

# Research on the Application of Block-chain Technology in Transnational Financing Mechanism based on Belt and Road Initiative

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**Abstract**—In recent years, the Belt and Road Initiative has provided a good platform for countries along the route to achieve win-win benefits, but there are still some weaknesses in financing. This paper tries to solve the problems in the financing of various countries under the Belt and Road Initiative background, make up for the shortages, guide the capital flow to the corresponding field and achieve the common development of all countries. With block-chain technology as the technical support, we try to construct a transnational financing project platform, credit information database, risk identification system, payment and settlement system to realize the integrity of transnational financing information, high efficiency, low risk and convenient payment. This paper discusses the feasibility of application of block-chain technology in corresponding solutions and provides practical suggestions for accelerating the financing development of various countries and solving the problem of financing difficulties.

**Keywords**—*Block-chain technology; Belt and Road; International financing; Platform*

## I. INTRODUCTION

19th CPC National Congress pointed out that since reform and opening up, China has persisted in promoting development and increasingly entered the world stage. As an important measure of China's opening up to the outside world and the top-level design of economic diplomacy, the construction of "Belt and Road", which focuses on Asia, Europe and Africa, is open to all countries at the same time, advocating policy communication, smooth trade, connectivity of facilities. "Policy communication, smooth trade, connectivity of facilities. The comprehensive and pragmatic cooperation of the main content of the fund financing and the mutual understanding among the people", in which the deepening of the fund financing will help the countries along the route to win together and mutually benefit. It has become an important support for Belt and Road to build a diversified financing model and open diversified financial cooperation platform.

In 2017, Chinese companies added \$14.36 billion investment to 59 countries along Belt and Road. The amount of investment accounted for 12 percent of the total and increase 3.5 percent over the same period last year. Under the background of huge amount of financing, national enterprises along Belt and Road are also faced with many difficulties. The main reasons for restricting financing are as follows:

### A. *Different development environment of the countries along the route*

Belt and Road involves many countries along the route. There are a large variety of differences on currencies, exchange rate risks, political, legal, cultural and others in countries and regions. The degree of transparency of government supervision, policy implementation are inconsistent. The various institutional standards and other issues have brought great uncertainty to the public sector and private financing institutions among countries [1]. Due to the lack of transparency and multilingualism, external capital is often suspicious when entering projects in countries and requires a great deal of energy and financial resources to understand the investment environment of the host country. Even if well prepared, it is difficult to avoid problems after entering. Because of the differences in many aspects, the coordination between countries is very hard, and it is difficult to provide effective guarantee for the investment behavior of external capital through inter-state cooperation. At the same time, Belt and Road's financing projects are mostly large-scale or infrastructure projects with a long return period. These factors will affect the smooth implementation of the financing process. These problems are particularly evident in countries with underdeveloped economies, political instability and imperfect legal systems.

### *B. Especially high geopolitical risk.*

Some countries and regions along The Belt and Road have unique resources and location, political and economic situation are very complex, The international situation, especially the foreign powers, is bound to affect the policies of these countries. Although the countries are improving infrastructure and have a common desire to achieve better development, does not mean there is no interests demand between them, so as to bring uncertainty to the construction of infrastructure in the regions, increase investment risks.

### *C. Different credit level of involved countries and high risk.*

Many countries along Belt and Road have serious fiscal deficits and high risk of default. In reality, infrastructure default rate of countries along Belt and Road is high, some international advisory bodies even listed some countries as high-risk debtors.

In view of the above reasons, we can utilize block-chain technology to try to solve. Block-chain technology, as a popular trust reconstruction system in recent years, has the function of preventing risks and building trust mechanisms. It is of great practical significance to study and apply block-chain technology to promote international financing among countries along the Silk Road.

## II. BLOCK-CHAIN TECHNOLOGY

The block-chain concept, one of bitcoin's underlying support technologies, comes from an article published on November 1, 2008 by Satoshi Na-kamoto, a Japanese-American, entitled "Bitcoin: a Point-to-Point Electronic Cash system". As the basis of bitcoin transaction, block-chain technology is essentially a point-to-point transmission, decentralized distributed ledger. The block-chain breaks away from the constraints of third-party institutions and generates transaction data without warrant, which is organic, and each set of data is generated according to time and arranged in sequence, irreversibly. At the same time, these data are protected by cryptography to ensure that the data can not be tampered with. Block-chain data is maintained by each node, each node can copy a complete database backup information, once any node information changes, all nodes backup information will be updated synchronously. Thus, the decentralized trust consensus mechanism can be implemented to ensure the security and reliability of data. The block-chain technology can play an important role in the verification of information validity under asymmetric information and the construction of trust mechanism between the two sides of the transaction because of the open data, transparent information on the block-chain and the difficulty to tamper with the information once it is generated [2].

