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How to design the token reinforcement based on token economy for blockchain model

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Abstract

The reinforcement of the token, which is based on the token economy currently applied in blockchain-based cryptography, plays a critical role in forming the cryptographic-related ecosystem. Therefore, in this paper, it was investigated the reinforcement principle of token supporting the Token economy for blockchain model. In order to create a healthy ecosystem based on the reinforcement system principle, it is necessary to find ways to secure scalability by seeking consensus between the participants and the market economy structure so that it can generate an influx of more participants than seeking to maximize profits of certain people. Desirable behavior is defined as an action required by ecosystem participants that have the property of making the token ecosystem sustainable, and to do so, each individual receives appropriate incentives (rewards) when taking this action, ultimately encouraging voluntary participation and action by all participants in the ecosystem to optimize the interests of both individuals and participants. The expected benefit of this study may contribute to the establishment of various business models based on the principle of the reinforcement system.

Keywords: Token economy, Blockchain, Ecosystem, reinforcement

1. INTRODUCTION

Based on blockchain technology, a variety of cryptocurrencies is being introduced into markets. Bitcoin was not associated with an external inflow of rewards and did not require a business model. But a business model is essential in order to grow the token economy faster recently.

An ecosystem that enables a network of blockchain, an ecosystem of cryptocurrency, to be implemented is defined as 'Token Economy'. Token Economy is an ecosystem in which tangible or intangible values are circulated between the desired behavior and the token, which is a reward to the participants in the network. This business model applies the compensation system principle of the token.

Token Economies are divided into two dimensions: designing a reward distribution structure for participants and designing a currency issuance mechanism. First, a proper compensation distribution design within the token economy encourages systematic reinforcement of the behavior that is aimed at designing a reward distribution structure to voluntarily induce the desired behavior of participants. Therefore, this study is intended to examine in detail through an analysis of the compensation principle of the token.

This study does an analysis of the compensation principle of tokens that support the token economy, which can contribute to related areas such as blockchain-based cryptography.

2. THEORETICAL UNDERSTANDING

2.1 Token and Coin and Token Economy

Coin refers to the ownership of an independent blockchain network (main net). Examples include Bitcoin (BTC), Quantum (QTUM), Ethereum (ETH), Steem (STEEM), and Nem (NEM).

In contrast, if it does not have an independent blockchain network, it is called a token. Examples include Tron (TRX) and IOS (EOS). The token is a kind of commodity created by blockchain and used in applications prepared by the developer of the blockchain, such as the right of use.

Table1. Difference between token and coin

Division	Token	Coin
Definition	It does not own an independent blockchain network.	It has an independent blockchain network.
Case	Ron (TRX), Ios (EOS)	Bitcoin (BTC), Quantum (QTUM), Iderium (ETH), Steam (STEEM), and Nem (NEM)

The token economy is a system of rewarding communities with a token for actions that have a desirable effect on the community, and three key elements are tokens, desirable behavior, and rewards. Token Economies' assessment is generally based on how 1) to induce the participants' desired behavior within the network; 2) to circulate the token within the blockchain; 3) to form a rule of distribution of the token; 4) to set the value of the token.

2.2 Type of tokens

If you look at the type of token, you can classify it as an IOU token and a native coin. The IOU token requires a centralized entity, and Tether is a typical example. Most of the tokens we use in our daily lives also have the nature of the IOU, and the tokens are useless unless the guarantor faithfully implements the token exchange.

The native coin is the core of the token economy, and bitcoin is the first case of bitcoin as a token that can be guaranteed even without a guarantor.

Table2. Type of token

Classification	Contents	Use case
IOU token	<ul style="list-style-type: none"> o I owe you o The guarantee of the exchange voucher gives value and is the same concept as the voucher. o Needs a guarantor and it is centralised 	Tether
Native token	<ul style="list-style-type: none"> o Characterized by no confidence; no guarantee subject is required. o Token issue according to blockchain code rules, e.g. bitcoin compensation half-life 	Bitcoin

3. REINFORCEMENT PRINCIPLE OF TOKEN

3.1. A problem resulting from a mismatch between reward and target behavior

The most difficult part of designing the Token economy is to effectively elicit the targeted action through incentives. If you look at the reason, it is because the interests of individuals and the interests of the token ecosystem as a whole are not always consistent, and this is an old subject of economics. For example, from the standpoint of each plant operator, discharging wastewater or smoke without purifying it is the biggest profit-seeking act, but this practice reduces the utility of society as a whole through the phenomenon of environmental pollution. Currently, China is suffering from health or economic damage due to the fine dust it provides to earn more revenue, and this phenomenon is called a negative external effect in economic terms.

