Assumption of the application of block chain technology in engineering project management

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Abstract. In recent years, along with the rapid development of construction industry, gradually exposed shortcomings existing in the project management process, block chain technology as a new technology, has a decentralized, transparency and traceability, if can block chain technology, introduced in the engineering project management, some existing problems will be improved, such as information back difficulties, poor supervision. Based on this point of view, this paper discusses the application of block chain technology in engineering project management.

1. Introduction
In recent years, China's construction industry has developed rapidly and become an important part of China's market economy. Blockchain technology, as a universal technology, has broad application prospects in finance, science and technology. Introducing the emerging block chain technology into the traditional construction industry will solve some of the problems existing in the project management, such as the incomplete supervision system and the low safety awareness, and promote the more efficient development of the construction industry. Other paragraphs are indented.

In 2008, a scholar named Satoshi Nakamoto published a paper entitled "bitcoin: a peer-to-peer e-cash system", proposing the idea of blockchain as a technology to support digital currency, marking the origin of blockchain technology. [1]. It has five characteristics, such as decentralization, trustlessness, openness, traceability, safety and reliability. Blockchain, in its broad sense, is a brand new multicentric foundation and distributed computing paradigm that uses cryptographic chain-like block structure to store and verify data, uses distributed consensus algorithm to add and update data, and uses codes running on the blockchain to guarantee the automatic and mandatory execution of business logic.

2. The existing problem in project management

2.1. Low safety awareness
Engineering projects need to consider many aspects in the construction process, many construction projects will set up the project manager and supervision to jointly supervise. However, in most cases, in order to ensure the interests of enterprises, they only pay attention to the efficiency of construction and have little supervision on safety, which leads to many accidents [2]. Taking the accident of Jing 'an fire in Shanghai as an example, through the investigation of the accident site, it can be seen that the management of the construction site was chaotic and there was obvious behavior of looting work. The
accident was caused by the illegal use of a large number of flammable materials such as nylon nets and polyurethane foam, as well as poor supervision.

2.2. Trouble was blamed for the accident
Each project for the construction of the need after a long period, multi-channel processes, several construction units, design institute and a number of features that when the project quality problems, there is a problem which is difficult to quickly find out procedure, who is responsibility and accountability unit, the subsequent liability need to spend a lot of time, seriously hindered the progress of the project. Taking Anshi Tunnel accident of Yunfeng Expressway in Fengqing County, Lincang City, Yunnan Province as an example, the first reason for the accident is that the parties involved in the construction did not firmly establish the concept of safe development and did not really put safety in the first place. Second, the participants are not aware of the safety risks of construction projects under complex geological conditions, especially the risk of water and mud gushing. Third, the investigation and design, construction, supervision and other links of the risk control is not in place. Fourth, the construction unit does not pay enough attention to emergency drills and safety training and education for construction personnel. Fifth, the functional departments of industry safety supervision is not enough. An accident, involving various units, the interweaving of all sides makes it difficult for us to quickly find the cause of the accident.

2.3. The credit mechanism is not perfect
Due to the urgent need to improve the credit mechanism of the construction market, in the process of project construction, there are also a lot of companies, in pursuit of interests, desperate, do some illegal activities, such as license, borrowing other people's qualifications to contract projects; After the successful bidding of the project, he subcontracts the project to other construction companies for the sake of high profits without considering the qualification of the contracting company. There are also some construction units will be in arrears of payment, not timely payment of wages, which have brought great challenges to our project management.

3. The advantages of block chain technology in the application of project management

3.1. Information transparency
At the present stage, the mode of China's construction industry is that the general contracting company conducts bidding, and the general contracting company is responsible for the owner. After the bidding is successful, the large project is divided into various units and given to the contracting company below, and the contract is signed by the general contractor and the subcontractor. This can make our construction cost to get the maximum control, however, in the process of layer by layer, because the management level is too many, easy to appear the phenomenon of ineffective supervision. For example, false accounts, substandard qualifications and other phenomena.