The block-chain is currently divided into three categories, public block-chains, consortium block-chains and private block-chains. The public block-chain means that any individual or group in the world can send a transaction, and the transaction can be confirmed effectively by the block-chain, and anyone can participate in its consensus process.

The public block-chain is the earliest block-chain and the most widely used block-chain at present. The virtual digital

currency of each bitcoins series is based on the public block-chain. There is only one block-chain corresponding to this currency in the world.

Consortium block-chain: multiple pre-selected nodes are designated as bookkeepers within a group, and the generation of each block is decided by all pre-selected nodes, other access nodes can participate in transactions, but no one else can do a restricted query via the block-chain open API without asking for the accounting process.

Private block-chain: only using block-chain general ledger technology to account, main body can be a company, can also be an individual, exclusive access to the block-chain, this chain and other distributed storage scheme is not that different. [3]

At present, block-chain technology has been applied in the financial field to improve the efficiency of bank settlement and payment, reduce the cost of cross-border payment, etc. Its application prospects also include judicial, medical, logistics and other aspects. At present, the application of block-chain technology is mining in depth.

## III. APPLICATION OF BLOCK-CHAIN TECHNOLOGY

In 2017, the Hong Kong bond market made new strides in the area of "Belt and Road" state sovereign and policy-related financial bonds, providing a new reference for related projects in the future. At present, Belt and Road's financing demand is exuberant, and there is still a gap in supply. Increasing and accelerating effective financing has become a common problem for the countries along the route. China, as the main advocate and initiator of Belt and Road, should bear certain responsibilities. Faced with the problem of financing, we can give full play to the advantages of regional chain technology. In order to solve the financing problem, this paper analyzes the reasons for the difficulty of financing in the countries along Belt and Road, combines the characteristics and advantages of block-chain technology, and explores the realization of technology application from the following aspects.

### *A. Constructing financing project information platform to realize the openness, timeliness and effectiveness of financing project information*

First of all, the financing needs of the countries along Belt and Road mainly focus on such large-scale projects as infrastructure construction, which has the characteristics of long investment cycle, high risk, long return period, and huge capital demand. Due to the unbalanced economic development of the countries and the different development conditions of enterprises in various countries, China, as a huge economic scale, has become the main force for investment, however, at present China is in a state of economic decline. To reduce the risk of financing, promote the diversified development of financing and let more countries participate have become the main point. For "Belt and Road" financing projects, the funds that can be utilized mainly include the financial resources within the countries along the route, the financial resources exchange between the countries along the route and the international financial resources. Among them, the financing and international financial resources between the countries along the route occupy a large part, so it is most important to realize the construction of the capital base by strengthening the

mutual communication and integration of the financial resources. Block-chain technology has the advantages of transparency of information and timeliness of information in the area of financing. The establishment of an international online virtual financing project system and a financing project information platform can effectively provide an open and transparent platform and a highly transparent and reliable environment for enterprises from all over the world. To provide effective, immediate and sufficient information on financing projects for banks or private financing institutions of all countries, to realize effective communication between enterprises and financing institutions, and to provide assistance for more financing realization.

#### *B. Constructing multinational credit database to improve credit system efficiency*

With a wide geographical distribution, there are a large number of countries along Belt and Road. Due to the differences of national culture, politics, religious beliefs and other issues, there are certain political conflicts among some of countries, and the level of cooperation between various countries and regions is still not deep. At the same time, there is a lack of historical experience in international cooperation in projects. There is a lack of trust between each other. After strategy of Belt and Road was put forward, countries have deepened their exchanges and cooperation with each other, have more opportunities and space for mutual benefit and win-win cooperation. Relevant institutions in the countries along the route have established special marketing departments for Belt and Road's business. But in various departments and institutions, there are no credit risk sharing and centralized management of relevant laws and regulations, business environment, salesman experience and risk information, etc. In the process of credit collection, we need to separate the information of the cooperation agencies, and there are many processes and multiple audits. It is vulnerability to incomplete Credit Information, not timely data and so on. This kind of cross-border information system is inefficient and has a high coordination cost. The research on the centralization of the cross border credit system needs to be put on the agenda, and the block-chain technology can provide effective technical support for this platform [4]. By taking the relevant information data of the block-chain, constructing multinational credit database, it can complete the credit collection and establish a unified information service platform. The block-chain can realize the integrity and untamperability of the information and guarantee the credit information. The effectiveness of the system, and the unified trust platform can effectively integrate the information of the enterprises in various countries, prevent forgery and tampering, reduce the cost of credit and improve the efficiency, so as to promote the improvement of the financing efficiency.

