

Optimization of Public Charity Information Disclosure Based on Block chain Technology and FTI Index

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ABSTRACT

A recognized fact is that the public welfare and charity in China has developed rapidly, but there are still some problems that need to be solved. In the face of the new epidemic COVID-19 spreading in the world in 2020, China's charities are confronted with the troubles of opaque information and low credibility while actively fulfilling their obligations. In view of this problem, the paper takes issues of how to solve the current pain point of charity in the post epidemic era as the research objective, optimize the information disclosure of existing charitable organizations based on block chain technology, build a credible reference evaluation system combined with China Foundation Transparency Index FTI, and analyze the advantages and effects of charity donation combined with block chain and FTI, so as to help charity avoid the shortcomings in the development and guide it to enter the benign sustainable development.

Keywords: *Charity, Information disclosure, Block chain, Foundation Transparency Index FTI.*

1. INTRODUCTION

In recent years, China's philanthropy has developed rapidly, but there are also problems and obstacles in the process of rapid development. In 2020, the rapid spread of the new epidemic in the world makes China's philanthropy face another big test. As the "third sector", charitable organizations play an indispensable role in promoting social equity and optimizing resource allocation [1]. Only by solving the problems of opaque information and low credibility of charitable organizations can China's public charity develop greatly indeed [2]. Since 2016, China has issued a series of laws or regulations, such as "the charity law of the people's Republic of China", "the management regulations of foundations", "the notice on the income tax policy issues of public equity donation enterprises", "the law on the management of public charitable organizations' public fund-raising", and "the basic management standard for Internet public donation information platform of public charity organizations", to improve the transparency of charity, information disclosure of charitable organizations should be encouraged. However, due to the fact that most laws and regulations do not provide for the commercial information disclosure of charitable organizations, China's charitable

and public welfare undertakings still encounter a certain trust crisis.

To sum up, it is considered that the existing charitable organizations mainly have some problems, such as unclear fund flow, low degree of information disclosure, opaque organization operation and imperfect public supervision system, etc [3]. Therefore, if the public only hope simply to restrict the information disclosure behavior of charitable organizations from the legal point of view, such as formulating methods, terms and regulations, so as to improve the degree of information disclosure of charitable public welfare organizations, it will be difficult to achieve the expected significant effect [4]. The rapid development of Internet technology provides new ideas for the information disclosure of social charity in China. Nowadays, the interaction between the Internet and all walks of life is becoming more and more intense, and the penetration and integration degree of China's public charity is also increasing [5]. The public charity combining with the Internet is in full swing. In this paper, from the perspective of the whole life cycle of donations, combined with Internet technology, starting from the flow direction of donations, using the characteristics of "decentralization" and "traceability" of block chain, it can be realized that the digitization and transparency of

donation by donors, and use the China FTI (Foundation Transparency Index) to build an evaluation system to visualize the degree of information disclosure of charitable organizations, and to guide the selection of charitable organizations between donors and recipients, so as to promote the establishment and improvement of public supervision evaluation system and build a stable "triangle structure" [6,7]. Only in the way of establishing a good interaction and stable relationship among the donors, recipients, the public and other stakeholders, can China's charity and public welfare continue to develop healthily and sustainably.

In the post epidemic era, how to solve the current pain points of public charity and promote its healthy development is the guiding goal of this paper.

2. RESEARCH STATUS

2.1. Research on relevant status quo

In recent years, scholars have conducted extensive research on how to improve the "trust crisis" and information disclosure transparency of charitable organizations, which can be divided into the following two categories: the first group mainly combs and studies the information disclosure mechanism of charitable organizations. Chai Zhenguang(2017) started from incentive compatibility based on the establishment of free public welfare market from the perspective of compatibility, and his paper analyzes the constraints of information disclosure of charitable organizations in China, such as the asymmetry of charity information and the obstruction of resource liquidity. It is thought that the internal governance mechanism should be optimized, and the establishment of a free public welfare platform could eliminate the information asymmetry and improve the transparency of charitable organizations, and the improvement of transparency can sort out the good society for charitable organizations themselves through the principle of signal display but the premise of incentive compatibility is the establishment of free public welfare market. The second type is the research on the influencing factors of information disclosure [8]. Li Jian (2018) analyzed the "positive factors" and "negative factors" of the information disclosure of charitable organizations, explained why it is difficult to make compulsory information disclosure alone effective, and modified Herzlinger's DADS model by using push-pull theory [9]. On the basis of building a new PP-DADI model, the research proposes that charitable organizations should adhere to the combination of push and pull, and explore innovative working methods and mechanisms on this basis [10]. From the viewpoint of research direction and content, although the above research has conducted a more detailed study on the mechanism and influencing factors of information disclosure of charitable

organizations, it has not played a guiding role in the establishment of reference evaluation system for charitable organizations, nor has it proposed solutions to dynamic problems such as the flow of donations.

