22.87	14.48

Table 5. 46-55 year-old poverty alleviation effect (Unit:%)

	Financial	Supply Chain	Public Welfare	Entertainment	Education
Village 1	25.24	26.20	34.32	34.23	3.47
Village 2	21.36	24.25	34.23	35.34	4.42
Village 3	23.26	28.73	36.52	36.53	4.35
Village 4	23.43	27.23	35.30	33.30	3.36
Village 5	22.67	26.54	34.25	35.24	4.65

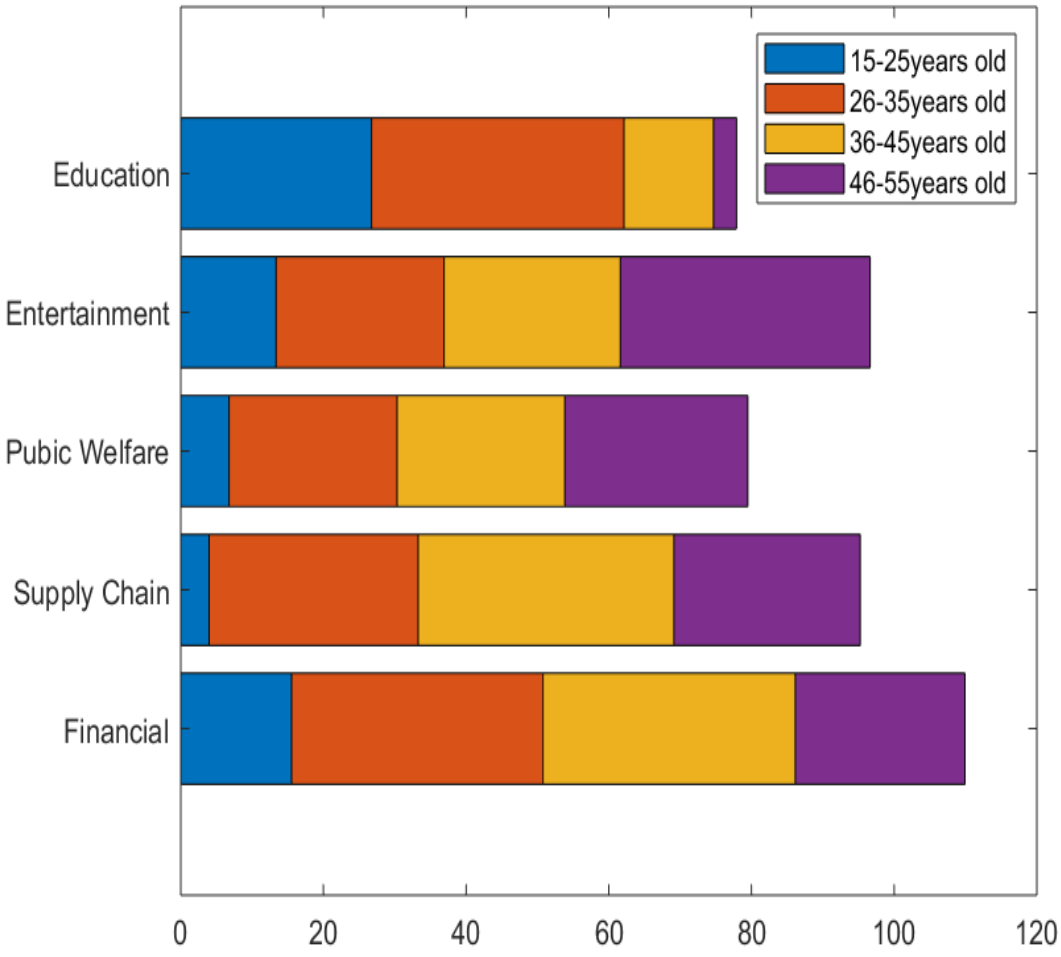

Figure 2. Blockchain applications for all ages

4.2. Effect of Blockchain on Targeted Poverty Alleviation and Alleviation

(1) Data show that the low poverty alleviation funds in a rural area using blockchain have been reduced by about 20%, the object identification ability of assistance has been improved by nearly 20%, and the accuracy of management of rural financial network has been improved by more than 30% compared with that in the absence of blockchain. In the control group, blockchain was not used in 2017 and 2018, compared with poverty alleviation in the 2019 group, as shown in table 6.

