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Token's function and role for securing ecosystem

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Abstract

The purpose of this study is to investigate the role and function of tokens to form a healthy blockchain-based ecosystem. Tokens must be constructed in a way that enhances their desired behavior to grow into a healthy token economy. The actions required of ecosystem participants in designing tokens should enable each individual to receive appropriate incentives (rewards) and encourage voluntary participation in taking this action. Also, all ecosystem participants must design to make the token ecosystem self-sustainable by generating profits. For example, in Bitcoin's proof-of-work method, mining is designed as a desirable behavior.

Token-based services should be designed to induce multiple engagements, to design penalties for undesirable behavior, and to take into account evolutionary development potentials. Besides, the economic value of the entire token ecosystem will increase if the value that is designed and designed to take into account the revolutionary Innovation Possibility is greater than the reward amount paid to tokens. This study will contribute to presenting relevant service model by presenting how to design tokens and criteria when establishing blockchain-based service model. Future research is needed to discover new facts through a detailed comparative analysis between Tokennomics models

Keywords: *Token economy, Blockchain, Ecosystem, reinforcement, Market exchange value*

1. INTRODUCTION

With the development of blockchain technology, the concept of digital currency has emerged in the market, which has led to the spread of various encryption currencies. The interest in tokens, which correspond to the underlying technology of encryption money, and the services that applied them are receiving much attention. In some cases, new services emerging in the blockchain-based cryptography market has successfully settled in the market, as in the case of bitcoin, but there are various cases where they disappear as soon as they are created. This may be due to an analysis of the token on a fundamental basis, as well as the lack of specific content to the design and valuation of the services it provides to the customer.

The purpose of this study is to explore the concepts, design methods, and functions and roles of tokens and contribute to creating a successful token-based business. This will contribute to the close study of various cryptographic money service models based on blockchain.

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2. MARKET EXCHANGE VALUE AND TOKEN

2.1 Market value

For all services to survive in the market, they must have corresponding market value. First, value is defined as the relationship between the object of ownership and the individual or individual wishing to own it. To distinguish between a wide range of subjective relationships that can occur among people, evaluators need to identify a value as a basis for evaluation. Of these, market value is the most common type of value, but there is also a value criterion other than market value.

The concept of market value reflects the collective perception and action of the market and becomes the basis of most resource assessments of the market economy. By applying the same definitions as market value in the assessment, the surveyors and users of the assessment services will be able to make an objective plan for the analysis. If market value is the objective of the assessment, the assessor should apply definitions, processes and methods.

If a value type other than market value is the objective of the valuation, the assessor shall apply an appropriate value definition. It is the responsibility of the assessor to avoid possible misunderstanding and misuse of valuation estimates in situations where non-market value is the objective of the assessment task.

The limits and assessment reports described for appropriate disclosure, verification and definition of terms and applicability of the assessment shall, in normal cases, comply with international assessment criteria. Such a market value assessment and recognition of such a service is necessary for non-services to have the life force to survive in the market. The following discussed the token, which is an important element of blockchain-based encryption services.

2.2. Token

The general meaning of the Token is evidence of the rights to goods and services promised specifically or in advance. It is a kind of bond-debt. The token issuer is obliged to provide the token purchaser with pre-arranged goods and services, and a typical example is a bus token or casino chip previously used. Only those with casino chips are eligible to participate in all kinds of games offered by casinos. It is also called the Physical Token because ownership is transferred in a physical way.

When digital means are added to physical tokens, they become "digital tokens." Digital tickets with limited functionality and mobile movie tickets that are only available for movie viewing are digital tokens.

When the function of exchange and trading is added to these digital tokens, it becomes a digital currency. Digital tokens are only exchanged for pre-promised goods and services, while digital currencies perform a relatively wide range of exchange and trading functions. For example, online vouchers provided by credit card companies can be used in several places and exchanged for legal money through offline markets. Online gift certificates are also a typical example of digital currency. Therefore, a token refers to a "unit or exchange authority" representing something and a token is a basic unit representing the economic value of an ecosystem.

2.3. Blockchain-based token and coin

The value of blockchain-based tokens is linked to the market capitalization of cryptographic assets linked to asset values. It is also closely influenced by the value of the ecosystem formed by the token.

From a technical perspective, the token is called a token if it does not own an independent blockchain network, and a typical example is IOS (EOS) and TRX (TRX). Coin, on the other hand, owns an independent blockchain network (main net), and some examples include Bitcoin (BTC), Etherium (ETH), Quantum (QTUM), Steam (STEEM), and Nem (NEM).