Therefore, this paper uses the technical characteristics of block chain to analyze the information disclosure of charitable organizations, and introduces the index FTI as the reference system for the transparency of charitable organizations, so as to achieve further transparency of public charity and promote the benign development of charity in China.

2.2. Block chain Technology

The concept of block chain was first proposed in 2008 in "bitcoin: a peer-to-peer e-cash system" by a scholar Ben Cong. As the underlying technology of bitcoin, it can be called a distributed digital record bill, in which each node (i.e. user) has the same rights and obligations to jointly supervise and maintain the operation of the whole block chain [11]. The definition of block chain is used for the concept based on P2P network technology, encryption technology and time stamp technology [12-14]. It adopts the distributed storage structure, uses cryptography, consensus algorithm, smart contract and other technologies to realize the anti tampering, anti forgery and traceability of information in the process of information collection, circulation and sharing[15,16].

In a block chain, all blocks are generated in chronological order. Each block can record all the activities that have taken place since they were created, and finally summarized into a record collection. Also, it contains the corresponding data, which cannot be modified in a distributed state to ensure the security of transactions [17,18].

Many scholars have explored and tried the application of block-chain in many fields, such as finance, public service, e-commerce platform product traceability and anti-counterfeiting, digital copyright and social governance.

One of the great significance of block-chain technology is that it has changed the traditional bookkeeping method (single bookkeeping - Double bookkeeping - distributed bookkeeping) and traditional trust mode (centralized third party - decentralized consensus). Its self-confidence feature can realize mutual trust of all parties by relying on its technical advantages without the need of a third party [19,20]. Each node can use proof of work, consensus and other algorithms to add time stamp to all incoming information, and then quickly spread to the whole network. Therefore, the flow of each payment is open and transparent, and all stakeholders can clearly trace the source and destination of each transaction.

In this sense, block chain creates an ideal "programmable society" [21]. It can record almost anything of value and express it in the form of code, so that the donation of public welfare and the two sides of the donation can be connected seamlessly. At the same time, the process of donation can be recorded and stored in real time and presented to stakeholders. At the same time, the block-chain has time stamp technology, leaving data records which cannot be distort or misrepresent, in the form of multi-party hash synchronization, so that donors, recipients and the public can implement comprehensive supervision [22].

The technology of block chain brings transparency of technology guarantee for public welfare undertakings, which can directly attack the pain points of public welfare. It also can initiate donation projects, prove workload, keep accounts, broadcast all over the network, and keep accounts all over the network. The distributed account book makes every item of donated goods and materials available at any time like express information, which cannot be changed or falsified. In the procedures of charity projects, the relevant data such as donation projects, donation material flow, donor feedback, third-party supervision, etc. can be synchronized with the block-chain network in real time, and stakeholders can trace the source at any time. Then, this technology naturally matches the field of charity.

2.3. China Foundation Transparency Index FTI

As mentioned above, FTI is a set of comprehensive index system jointly developed by CFC (China Foundation Center) and Research Center of incorrupt government and administering of Tsinghua University, which aims to reflect the level of foundation self-discipline and transparency in China. The index FTI 4.0 has become the most authoritative and professional third-party foundation transparency evaluation system in China according to some provisions of relevant national laws and regulations. From this, it can be seen that the index FTI has a certain degree of authority and representativeness in the field of charity, and the index algorithm developed by FTI can quantify the information disclosure degree of charitable foundations, and the visualized data can accurately reflect the information transparency of charity organizations.

The specific algorithm of FTI 4.0 is as follows:

$$FTI_n = \sum (T_i \times W_i \times S_i \times C_i)$$

n: Foundation serial number, such as 1, 2, 3;

I: Index serial number, ranging from 1 to 40;

T_i: whether the index i of the third level indicator is disclosed, with a value of 0 or 1;

W_i: the weight of the index i of the third level indicator, ranging from 1 to 9;

S_i: the information source of the ith index. If the information source is the official website, the S_i value is

1.2; if the source is from other channels, the S_i values 0.8;

C_i: the completeness of information disclosure of the ith index, whose value is between 0 and 1. The higher the integrity is, the closer the value is to 1 (this parameter is only applied to the calculation of information score of main items).