Table 6. Survey data of poverty alleviation objects

Years	Poverty alleviation funds	Recognition ability	Management accuracy
2017	46.6million	40.2%	22.96%
2018	50.1million	42.67%	25.46%
2019	40.2million	67.58%	53.41%

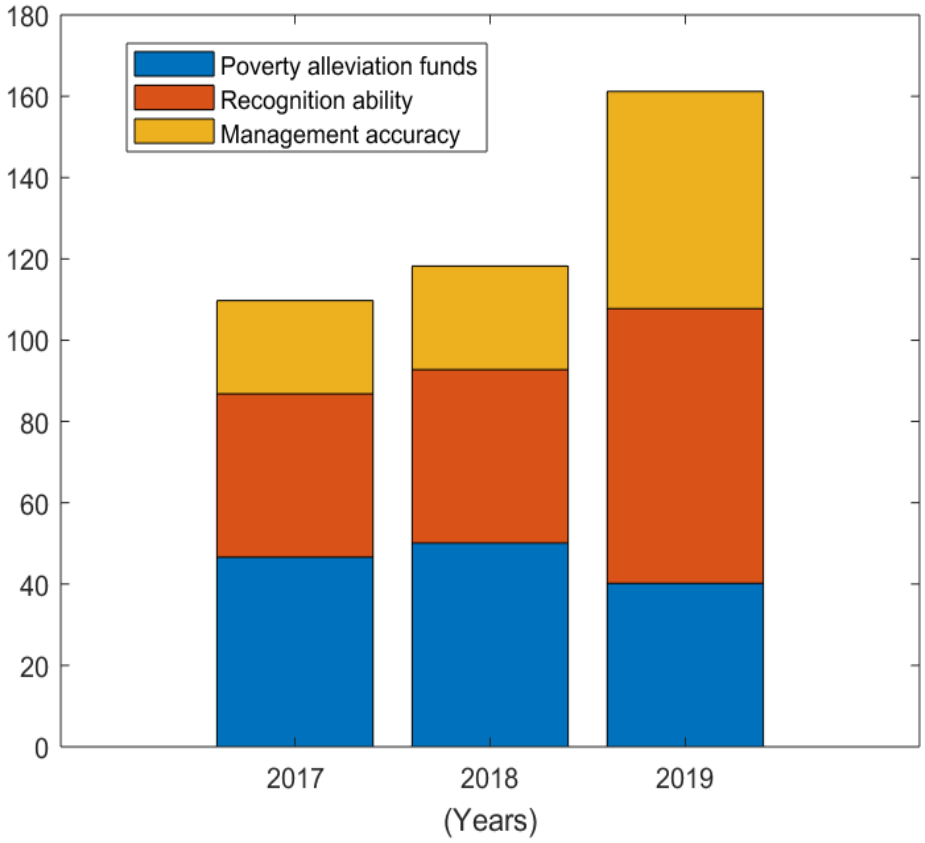

Figure 3. Survey data of poverty alleviation objects

(2) The table 7 shows that in 2017 and 2018 did not use a chain block, the accuracy of rural poverty alleviation of poverty a number of development level is not obvious, after using the block chain in 2019, the development of the countryside, such as financial services, supply chain

management, social public welfare direction has the obvious promotion, further to the success of precise poverty alleviation of poverty. The data are shown in table 7.

Table 7. Use the same blockchain(unit:%)

Year	Financial	Supply Chain	Public Welfare	Entertainment	Education
2017	23.56	19.78	5.45	4.34	12.89
2018	22.65	20.61	6.07	4.62	15.37
2019	43.2	37.60	22.85	23.65	32.45