Negative externalities undermine the interests of society as a whole, thus lowering the incentive for action through sanctions or additional charges, which may be seen as limiting the maximum profit-taking for some individuals. If you look at closely, the individuals have shifted the burden of their own expenses to society as a whole, so the sanctions are not just fair.

The Tragedy of the Commons referred to in economics, shows that maximizing personal profits are not always desirable. The Tragedy of the Commons is briefly discussed, and the story begins when there are several farmers in the meadow, and each raises cows. Currently, the amount of grass growing in the meadow and the amount of grass eaten by cows are the same, so the meadow can always be green, but for a farmer's individual, maximizing profits is to increase the number of cows to make more milk.

Although the amount of milk each cow makes may be reduced by a small amount of grass that can be eaten per cow, the number of cows it is raising increases several times, thereby benefiting individual farmers. The problem is that every farmer has this idea, and the total number of cows grazing the meadow will eventually increase several times, and the grass will become scarce and eventually turn into a desolate land. This resulted in each farmer maximizing profits in the short term, but in the long run, they suffered huge losses.

The token economy also has these problems, and the root of the problem is that maximization of individual profits, such as fine dust emissions and the release of contaminated waste as examples, has negative ripple effects on the entire ecosystem.

To find a clue about how to deal with these problems, profit is to take away expense from the cost therefore, the profit can be explained into two components: cost and expense.

First of all, in terms of cost, the first time compensation fails to drive the targeted behavior is when costs can be lowered indirectly. Most targeted actions in Token economies require tangible and intangible resource inputs.

Bitcoin offers the intellectual behavior of mining equipment and electricity charges, in the case of Steem, in writing and evaluating, and in Neo, it requires buying tokens and rewards them when they are satisfied. However, if there is a way to get a similar level of reward for investing in these far fewer resources and doing normal target behavior, a growing number of people will do so because of the maximum profit-seeking motivation.

Those who do relatively targeted actions will lose in terms of returns. Eventually, over time, the target behavior in the token economy will disappear and only the low-cost bypass action will remain. Fewer resources will result in a drop in the value of the ecosystem and token prices as well

The other aspect is revenue, and specifically what the token economy designer should throw at is whether there are other ways to profit from the token in addition to the targeted action.

Token Economy can be threatened if there are other sources of income and this is more attractive than the rewards of the Token economy. For example, there may be options such as creating empty blocks to paralyze the network to get higher fees or saving fees by putting transactions that are generated by their servers first.

The block-size debate at Bitcoin also reflects the interests of miners outside the token economy. In this case, it is an act that forces altruism to deal with such issues as morality or norms, as all market participants seek to maximize profits. An important element is to thoroughly investigate the loopholes that token economy compensation system might have in advance and design token economy so that individual profit-seeking is as consistent as possible with social profit-seeking.

3.2 Prevention of undesirable behavior

It is not a moral or ethical issue that is desirable and undesirable in a token economy, but a matter of thoroughly economic and profit. In other words, desirable means increasing token value in the long run and undesirable means lowering token value

In the case of Bitcoin, a typical example of undesirable behavior is spam attacks or 51% attacks, and if this had happened consistently, the value of bitcoin would have been much lower than it is today, and because Bitcoin still responded effectively to these attacks, the current high value is maintained. While the best interests were sought on the part of the attackers, the value of the entire network naturally falls.

Only when the criteria of desirable and undesirable are used as long-term co-prosperity, not as short-term interests of individuals, but as a long-term co-prosperity in which the entire ecosystem is large and individuals can benefit, can the discussion on the token economy be accurately understood.

Token economy designers can look at ways to prevent undesirable behavior that degrades the value of the ecosystem in terms of cost and revenue. If the return is not greater than the cost, the material motivation for the action will disappear, and if the expected return on doing an undesirable action is not smaller or more different than the desired action, then there is no need to take an undesirable action and pose a potential risk.

In terms of cost, it is a basic design concept to ensure that costs go up when doing something undesirable. Typical methods include spending more fees on spam attacks and investing more in stakes or mining hash to launch 51 percent attacks.

Some mining pools may be able to attack 51 percent if they want to, but they may not because they thought it would be more profitable to grow the market as a good actor without launching 51 percent attacks in the long run.

Even if the attack is successful at a high cost, a drop in token prices may lead to lower-than-expected profits after rumors are reported in the market. If it takes a long time to untie a bound token, for example, such as staking, it is ultimately a loss to act consistently to reduce the value of the ecosystem.

Token Economy, which is currently blockchain-based, cannot quickly change systems to control any situation that changes from time to time, and thus have recently come up with semi-centralized or centralized solutions.

3.3 How to create a sustainable token economy

The following table shows technical and institutional aspects as a solution to The Tragedy of the Commons in the token economy.