Blockchain has the characteristics of decentralization and openness and transparency, which indicates that in the blockchain technology, the data of all nodes are transparent. Within a certain reliable range, the steps of each project are open and transparent, and every node of the blockchain can be made public. As a member of the block chain, the owner can check the progress of each project at any time, and will not be limited to the general contractor as before, and his participation in the project construction process will be greatly enhanced. At the same time, due to the openness and transparency of the construction project information, every step in the construction process will be recorded and queriable, which can avoid illegal subcontracting, contract defaulting on the project payment, construction units jerry-built and other behaviors to the greatest extent. As shown in Figure 1 [3] below:
3.2. The information is traceable and immutable
Blockchain technology has information traceability. The blockchain can provide a complete information flow, and the nodes on the blockchain can trace the records that need to be traced according to the transaction time stamp, transaction content and transaction order [4]. When there is an accident in the construction project, we can trace it through the time line or project classification to find out the cause of the accident more conveniently and quickly.

At the same time, each unit can only modify the data on its own node, and can only query and record the data of other nodes. Therefore, both the project leader and the budget estimator need to take responsibility for the data they upload, and it is a lifelong system, which fundamentally solves the technical problems, and can also eliminate the fluke mentality of some people forging data, and solve the problem to a certain extent Corruption in project management [5].

3.3. Promoting regional coordination
Based on the blockchain distributed ledger technology, we can establish an information sharing system. Encourage the construction, design, suppliers to exchange information, cooperation and win-win. On the premise of not disclosing the design secrets and the owner's privacy, both parties can discuss and compare the construction quality, construction progress and cost [6]. In this way, all parties can quickly retrieve the information they need. At the same time, in case of unqualified quality or lack of integrity, it will also be recorded. The information recorded in the blockchain technology can be used as an important reference data in the bidding process, and also can improve the construction unit's awareness of construction quality and safety protection to a certain extent. As shown in Figure 2 [7]
4. Challenges of introducing blockchain technology in project management

4.1. Lack of instance support
The application of blockchain technology in engineering project management was first proposed by Wang [8] in 2017. The prospect of applying blockchain technology in the field of construction management was put forward, and a program example of intelligent contract and schematic diagram of blockchain network were provided. In 2019, Zheng [9] stressed the urgency of applying blockchain to energy network. But there is no specific application program. At present, the research on blockchain application mostly focuses on the application concept, the specific practical effect is unknown, the lack of actual data, and the lack of basis for promotion.

4.2. Lack of professional talents
Since the blockchain technology was put forward in the 1970s, although the development speed is very fast, its development direction is mostly in the economic field, and the research in the direction of engineering project management has gradually increased in recent years. Research time is too short, leading to the research direction of professionals are not many, low level of specialization.

At the same time, the age of modern management is mostly 40-50, the level of specialization is low, the knowledge update is fast, and their acceptance of new knowledge is not high. If blockchain technology is introduced into the construction of engineering projects, managers may not be able to adapt because of their low degree of specialization, which will lead to the decline of management level.

4.3. High technology cost
The application of a new technology will be accompanied by the research and development of a new system. As the practical application scheme is still under study, if enterprises want to use blockchain technology to strengthen our project management, they will invest a lot of money in the research and development and maintenance of the system based on blockchain technology, which is contrary to the enterprise's goal of pursuing profits.

5. Conclusion
With the progress of the times, information technology comes into being and is widely used in various industries, so is the construction industry. The application of blockchain technology to project management should be the main direction of our future project management research. Its decentralization, traceability, non tampering and coordination will play a huge role in project management. However, in the current situation, due to the incomplete technical concept, the lack of actual project case support and enterprise profit reduction and other factors, the implementation of
blockchain technology is still difficult. How to improve the current concept, to create a blockchain technology and project management project is the direction of our future research.

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