In terms of the token type, it is classified in the form of IOU (I owe you) token and Native token. The IOU is valued by guaranteeing exchange rights and a typical case is tether, with the same concept as gift certificates. In this case, the centralized approach is being used as a guarantee subject. Native tokens feature trustless, making them unnecessary for warranty subjects and issuing tokens according to blockchain code rules. A case in point is the half-life of Bitcoin's compensation.

The following is the classification of tokens in terms of encryption.

Table 1. Classification of tokens viewed as cryptocurrency

Classification		Contents
Main purpose criteria of cryptocurrency	Cryptocurrencies	o This is a cryptocurrency aimed at the 'digital currency' function for the transfer of monetary value, and BTC (bitcoin) is a prime example.
	Network Tokens	o This is a cryptocurrency aimed at facilitating network activation and growth in ecosystems o Cryptocurrency benefits for contributions within the ecosystem are generally network tokens. o Representative case is GNO (gnosis)
	Investment Tokens	o This is a cryptocurrency for the purpose of investing real assets. o A prime example is DGX (digix gold).
Criteria for Usability of Cryptocurrencies	Usage Tokens	o This is a cryptocurrency that gives access to network or service functions. o Typical examples are BTC (bitcoin) and STX (blockstack).
	Work Tokens	o This is a cryptocurrency that allows cryptocurrency owners to make operational contributions to network systems. REP (augur) is a typical example
	Hybird Tokens	o This is a cryptocurrency that performs both the usage token and the work token, and ETH (etherium) and DASH (dash) are typical examples.
Legal Status of Cryptocurrency	Utility Tokens	o In this case, Legal Status of Cryptocurrency Utility Tokens o This is a cryptocurrency that functions to provide access to the products and services of the blockchain ecosystem, or to provide discounts or special rights to them. o According to FINMA's guidelines, this is not considered a security. o A prime example is STEEM (steem).
	Security Tokens	o This is also called Asset Token, a cryptocurrency that promises and issues future distributions of company income or capital flows. o This includes the exchange of physical assets on the blockchain, which is functionally similar to stocks and bonds, so FINMA classifies them as securities. o SPiCE (spice vc) is a prime example
	Cryptocurrencies	o This is also called a Payment Token, a cryptocurrency designed as a payment or monetary value transfer means for purchasing goods and services. o Currently, FINMA does not treat this case as a security, but there are various legal opinions on this. o BTC (bitcoin) is a prime example.
Fundamental Value Criterion of Cryptocurrency	Asset-backed Tokens	o This refers to digital assets backed by tangible or intangible assets of economic value, such as real estate and energy. o An example of this type of practical use is to issue cryptocurrencies for ownership of art and share them among several. o GOLD (goldmint) is a typical case.
	Network Value Tokens	o This is the type of cryptocurrency itself that is connected to the value of the network, not the others. o ETH (ehterium) and STEEM (steem) are representative examples.
	Share-like Tokens	o This type is a case of promising future income, distribution of capital or voting rights. o This can be classified as a security token.
Based on technology layer of cryptocurrency	Blockchain-Native Tokens	o At the bottom of the blockchain technology layer, this is a type of cryptocurrency that is issued directly upon block creation. o BTC (bitcoin) and ETH (etherium) are typical cases.
	Non-native Protocol Tokens	o More indirectly, it means cryptocurrency implemented through crypto economic protocols. o REP (augur) is typical case.
	(d)App Tokens	o It is a cryptocurrency with a function more similar to the dictionary meaning of token, which is implemented in the blockchain application layer. o WIZ (Gnosis) is a typical case

2.4. Market exchange value and token

From the manufacturer's point of view of the token, the token has a close relationship with the token economy based on the digital currency aspect and the principle of compensation and the desirable behavior that provides a change in the value of the token leading to it.

Fig.1 Token as market exchange value

Looking at the token from an economic standpoint, the provision of compensation is required, in which case the issuance of the token is based on the rules of issue, which increases or decreases the value of the root through the increase of the token volume. Providing tokens provide the shares of the ecosystem generated on the basis of tokens, which is the same behavior as giving treasury shares from the corporate perspective. The token can be converted to the national legal currency at some point, providing positive effects of contributing to the economic activities of the enterprise. In addition, in ecosystems associated with tokens or encoding money, the increase in participants through the utilization of tokens, a digital asset, leads to the activation of the relevant ecosystem.

