A Study on a Blockchain Based Community Governance System Model and Its Characteristics

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Abstract. Community governance is a comprehensive system to coordinate and integrate all the elements of a community like interest holders, public community issues, the policies, the relations, and institutions etc. With the successful progress of underlying technology like blockchain technology in the financial field, more and more fields of human society could be benefit from the maturity of technology. This paper examined how this technology could influence the community governance system by establish a blockchain-based community governance model. And the community governance could be rebuilt in operational layer and by its innovative philosophy.

Introduction

The innovation of technology has been the prominent force for the development of human society. The technological sector especially the information technology provides more and more technological instruments which used in every sector of the society. We could identify these great changes not only in economy or politics but also in the daily life of every human being.

The technology of blockchain was firstly introduced in the area of electronic currency known as Bitcoin (BTC). The technology of blockchain provides a fundamentally technological basis for the new currency system. And moreover blockchain technology provides a new philosophy of how the system works in contrast of the traditional currency system. It brings distributed, weakly centralized, self-organizing, collaborative etc. principles for the change of existing currency system. Then more and more studies and practices have been focused on the implementation of blockchain in more areas. In public sector, blockchain technology also has ample scope for re-structuring the procedures and principles of the public affairs management. In community sector, the governance of community will benefit from the innovation of blockchain technology, not only because it provides new technological system, and more importantly because it could significantly change the fundamental principles of the political or administrative system.

Community and the Traditional Community Governance

Ferdinand Tonnies (1887) firstly stated the difference between the community and society by using the term Gemeinschaft. From then on different definitions have been stated by various scholars from different aspects. Community could mean a group of people connected by ties of blood, geographical relationship or mental friendship etc. They have common interest and share similar value. They have been bonded by cultural or psychological factors. Secondly community could refer to a specific location where people interactive with each other in their daily life. Thirdly community could mean collection of the different relationships by the people. And also community could be a combination of institutions by which behaviors have been regulated or determined.

The community governance means a process or activity to organize, coordinate and manage all the public affairs of a community for a pre-set purpose. Hence it is a complex system to contain all the elements of community. For an ideal development of community, all the elements such as interest-related social subjects in the community, their activities, their interactions, their connections, the environments of a community, the technological supporting instruments, the institutions, the
common value or shared vision etc. should be organized into an organic and harmonious whole and form a stable and adaptive structure.

The development of community governance is a historical process affected by many environmental and subjective factors just like the development of community itself. In urban area, traditional community governance mostly appears to be a centralized structure which leads to a vertical and close structure. Local authorities usually are lower-level governments and related organizations like sub-district administrative office or urban residential committees take the lead of the public affairs of a community. The governance appears to be an administrative style. The participation of community residents and other relevant parties tends to be an asymmetric structure in the traditional governance. As urban residents are seldom connected by ties of blood, the trust mechanism and communication mechanism become a critical factor. As interests and appeals are diversified among residents and organizations, and also with the public affairs become heavier and more specialized, traditional governance tends to more and more rely on the authority center. This traditional arrangement has been determined and restricted by its environmental elements until the change of environmental elements push a different demand and provide more governance instruments especially technological ones.

**The Constitutions of Blockchain Based Community Governance**

There are several fundamental subsystems in the community governance system which operates in their own laws separately and interact on each other on this basis. A block-chain based community governance reflect a new balancing state determined by all these subsystems with integration of the technology.

**The Technology Platform**

A lot of technological instruments has been applied to enhance the governance of urban community in recent years especially with the rapid progress of information technology. Technological platform provides different options to improve the process of governance. Urban community often has a large population, and also has more complicated public affairs and public issues. The core parts of technological platform are network-based distributed computing system and decentralized database system or ledger system. Based on blockchain technology, distributed computing will constitute a powerful technological platform for public information to collect, share and exchange, and also provide a platform for different applications in specific scene. So the technological platform based on Ethereum could include various applications system such as communication system or social network, community election or voting system, coordinating governance system, decision-making system, public policy system, emergency response system, public affairs hearing system, or Identity Authentication system, risk control system etc. Any community affairs like public medical, public education, policy process, and feedback could be benefit from this platform. These systems could be build and improved by distributed computing, trusted computing.

**The Power Distribution System**

Power distribution structure belongs to the political arrangements. Power is the core element of any organization which determines the relationship structure between any organizational members. In the field of community governance, public power structure determines who could make public policies or decisions, who could have access to the communal resources, who could give influents to other parts. The pattern of power distribution has been determined by the institution arrangements. And factors of economic base and technology serve as fundamental elements.

Power has a strong interaction with technological system. Different technological platform accommodates different power distribution pattern. The innovation of technology will promote the re-building of community power structure. Traditional community governance was based on pyramid structure as the local governments function as the core part of the governance system on the top layer. With the distributed computing, a flatter and decentralized community power structure has been more and more implemented in practice because vertical-intensified structure shows inadaptability with the
new technological platform. The theories and practices of Diversified governance, Holistic governance, and Polycentric Governance are the reflection of changing of power distribution pattern. A decentralized autonomous community governance structure is more likely to implemented with the technological support of blockchain system and also it adapts to the philosophy of blockchain technology.