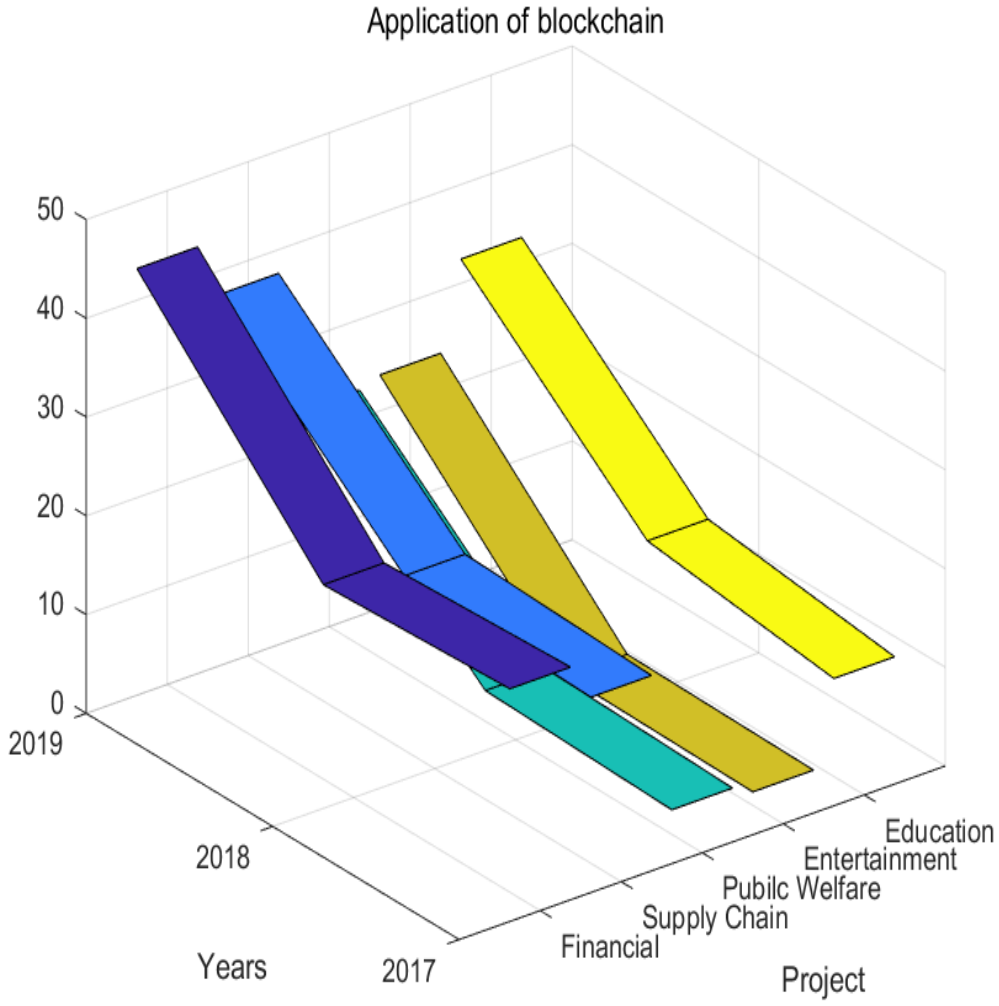

Figure 4. Use the same blockchain(unit:%)

(3) A survey on the happiness of rural people.

Through the research survey method, the survey measured the well-being of rural families in a variety of ways. Rural household income was used as an independent variable to test the poverty

alleviation situation of rural people under the block chain application. The data showed that the overall happiness of families in a certain rural area was higher in 2019 because of the real realization of making farmers rich. Households in the test villages lifted themselves out of poverty faster than those in the non-test villages. Table 8 shows the results of the rural happiness survey in 2019.

Table 8. Rural happiness survey 2019

	Sample size	Min	Max	Mean	Standard deviation
Dependent variable: happiness					
Unstandardized rural family happiness (Unit: points)	1050	1.00	10.00	8.42	1.25
Standardized Proportion of Well-being in Rural Households (Unit: points)	1050	0.86	33.00	6.38	1.36
Independent variable: Revenue					
Total rural household income in 2019 (Unit: thousand yuan)	1050	1.00	100.0	9.24	6.61
Per capital household income in 2019 (Unit: thousand yuan)	1050	0.20	23.33	2.50	1.82
Self-scoring of economic conditions of unstandardized households (unit: points)	1050	1.00	10.00	6.38	1.67

