

Research on Public Participation Model Based on Block-Chain Mode: Taking Sponge City Construction as an Example

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Abstract: Public participation in decision-making and design is a symbol of democracy ^[1]. Public participation provides a more creative and suitable scheme for urban design projects ^[2]. However, with the emergence of some unique plans such as sponge cities and smart city projects, design companies and government could not organize effective public participation with stakeholders, like local people or computer technology companies. Some design companies know little about computer science knowledge and the demands of local people in smart city projects. So this essay would introduce new public participation based on block-chain mode. This model allows task publishers to disassemble tasks and directly releases some professional tasks to specialized technology companies, thereby achieving more efficient project cooperation. Simultaneously, in this model, the urban designer assigns the design task of community reconstruction to the community resident group, and the resident group designs their community. To achieve the goal of maximizing public participation in community reconstruction, and make community reconstruction and urban design more democratic. What's more, this essay would also introduce how to apply it in the sponge city construction project.

Keywords: Public Participation, Block-Chain Mode, Sponge City Construction.

1 INTRODUCTION

The definition of public participation is that citizens could directly participate in the decision-making. Public participation is a complex work and it could provide many benefits for urban design or policy-making ^[3]. The most important benefit is that it could provide more acceptance design schemes for local people. For example, if they could participate in the community renovation project, they could redesign their communities based on their demands. And then they could submit it to the design companies and government.

However, some projects are mainly led by the government and design companies in some countries, the public just participates in the seminar to share their ideas at the end of the project^[2]. So this project would study a new model of public participation based on Block-chain mode for urban design or planning to help stakeholders have better cooperation with urban designers in urban design and planning projects.

2 CASE STUDY

The project occurred in the northern part of New England in 1988. Approximately 1 million acres of forest land were sold in the project. The project has aroused local people's attention to forestry development and use and future use rights. The local people are also worried about the unstable ecological environment and forest economy that the project may cause. Therefore, the government organized relevant departments to investigate it and collected opinions from various states, and set up a committee to take charge of this matter. In the early stage of its work, the council devoted itself to listening to and studying the different concerns, interests, and values of the residents of the area, and emphasized the development of a public participation plan. To better conduct public participation, the board of directors hired two public participation consultants to provide them with procedural suggestions. During the participation process, the council encourages the public to make suggestions and transparently handles their requests, showing the public how the council responds to various proposals. As the project progresses, the committee holds meetings with all stakeholders and collects their opinions ^[4].

This project shows a better public participation case. The committee fully collected public opinions and showed them how the committee handled these public opinions. However, it needs the committee to connect different agencies to meet the demands of the public. This process will consume a lot of workforce and material resources. What's more, when stakeholders ask some professional questions, which committee could not respond. They have to invite experts in this field to answer this question. This essay will study a new participation model, which could connect participation with related agencies and technology companies directly.

3 METHODOLOGY

A block-chain can be thought of as a public ledger in which all committed transactions are stored in a block-chain. This chain grows as new blocks are attached to it. Block-chain technology has some key features such as decentralization, persistence, anonymity, and auditability ^[5]. This essay would simulate a participation model based on block-chain mode.

There are mainly two important parts of this model. The first one is participation levels division. One project may have several participation levels. Every level has specific participation groups. The second part is the decentralization of tasks and powers. The model decomposes the project tasks. The higher-level groups will directly issue tasks and rights to the next-level group. The next level group will decompose and delegate the tasks. Finally, when the last participating level group completes the task, all tasks will be uploaded to the previous level. The highest-level group, the initial publisher of the project, will summarize and organize all completed tasks and form a complete design plan. According to figure 1, when the government wants to publish a community project, they would distribute the design tasks to the next level of participation, different design companies, to complete community renewal projects in different communities. After receiving a design task, the design company will decompose the design task and send the specific design task to the community committee. After receiving the task from design companies, the community committee divides the public space and private space of the community and distributes the task of updating these spaces to each household. In this project, the households are the last level of the project's participation level, and they renovate and design

the public and private spaces for which they are responsible. During this period, there will be an expert consulting team to provide design and technical guidance. After these households have completed the plan design, they will upload the plan to the community committee. The neighborhood committees upload it to the design company after preliminary integration. The design company finalizes and integrates all the submitted design plans, fine-tune inappropriate plans, and submits the final renovation plan to the government.