Table 3. Solutions for The Tragedy of the Commons in Token Economy

Division	Contents
Technical solution: KARMA	<ul style="list-style-type: none"> o A number of technical solutions are being proposed in part and Karma is one of them o Karma team sets minimum power-up quantity criteria for boat compensation to create spam accounts to drive boats or to prevent unauthorized stealing and disappearing of other people's content temporarily o As a technical solution to limit freeloaders in the P2P network, Vishnummert et al proposed KARMA, a system that excludes only those who consume resources for free from P2P global pools, similar to the tragedy of the common land. o KARMA restricts the free use of shared resources on an object by tracking the allowable usage of resources on an individual node
Institutional solution	<ul style="list-style-type: none"> o Elinor Ostrom argues that it is necessary to institutionalize community solutions o 8 institutional design principles of Ostrom are presented and the best practices are presented; 1) clearly defined boundaries, 2) Compliance with the local conditions of the rules for use and delivery, 3) Participation in the user's collective selection process, 4) Surveillance activities, 5) Incremental sanctions, 6) Conflict resolution device, 7) Ensuring minimum

	autonomy and (if the shared resource system is large) 8) a cohesive business unit of the middle class
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A comprehensive approach to proposing a solution to the tragedy of shared resources using a compensation system is as follows. For the expansion of the KARMA system, KARMA is a way to manage the scalar of a decentralized object in the P2P network to overcome the Tragedy of the Commons. One can think of ways to add several additional shared resources to the KARMA, which manages a simple shared file consumption allowance, Scala. One can think of how to manage lots of scalars with vectors rather than with multiple resources.

Ostrom shows that in many cases, mutual monitoring among community members and management of shared resources through mutual sanctions can be effective. In other words, members of a community have information that external authorities do not have, and can avoid tragedies by monitoring and regulating each other based on mutual trust.

Ostrom's method of community-based P2P application is not clear as it suggests institutional design principles or how they can be applied in a P2P decentralized network. However, we believe that cooperation within the human system proposed by Ostrom could be linked to Karma if it can be controlled by vector or matrix.

The desire that man seeks in life can be thought of as the human fifth-phase desire that Maslow said. It can be marked with five scalars to manage each consumption allowance. The desire for physiological lower parts is related to natural goods, which are limited resources, so scarcity is involved and can be naturally marked as scalar. Therefore, it can be marked and managed by a vector of desire. Some things are very difficult to achieve and possess, such as self-esteem and self-realization, which are the top needs. However, self-realization is an infinite disaster. Thus, the self-sustainability of the system is ensured if it can only create incentives to induce the limited goods to transform the needs of the lower into those of the upper classes, the infinite goods.

Maslow is mentioned as being limited to individual needs, but it is Ostrom's institutional solution to let them manage their common needs more systematically in social terms. Thus, it is a comprehensive solution if individual needs and social needs can be made into metrics.

4. APPLICATION CASE OF BLOCKCHAIN-BASED TOKEN REINFORCEMENT

4.1 The reinforcement principle of bitcoin

Bitcoin founder Satoshi Nakamoto established a mutually reliable P2P payment network without central agency control. To this end, token economy was designed such that the miner creating a new block of bitcoin blockchain was given a token as a reward of 'bitcoin', recording transactions in the block, and receiving transaction fees.

Bitcoin is a structure in which the total amount of issuance is limited, and prices continue to rise if there is demand. Thus, the compensation for mining it at this limited supply serves as a strong incentive for participants to mine. Thus, the algorithm of compensation system that induces behavior within Bitcoin is called proof of work (PoW) method. Therefore, Bitcoin can be seen as building a token economy suitable for P2P payment services.

This proof of work (PoW) method of proof of work, such as Bitcoin, has the disadvantage of wasting resources, as it requires overly complex calculations. Because it is done by mining a kind of math problem, the more high-performance equipment participants can solve this problem, the easier it is to mine, which leads to more rewards. Thus, due to this compensated structure, miners have limitations on the waste of resources to spend huge amounts of resources to mine faster.

4.2 The reinforcement principle of Ethereum and Ios

Such a proof of work (PoW) approach has emerged as a key to Ethereum's token economy. PoS is an algorithm designed to give a proportionate authority to create blocks as many coins are held. Within Ethereum, Token Economy considers the consensual way of maintaining a blockchain network, rather than solving math

problems, such as Bitcoin's PoW, as if it were holding the coin in its wallet. Therefore, the higher the stake in the coin, the higher the probability authority to record in the block. In other words, the amount of coin being compensated is proportional to the amount of coin held, so there is a distinctiveness that is considered an 'interest' concept. Also, a variety of token generation methods are applied to token economy in each cryptography, such as Dedicated Proof of Stake (DPOS), which delegates authority to the few representative verifiers adopted by Ios. The evolution of this token generation and distribution method increases the diversity of token economy and is developing the encryption shield, or blockchain itself. In particular, Ios can be seen as an ownership model that allocates resources to Ios token holders. This is different from the rental model of Ethereum, in which fees increase as miners' transactions become concentrated and GAS fees are required. This is because the accompanying GAS for the Ethereum transaction is similar to the rent for network use.