3. TOKEN'S FUNCTION AND IT'S ROLE

3.1 Ideal Behavior Concepts and Designs, Reward Criteria for Tokens

The criteria for action should be set to look at the concept of desirable behavior. In general, desirable actions to enhance the use of tokens with monetary and exchange-worthy characteristics are referred to as follows:
A desirable behavior is an "act required by ecosystem participants" that has the property to ensure that the token ecosystem is sustainable, which should encourage voluntary participation by each individual to receive appropriate incentives (reward) for this action. In addition, it is defined as an act that optimizes the interests of all ecosystems participants, as well as individual interests, by ultimately all participants in the ecosystem voluntarily participating and acting. As a specific example of this, Bitcoin is designed as a desirable behavior in the Pow: Proof of Work. Good behavior can be presented in various ways to elicit participants from all environments.

The following considerations exist for the question of how to design a desirable behavior.
First, many participants should be designed so that they can voluntarily take the desired action and receive compensation in order to induce many participations. There may be room for compromise if many are excluded and only a few are involved and not decentralized. As an example, Bitcoin is more likely to be exposed to several attacks, such as attacking 51% of users, unwarranted censorship of certain transactions, and selfish mining. In addition, side effects such as increasing inequality coefficients are likely to occur, and long-term sustainability is lost and related ecosystems are not functioning properly.

As can be seen in Bitcoin's case, 'mining' in coin using work certificate method (PoW) showed that ASIC mining machines were developed and 'mining' was monopolized by a few as the value of the coin provided as a reward grew beyond the initial design. This can have a fatal effect on the ecosystem in the long run.
On the basis of desirable behavior, the token was designed to favor the public with 'mining' using ASIC-resistance algorithms, but this method was also advantageous to miners equipped with large-scale memory and, more recently, threatened sustainability by the development of unique miners.

Second, a penalty (reverse compensation) design for undesirable behavior is needed. Penalty designs are needed to prevent participants from voluntarily taking undesirable actions in the system. When the PoS (Proof of Work) was first introduced, there was no penalty in the coin used and it was exposed to potentially fatal problems such as "Nothing at Strike".

Third, design is required to take into account the incremental, evolutionary development possibility
It argued that it was necessary to provide gradual and innovative changes in that the criteria for desirable behavior could change economically or culturally. Sustainability can be achieved only when the environmental changes in the ecosystem allow desirable behavior or compensation regulations or levels of that action to change and are designed to evolve and adapt continuously. For Bitcoin, devices for evolution can be thought of at the algorithm level and at the community level in two ways

With large-scale investment in mining equipment made by early professional companies as an evolutionary development device at the algorithm level, the desired behavior of mining has changed greatly. In preparation for these mining equipment investments, the design has been changed so that the puzzle difficulty adjustment for block generation can be adapted evolutionary every two weeks.

According to community-level evolution and development devices, anyone who finds technical problems or errors in Bitcoin programs can submit a "BIP; Bitcoin Improvement Proposal" and the design has been changed so that they can be adopted or rejected through community discussions.

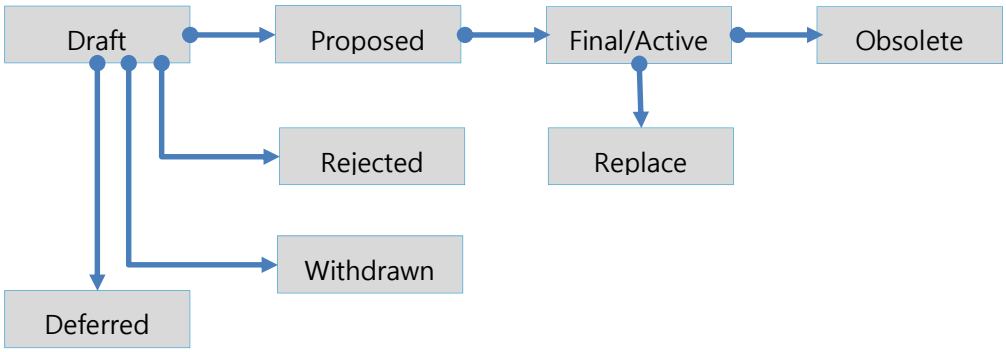

Fig. 2 BIP workflow ; The process of evolutionary development

Fourth, a design that takes into account the possibility of innovative development is required. When the environment of the ecosystem changes significantly and requires innovative changes rather than gradual ones, institutional mechanisms to accommodate they are needed to ensure sustainability. Theoretically, it is necessary to ensure self-sustainability equipped with self-evolution and self-innovation so that an ecosystem in which participants voluntarily participate and take the desired action remains permanent.