This project model changes the urban renewal model centered on the design company and takes stakeholders as the core executors of design tasks. Therefore, stakeholders can directly participate in the design process. However, this model requires high design professionalism and a sense of responsibility for other participating levels except for the design company. Although the design company can organize an expert group to guide its work, it still needs a high level of cooperation from other participation levels to complete the task.

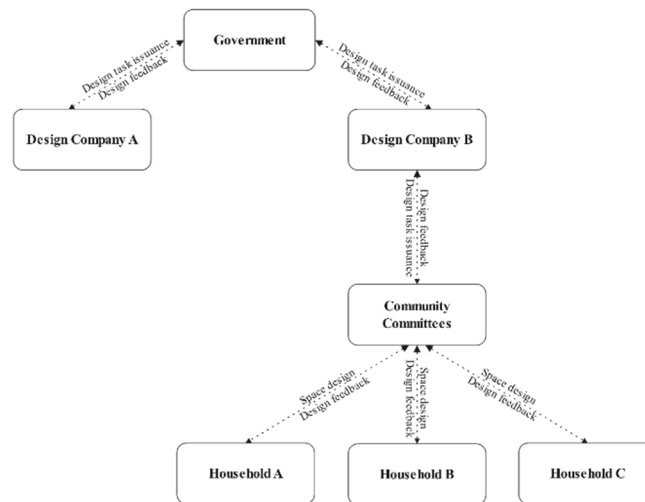


Figure 1: Prediction model based on block-chain mode.

4 APPLICATION

Faced with the impact of climate change on cities, some special plans such as the construction of sponge cities require the participation of the public as well as professionals from different fields to complete [6]. In the traditional project model of some countries, the design company, as the core of the project, is responsible for cooperating with other technical departments to complete the project. However, because some design companies lack knowledge in related fields such as water conservancy engineering, the design plans made by the company are unreasonable. It causes the water conservancy engineering company to be unable to perform construction. This section will introduce how to use this project model to help design companies to cooperate with other technical agencies efficiently.

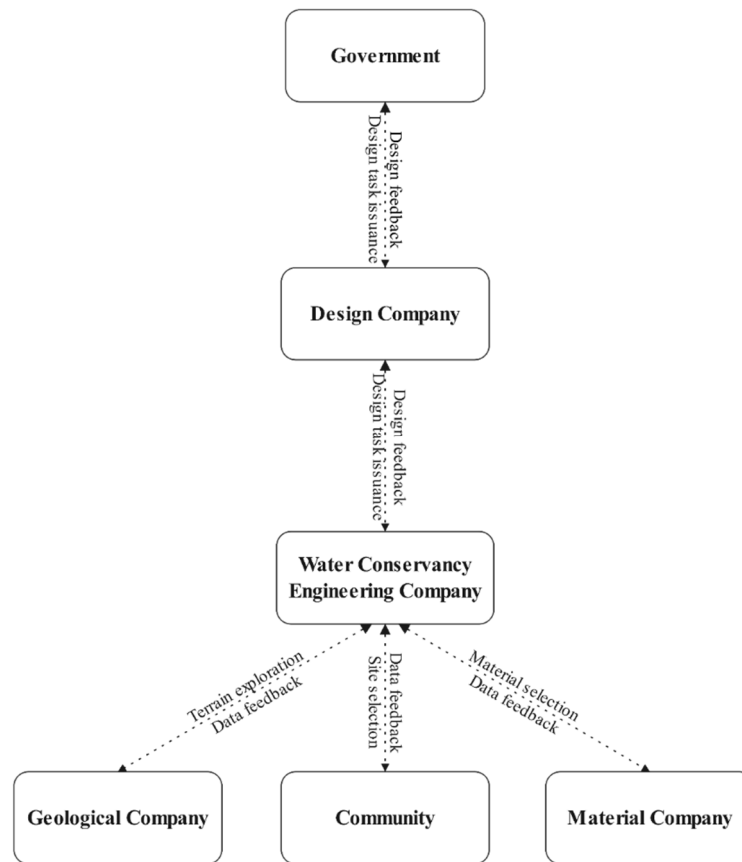


Figure 2: Participation model applies in the sponge city construction.