4.3 The reinforcement principle of Lympo

The Lympo token, created by a Lithuanian founder, is a token that allows one to be compensated according to an individual's amount of exercise. Lympo is the main project development with sportswear companies, creating a synergy effect that allows participants to exercise themselves and get the token rewarded.

Given that it is a reward-acquisition structure through the achievement of an individual's exercise goals, Lympo does not require participants to exert themselves separately to compensate for the token. Rather, there is the advantage of differentiated token economy in that it is easy to obtain a token through part of an individual's life. Token Economy such as Lympo have strong motivations that allow participants to participate voluntarily in the token acquisition process continuously. Token Economies have formed the basis for long-term operations in that they can induce participants to act through actions closely related to their lives, not through mining compensation, such as bitcoin.

4.4 The compensation principle of SymVerse

When using blockchain-based tokens, you need to think about how to reward users who activate the related ecosystem. The main subjects of compensation are divided into producers (node operation) and consumers (contribution to the blockchain through transactions).

SymVerse is a cryptocurrency for the next-generation blockchain platform designed and developed by SymVerse based on game theory. It has a mechanism to add used gas and newly issued coins to the corresponding contributors, and it is called SymReward. If you look at the reward policy for consumers among SymReward, there are two types of reward policies for users who are wallet users (SymWallet): 'general compensation' and 'random compensation'.

SymReward has a contribution collection unit that collects transaction history for one day and stores the contribution data, and a mechanism that includes parameters and functions used for reward distribution. In addition, it is operated with a compensation processing unit that issues new coins according to gas usage statistics and evaluates contributions to compensate.

Table 4. The compensation principle of SymVerse

Division	General compensation	Random compensation
Contents	<ul style="list-style-type: none"> o Contribution assessment item: GAS usage, transaction count, minimum equity Compensation criteria: at least 1SYM, 3 transactions in 1 day 	<ul style="list-style-type: none"> o Compensation criteria: at least 1SYM, randomly select 10 accounts out of less than 3 transactions in one day to compensate o At the start of the day (57,600 blocks) the balance must be 1SYM or higher to be compensated o The date of the initial deposit is not compensated for the occurrence of a transaction, and the details of transactions from the second day are reflected on the third day

5. CONCLUSION

The reinforcement of the token, which is based on token economy currently applied in blockchain-based cryptography, plays a critical role in forming the cryptographic-related ecosystem. This research is a study of the reinforcement principle of token supporting the Token economy. In order to create a healthy ecosystem based on the reinforcement system principle, it is necessary to find ways to secure scalability by seeking consensus between the participants and the market economy structure so that it can generate an influx of more participants than seeking to maximize profits of certain people.

Looking at the principle of reinforcement for native tokens that are generally not revenue-generating from the outside, blockchain should essentially be independent of the external system and paid by increasing the total token issue in the blockchain. In other words, rewarding tokens can reduce the stake value of existing tokens. In the token economy, the high and low rewards do not directly affect the overall value of the token ecosystem. The value generated by the ecosystem due to the rewarded activities to produce the value of the entire ecosystem needs to be greater than the reward amount paid by the token. This is similar to the concept of corporate incentives. The level of compensation is adjusted to dynamic by the blockchain itself according to market principles.

The IOU token affects the value of the token ecosystem since an inflow of outside funds is essential for issuing additional IOUs to reward them with the token. The IOU token Economies are compensated by outside funds, so any favorable or unfavorable act does not directly affect.

Desirable behavior is defined as "action required by ecosystem participants" that has the property of making the token ecosystem sustainable, and to do so, each individual receives appropriate incentives (rewards) when taking this action, ultimately encouraging voluntary participation and action by all participants in the ecosystem to optimize the interests of both individuals and ecosystem participants. For example, the desirable behavior in Bitcoin is mining in Proof of Work.

Undesirable is to lower the value of the token in the long run, for example, the 51 percent attack on the spam attacks of Bitcoin. In token economy design, it is a fundamental principle to ensure that costs go up when doing something undesirable. However, blockchain-based Token Economies is finding it difficult to quickly switch systems and continues to work to apply the problems that still appear today.

The expected effects of this study may contribute to the establishment of various business models based on the principle of the reinforcement system.

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