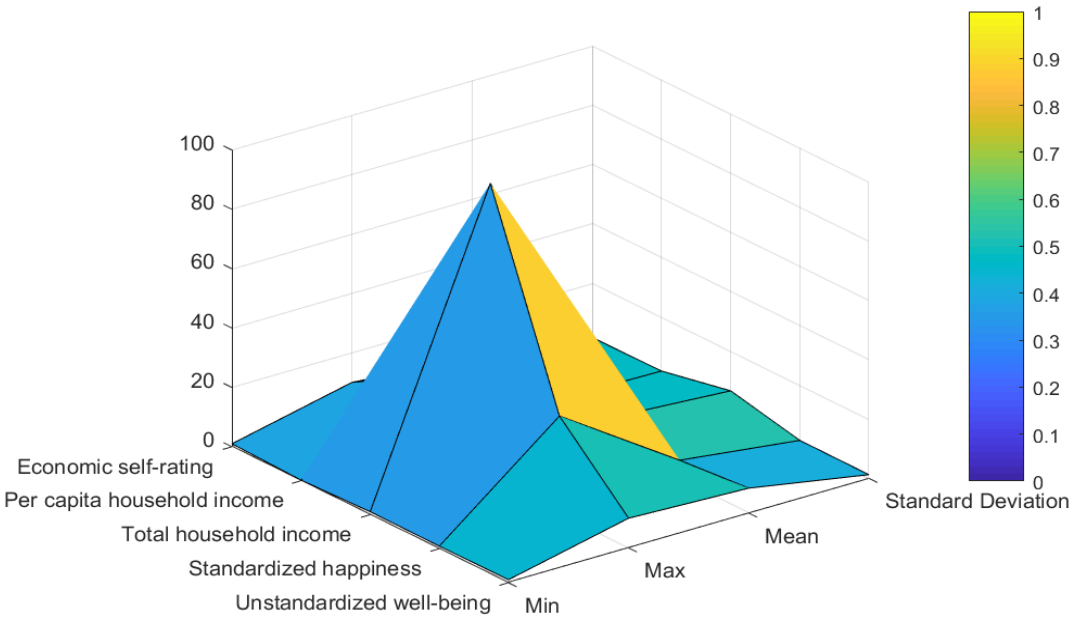

Figure 5. Rural happiness survey 2019

5. Conclusion

(1) In the most critical and final stage of building a well-off society, rural poverty presents China with a new and complex problem under the new economic background. China is committed to helping and solving the problem of lifting poor people out of poverty. To this end, we have proposed the "Internet plus" targeted poverty alleviation model -- block chain. Blockchain is the model that can eliminate inefficiency, misallocation of resources, regulatory gaps and, most importantly, make up for the problems caused by poverty. Block chain is the key word of innovation. It USES the convenience and Shared resources of the Internet to create a diversified online platform, which can dynamically develop under the application of targeted poverty alleviation. Blockchain, for example, can track and manage recipients' real-time information based on a dynamic database. In order to solve the problem of poverty alleviation, the government, enterprises and society should cooperate with each other in an all-round way and strive to push "Internet plus" to a high point. In this way, "the hat of poor counties and the hat of poor people will be completely removed" will be realized.

(2) The encryption algorithm, consensus mechanism and distributed bookkeeping of block chain technology reflect its broad development prospect in the field of information sharing, and are applicable to the construction of information sharing platform for rural finance, supply chain, social welfare, culture, entertainment, education and employment to solve the problem of rural information asymmetry. According to the characteristics of blockchain technology, the basic model of information sharing system such as finance and supply chain is preliminarily established, and the content and functions of government and financial institutions in various work fields are clarified, which is highly operable.

(3) In this paper, the implementation of block chain has a significant effect on targeted poverty alleviation and alleviation in rural areas, so as to ensure that China's current rural standards can be lifted out of poverty by 2020, and all poor counties will remove the poverty cap. This experiment adopts a variety of different modes of investigation. The application of blockchain in different directions in different age groups has obvious changes visible to the naked eye. Especially in the middle and young age groups, the experimental data show that finance-related blockchain projects, such as financial services and supply chain management, are the most effective in targeted poverty alleviation in rural areas. At the same time, the happiness level of the experimental rural villagers was also investigated. Taking off the poverty cap would make people happier and happier.

(4) As a successful civilization discovered in the new era, blockchain is of great significance for accelerating targeted poverty alleviation and alleviation in the rural sector, and it is able to achieve true information transparency in all aspects of the rural sector. In the information transparency of the help effect will be particularly prominent.

Funding

This work was supported by the Innovation and entrepreneurship training program for College Students (202211664099X, 202211664012; 202211664021).

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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