Fifth, the economic value of the entire token ecosystem may arise if the action subject to compensation is greater than the amount of compensation created and added to the ecosystem by token, if the action is rewarded with a token for a particular action.

3.2 Token's function and it's role

There are social reinforcement, environment of refinement, learning to plan ahead and save earnings, individuals and groups, consistent application horizontally,, and consistent application of the functions and roles of the token.

First, social reinforcement. Tokens are meant to make explicit and immediate reinforcement and to strengthen behavior, but in the end social reinforcement should be sufficient to maintain a learning (learned).

Second, Shaping. All the principles of learning that work is applied within the token economy and composition means that the customer does not expect to complete everything at once. In addition, actions can be obtained in stages and initially means that if the target behavior is to be followed by a 30-minute attention span, the

customer can initially be enhanced for five minutes.

Third, Immediate of Reinforcement. Reinforcement provides a greater impact on behavior when given right after the reaction is made and the longer you must wait for the reward, the less effective it is and less to learn. The principle of delay discounting, and immediate token compensation can be linked to subsequent enhancements

Fourth, learning to plan ahead and save earnings. You may get more rewards, such as spending weekends at home, going to a movie or going on a picnic. If such rewards are given for one example of target behavior at a time, scarce resources are soon depleted, and incentives are lost as a result. One of the advantages of a token is that it can be used to divide larger rewards into parts. Customers can save tokens for expensive rewards later, which should not immediately consume all the tokens acquired for attractive small rewards and will learn to plan ahead. In this way self-control can be acquired.

Fifth, it is an incident of individuals and groups. Most token economies target groups, and the system operate in the entire ward or class and may add contingent individual goals and reinforcements within the group.

Sixth, it is a consistent The power of the token economy depends primarily on application consistency and is essential to employee training to achieve it.

Seventh, it is a horizontal system. Often, the token economy is a step-by-step program and customers can pass through different levels until they reach the highest level. At this point, actions are performed without token reinforcement and the higher the level, the more complex actions are needed, and incentives to move from one stage to the next can ensure the usefulness of increasingly desirable hardening. Token ecosystems can be maintained with persistence when the compensation function and role of such soil root can be performed well.

3.3. Tokennomics

Tokennomics means tokens and economic tokens, and the goal of tokennomics is token economy that both participants benefit from. To realize tokennomics, the design of the token, the issuance of the token and the distribution process of the token are passed.

The design of the token should provide an environment in which everyone is benefiting from performing the desired behavior by presenting desirable action objectives. Issuing should be made at a time when appropriate target customers and customers can reach the purpose of the token service. In addition, the token should provide clear evidence and criteria for distribution. In this distribution, the justification for the purchase action and the value through each engagement should be available.

Through this process, participants will achieve their desired goals and engage actively. Ultimately, it forms a token economy that is able to circulate for the design of the token ecosystem, the following must be met to create a healthy token economy:

Table 2. The consideration for creating a healthy token economy:

Classification	Contents
Co-Creation	Blockchain ecosystem is a co-owned, self-governing network
Value Creation	Must be able to provide value to all participants
Value Capture	Tokens are a means of value creation and the underlying system that makes the network run
Revenue	Make money by selling tokens
Incentive Mechanism	Common incentive mechanisms are important
Compensation	Designing Strategic Behavior and Reward Structure of Participants
Operating System	Need a system to create and operate governance
Nonconcentration	To prevent the concentration of wealth on a particular person

4. CONCLUSIONS AND IMPLICATIONS

In this study, we considered the content of the token being constructed in a form that enhances the desired behavior and can grow into a token economy

The actions required by ecosystem participants in the design of the tokens should enable each individual to receive appropriate incentives for taking this action and to induce voluntary participation.

It should also be designed so that all ecosystem participants can generate profits so that the token ecosystem can be self-sustained. As a case in point, Bitcoin is designed as an action in which 'mining' is desirable in the work certification scheme.

For token-based services, the design of penalties for undesirable behavior and design should be made in consideration of the incremental evolutionary development capability. In addition, the economic value of the entire token ecosystem is increased if the value added by the ecosystem is greater than the amount of compensation created by the token by design and reward considering the probability of innovative innovation.

This study will contribute to future presentation of related service models by presenting how and how to design tokens in establishing blockchain-based service models.

Future research needs to be done to discover new facts through detailed comparative analysis between token-nomics models.

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