#### *C. Identifying financing risk effectively*

Under Belt and Road, financing faces many risks, such as interest rate risk, exchange rate risk, political risk and so on. In the process of the project, any changes, such as a change of government, a great rise or fall in the exchange rate, intervention by other countries, public protests, religious movements, etc, will lead to the stagnation or even termination of the project, exposure of risks causes serious losses to enterprises, financial institutions and state interests [5].

Block-chain technology can be used in the construction of financing project risk detection and control and other aspects. Regional chain technology has the characteristics of transparency, information can not be tampered with, information integrity, timeliness and so on. The region block combines the data structure in the form of chain according to the time order, which can realize the effective integration of the financing fund transaction information, prevent the financing transaction data from tampering, and ensure the security and reliability of the data. Financing related data records can be transferred to the regional chain to enable the implementation of in-platform projects Information can not be tampered with the authenticity of information. At the same time, each node of the regional chain system does not need to be publicly identified. The person who holds the private key can control the transaction, and the technology of regional chain can be private in the process of financing. Area chain technology can realize data backup, and can synchronize real-time update through network and platform. The change of information can be traced back. This ensures that the finance-related transactions are complete, true, complete, and true information can more fully respond to the changes in financing projects, making the risk more manageable.

#### *D. Realizing convenient international payment and settlement*

In the past, the traditional way of transnational settlement is: collection, exchange and consignment collection. All three require banking services. International traditional payment and settlement through intermediary transactions, the bank, counterparty, central bank, foreign banks. In the process, each organization has its own accounting system, and each needs to establish an agency relationship and a credit line; each transaction needs to be recorded in its own bank, and it has to be cleared and reconciled with counterparties, etc. Transactions is low in efficiency and cost high. Differences in language and exchange rates increase the risk of payment. The involvement of a large number of human resources increases the risk of information. SWIFT CODE, which is dependent on banks, has been exposed to frequent attacks in recent years [6].

In contrast, block-chain systems are characterized by high security, privacy protection and high redundant storage in settlement. Block-chain system is composed of a large number of nodes, there is no centralized hardware or management mechanism, and the damage or loss of any node will not affect the operation of the whole system. The block-chain has a time stamp, which is verified and recorded by multiple nodes at the same time. Each participating node can obtain a copy of the complete database. Once the information is validated and added to the block-chain, it is permanently stored, and unless

more than 51% of the nodes in the system can be controlled at the same time, tampering and forgery is almost impossible. In addition, there is no need for public identity between nodes. Only those who have the private key can open their wallets and protect the privacy of the transactional parties. Therefore, block-chain technology has great application value in Belt and Road transnational payment and settlement field, which can provide convenience for international financing.

#### IV. CONCLUSIONS AND SUGGESTIONS

In the context of the Internet, with the the advantages of centralization, safety and reliability, block-chain technology has gradually attracted the attention of scholars in various fields. Based on the discussion above on the application of block-chain technology to inter-state financing of Belt and Road, it is essentially a mathematical solution to build trust mechanism of trading parties. At present, it is not mature in application and faces a lot of challenges [7]. Block-chain technology can play an important role in realizing the disclosure, timeliness and efficiency of financing project information, improving the efficiency of credit information system and effectively identifying financial risks. The application of block-chain technology in this field will effectively improve the financing efficiency and reduce the financing cost among the countries along the route, but how to realize the application still needs to be further discussed. In view of the current research on regional chain technology is still in the exploration stage, the implementation of application still needs to overcome some technical problems. At the same time, the countries along Belt and Road still need to solve the problems such as network laying to build relevant platforms and systems based on the block-chain technology, etc. The relevant institutions of each country should carry out the experiment of block-chain technology in relevant fields as soon as possible, and formulate corresponding industry rules to paves the way for the mature application of this technology.

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