The Interaction System of Participants

The subjective bodies in the community governance system include all parties who are interest relevant in the governance process of the community. The local communal authorities or local governments, the community residents, the enterprises in the community, are the traditional active participant. And many NGOs, autonomous organizations of residents, the technological supporting enterprises or experts are more and more involved in the governance system. The interaction structure will illustrate what role a specific participant would play, what responsibility and function they take, the motivation and the strategy of their behavior. As community affairs are public sector, the interactive relation between all parties includes collaboration, trust, consensus and even conflict activities in this public sector. The interaction system has been deeply influence by the power structure and the technological layer.

The Participation Channels for Stakeholders

All the related parties should exert their different influents through different channels. These channel leads to the power system, the governance procedure and information database etc. of a community. Blockchain technology could provide different technological instruments to improve the participation channels. The distributed database system could be a basic public resources for the parties to apply in their public participation activities, and more importantly the distributed database system itself could be a fundamental and critical channel in the governance system. By an open and participatory ledger system, the database system could encourage all different nodes to participate by providing a more transparent and credible environment. And only by an open database system, other participation channels could be built on easily such as voting channels, policy-making channels, interest expression channels, hearing channels. And different technological solutions could be provided for different channels.

The Information Flow and Policy Flow

In a static governance structure, flows are dynamic and active. The web of various dynamic flows reflects the interactive structure of all the participants in the community governance system. They are the preconditions and also the intermediaries between all the governance participants. In an open ledger system, the collection, storage, modification and exchange of information make every individual node or participant takes accountability for each other. When information has been not possessed and conducted by the authorities or experts, information flows could integrate the whole community. Policy flow originates from the public issues or needs, the raise of problems, the creation of agenda, the selection of program, the implementation of policy, the feedback of program, and the adjustment of program etc. constitute a complicated web of policy flow. And also policy flow will be restructured by the open and trustworthy system. With the improvement of the governance system, the augment of the information flow and policy flow will occur, which would enhance the efficiency of the governance system. On the other hand, it will inevitably increase the stress for the governance system especially for a closed or semi-close system. Not all the public issues or concerns could be brought into agenda or procedures for the lack of resources or abilities to cope with them. Traditional governance system tends to simplify or restrict the flows to maintain the order of system at the cost of ability and efficiency of governance system, or the enthusiasm of individual participant. And lastly the two kinds of flow can accompany with each other and feed on themselves.
The Structural Characteristics of Blockchain Based Community Governance

A Flatten Model in Governance Structure

The traditional community governance has been based on a vertical pyramid structure. On the top level, the community authorities take the role as the center of the community governance system. It is the center of information and public policies. It collects the information, store in the public database, establish agenda and give feedback of policies. It takes the responsibility of organizing all the participants in local community and governance of the local affairs by the process of public policies. By decentralized and distributed underlying technology arrangement, every node takes its own accountability and rely more and more on other node instead of administrative center which would leads to a peer network structure. The whole structure of the governance system will change.

Self-Governance in Interaction Structure

Self-governance means the governance system should be organized by itself. Governance structure primarily rely on the power distribution system. Self-governance could not achieve in a traditional model without the active and effective participation of all peer nodes in a community. So the change of power distribution occurs when the influence has to be shared by all peer stakeholders. Once power distribution structure become symmetric, all participants are involved in the governance system voluntarily. The operation of self-governance relies on an environment of open system, diversified participation channels, shared information resources, accountability of participants, common values etc. However, power system operates independent relatively. A certain kind of power structure operates in a certain technological or social environment, but adoption or implementation of a certain kind of technological arrangement have to be determined by the institutional arrangement. The community power system evolves only when every participant evolves. Technology could be critical contributing factor when it actually changes every aspect of community.

An Integrated Foundation of Institution

Institutional arrangement means a kind of social structure which could be implemented to regulate the behaviors of every member of the society. Blockchain system has provided an experienced worldwide distributed coordination practice in the financial field and other more fields. The core elements of distributed coordination are common responsibilities, consensus, trust and stimulation. Distributed coordination mechanism itself relies on a set of institutional arrangement. A system of protocols or codes constitutes institutional arrangement in technological layer. The whole institutional arrangement of community governance must be bearing social attributes which should be far beyond technological layer. And the customs and manners in cultural layer, the laws and regulations in legal layer, the rights and obligations in political layer, the agendas and procedures administrative layer constitute an integrated institutional arrangement which not only determines the governance structure but also determines the governance of blockchain system. However, the practice of blockchain has change the political, cultural, legal environments of the world gradually as we could observe in recent years. On the one hand, the innovation of technology evolves distinctive kind of governance institution, and on the other hand technology contributes to create a different kind of institution arrangement in governance as its revolutionary power.

Summary

With the maturity of blockchain system in financial field and more exploratory efforts in other social fields, the practice and philosophy of community governance have been influenced deeply. And the change occurs in political, economic, and cultural fields simultaneously. The operation of community governance system relies on the integration and coadaptation of all subsystems. A stable structure reflects the balance of the interactive arrangements.
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