From the above description, it can be found that the data and visualization function of FTI on the information transparency of charitable organizations makes the information disclosure degree of charitable organizations clear at a glance in the selection of charitable organizations by donors and recipients, and has a significant guiding role in the selection tendency of donors and recipients, and also plays a signal-based role in charitable organizations. The positive guiding role of the display principle can give positive feedback to the majority of charitable organizations to improve information transparency. At the same time, the massive flow of donations and materials will also feedback the charitable organizations with high transparency, so that their reputation and value effect will continue to grow positively. At this time, if those foundations with poor performance do not strive to find effective solutions, they will not be recognized by donors, recipients and public supervision, and will eventually be eliminated by the industry. Therefore, under the mechanism of integrating FTI, the charity and public welfare industry can eventually form a virtuous circle.

3. APPLICATION OF FTI INDEX COMBINED WITH BLOCK CHAIN TECHNOLOGY IN CHARITY AND PUBLIC WELFARE

The application of block chain in the field of public welfare and charity is no longer only in the theoretical stage. Since 2016, block chain technology has been formally combined with public charity projects. Among them, "The Listening Angel Plan", "The Noah's Ark Plan", "'Blockchain in People finding' of Tencent", "The Succour Publicity Platform with Blockchain" and "The Smart Blockchain for charity", organized separately by "China Social Assistance Foundation", "SEE Conservation Ecological Association", "Trust SQL", "Ai You Foundation" and "Guizhou Provincial Foundation for Poverty Alleviation" are the typical events of public welfare projects applying block chain (see table 1).

Table 1. Public welfare projects applying blockchain

Projects with Blockchain	Organizations	Starting Time
The Listening Angel Plan	China Social Assistance Foundation	July, 2018
The Noah's Ark Plan	SEE Conservation Ecological Association	June, 2017
“BlockChain in People finding” of Tencent	Trust SQL	September, 2017
The Succour Publicity Platform with Blockchain	Ai You Foundation	August, 2018
The Smart Blockchain for charity	Guizhou Provincial Foundation for Poverty Alleviation	October, 2018

Based on the introduction of the functional characteristics of the block chain and the index FTI, as well as the analysis and research of some public charity projects which have been launched online, this paper puts forward an idea on the optimization of charitable public information disclosure, so as to optimize the donation process, improve the public evaluation system and perfect the information transparency of charitable organizations by means of technology empowerment.

Figure 1 is the framework structure proposed in this paper based on FTI and block chain technology.

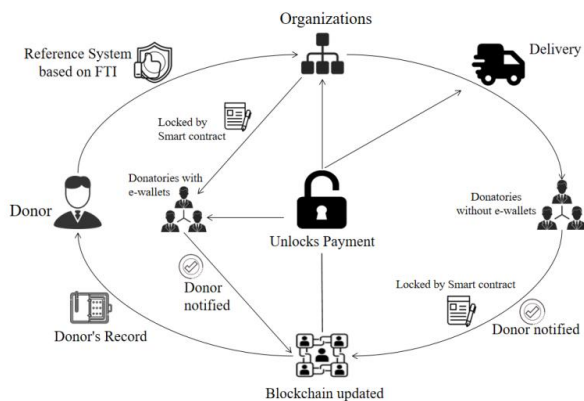


Fig. 1 charity activity architecture based on block chain and FTI

According to this idea, donors can refer to the FTI data before donating and choose more transparent and suitable charitable organizations. After the donation, the fund will be locked by the smart contract which can provide secure transaction and work proof, and cannot be destroyed or manipulated passively, and the donor can track and view at any node in the process of donation flow. The charity organization can choose the way of donation according to the actual situation of the recipient: if the recipient can own the E-wallet, the charity organization can directly implement the donation behavior through the network; if the recipient does not meet the above conditions, or the recipient area is suffering from major natural disasters such as flood and earthquake, and the network is damaged, the charity organization can choose to donate items, such as food, clothing, tents, etc., and use logistics to reach the

donation terminal. In the above way, after the recipient confirms the donation, the donor will receive an accurate notification through the block chain platform, and the block chain node will upgrade according to each item.