According to figure 2, when the government publishes a sponge city plan task into a design company. The design company decomposes the construction and planning tasks of the sponge city. The design company would make a detailed description of the design task and delegate the design tasks to the water conservancy engineering company. The water conservancy engineering company is directly responsible for the design. After receiving the design task, the water conservancy engineering company decomposes the task and delegates the particular task to some specialized technical departments. For example, the geological survey task is delegated to the geological company. The site selection task is delegated to the community. The community carries out the construction intention to the residents. After the investigation, the results are reported to the water conservancy engineering company. The water conservancy engineering company sorted out the results and selected the urban areas that need to be focused on sponge city construction. When the water conservancy engineering company completes the design, it uploads the plan to the design company. The design company summarizes and fine-tunes the plan and then submits the final plan to the government.

It can be seen that the project model is different from the traditional planning and design project model in that it directly delegates the design tasks and rights to the relevant technical

departments, and these stakeholders are directly responsible for the relevant design. The design company only serves as a resource organizer and consolidator. This project model can improve the professionalism of the project and is more conducive to project implementation.

5 PROSPECTS AND CHALLENGES

According to figure 3, the advantage of this model is that it could directly assign some tasks to the groups or individuals most suitable for this task. For example, in a smart urban design project, the government could directly allocate the hardware and software design task of the smart city to the computer company and assign the task of urban design to the city design company. This model doesn't need the city design company to connect with the computer company to allocate related services separately. So it saves time and eliminates some misunderstandings in task delivery. Additionally, this model could make the design more democratic. In this model, the urban designer is no longer the designer, but the assigner and coordinator of tasks. Residents and other stakeholders became designers. They can submit their ideas and plans to the design company or the government. The design company and the government integrate and adjust the plan as a whole and output the final plan. Therefore, it effectively improves the public participation part of urban design and eases the conflict between residents and the government.

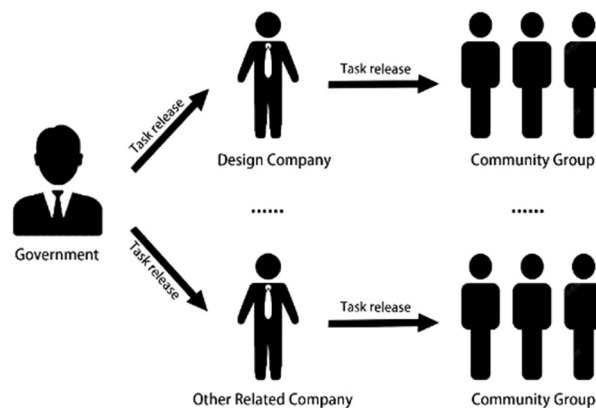


Figure 3: Task allocation model

The challenge of this model is that it needs participants to have a high level of professional knowledge. For example, when community group participants in the design, they should have a basic understanding of design. To solve this problem, it requires the design company to set up some expert groups to go to the community to guide the residents to design and realize the residents' design ideas. Therefore, this model requires a lot of workforces and material resources to achieve the final design.

6 CONCLUSION

In summary, this participation model breaks the traditional urban planning and design model. It invites stakeholders as the main designers and planners for the projects. The design company only serves as a resource summary and technical consultant in this project model. It improves the implementability and acceptability of the project. The more levels of participation are divided, the acceptability of the project plan is higher, but the difficulty of project implementation is also higher.

However, this model still requires these stakeholders to have a high sense of design responsibility and understanding of design. These issues will be improved in future related project research.

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