Analyzing on the business model, before the use of block-chain, the circulation of donation materials inevitably needs to be completed by public welfare organizations. If this kind of institutions are only subject to their own constraints, the government and the public supervision system cannot go deep into its internal inspection of its operation mechanism, which means that the transparency is low and the flow channel of donations and materials is not smooth; after the adoption of block-chain, however, all institutions, departments and individuals involved in the donation and distribution of materials have been connected to the block chain, i.e., all participants' information and data have been validated in an open, transparent and distributed way from the moment they reach a consensus on the link. In the whole business process, each donation flow is sealed with a time stamp and recorded in the block chain platform. After the necessary privacy is protected, the distributed storage data will be fully open to the recipients, donors, charitable public welfare platform and public supervision system, which is more transparent and cannot be tampered with. Therefore, the credibility of charitable organizations can be then greatly improved.

4. COMPARATIVE ANALYSIS

The public charity proposed in this paper combines block-chain and FTI, and has greater advantages compared with the traditional charity mode, mainly as follows:

(1) Making flow of donations open and transparent. Different from the traditional charity donation information confidentiality, in the new mode, the transaction records generated by donation can form a time stamp and be stored for a long time, which has traceability. The stakeholders can check the flow direction of the donation at any time, which ensures the high transparency of information disclosure.

(2) Decentralizing charities. Traditional charitable organizations, which hold the initiative to open the information flow of public charity, are in the central position in the whole process from several parties of donation, and their internal operation mechanism cannot be seen by stakeholders, thus restricting the benign development of charitable organizations. After the combination of charity and block chain, charitable organizations only play an audit role, and the original centralization no longer exists, so as to effectively improve the transparency of charitable organizations. The effect is shown in figure 2.

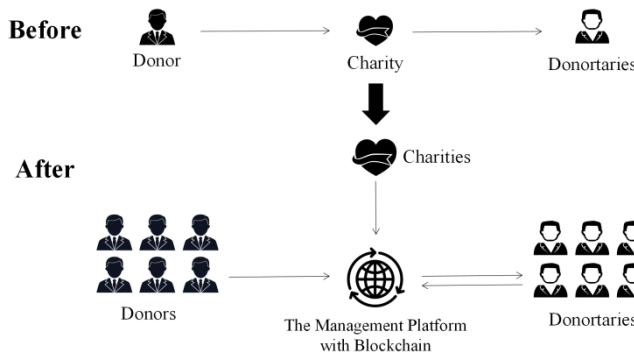


Figure 2. Comparison of charity structure before and after application of block chain

(3) A guiding evaluation system. The information of traditional charitable organizations is not visible, which has caused some troubles to the public welfare activities. The combination of FTI and charity has played an effective guiding role in the selection of high transparency charitable organizations.

(4) Reducing the operation costs of charitable organizations. Traditional charitable organizations mainly use offline or combined with part of the online mode, the management and operation of the organization needs to consume a large amount of human and material resources, and the proportion of management costs is high; under the new mode proposed in this paper, these resources, including human and material, are saved evidently, and the management cost of the organization will be greatly reduced; the block chain network can complete the donation and its usage online, avoiding the time conversion cost from offline to online

(5) Increasing public participation. In the process of traditional charity activities, the disclosure of donation flow information has the dual limitations of content and time, and the degree of information disclosure is low, so the public participation enthusiasm is not high. In the new mode, due to the integration of block chain technology, the public join the whole network as an independent node, and can see all the donation information allowed to be disclosed by law. In addition, with the adding of FTI, the public has a reference system for the transparency of charitable organizations. Public supervision enthusiasm has been enhanced, which has played a positive role in promoting the benign development of the charity industry.

5. CONCLUSION

In recent years, with the rapid development of China's public charity, it also encountered some obstacles in the process of public welfare and faced with new problems. Although a series of improvement measures have been put forward, the transparency of charity information has not been completely changed.

With the popularity of the Internet, block chain technology has also been raised. Its traceability, decentralization, distributed accounting and other characteristics put forward a new idea for the development of philanthropy.

The launch of Foundation Transparency Index (FTI), which is jointly certified by thousands of charitable organizations in China, provides a reliable reference system for donors, offers a good evaluation standard for the public supervision system, and gives effective help for the improvement of information transparency of charitable organizations.

Based on the perspective of donation flow, this paper explores the adaptability of block chain technology and charity field, introduces FTI as a reference system, explores the way of applying the two in the field of charity, and furnishes a new charity application mode. It is hoped that technology can be achieved in the future, so as to effectively solve the problem of public trust in charity, so as to make charitable donation really play its due role.

ACKNOWLEDGMENT

The funding of this paper is: Innovation and Entrepreneurship Training Program for College Students of Tianjin University of Technology (202010060025)

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