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SMART CONTRACT, AS A LOGICAL STEP IN THE DEVELOPMENT OF THE DIGITAL ECONOMY

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Abstract. The article analyzes the evolution of the traditional centralized contract system into a decentralized system in the transition to a digital economy. As a result of the comparative analysis of these systems, the author outlines the advantages of implementing smart contracts using blocking technology in modern business processes.

Keywords: development of the digital economy, blockchain technology, smart contract.

Smart-contract, supported by crypto currency, is an actual information technology on the service market during the transformation to the digital economy. Smart-contract is a computer code which is integrated into crypto-currency's net powered by blockchain technology. Blockchain allows the participants of transaction to work with decentralized distributed database. It enables to make transactions without intermediary and consequently makes the process cheaper. The difference between smart-contract and blockchain is that every transaction in the system not only fixes the flow of funds, but also has a code, which sets the conditions of the transaction. The code can be edited for the client's purposes, what makes smart-contract applicable almost in all spheres. In other words, smart-contract contains not only information about the date, time and conditions of the transaction, but also executes on its own, that means it provides the execution of deal's obligations independently.

The mandatory features of smart-contract are:

1) digital signature based upon the private keys, which are available to all sides of transaction;

2) The existence of the subject of the agreement and instruments for its execution (e.g. bank or crypto-currency accounts for transfer of funds);

3) Clear execution's conditions of the agreement, which is signed by transaction's participants using digital signature;

4) The existence of decentralized private database, which will help to carry out the transaction.

Consequently, smart-contracts work in the following way: participants make an agreement about the transaction and draw up a contract, then the currency and assets are allocated in the database, participants sign the contract with digital signatures and the program starts monitoring the execution of agreement's conditions. As soon as the conditions were met, the client gets the products and the seller gets the money. At present the implementation of smart-contracts is being tested in different fields of activity.

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On automation, contracts can be conditionally divided into three groups:

1) Partially automated contracts: part of the transaction is fixed on paper carriers, another part of the transaction is automated, for example, only payments are automated;

2) Automated contracts: operations are conducted using a computer, but copies of transactions are additionally recorded on paper;

3) Fully automated: the entire transaction is carried out on the computer.

At the moment partial-automated contracts are the most common, for example, taxi services, where automated electronic payments are supported. A promising option is fully automated smart contracts,

but this kind of contracts is only tested. The difficulty lies in the fact that a very large number of participants in transactions must be involved in the program: banks, government bodies, companies, etc. An example of automated smart contracts are popular services for car-sharing: in order to use the services of car-sharing, the user must first enter into an electronic contract with the company that provides the corresponding services, after that the user is provided with a car on the terms agreed in the contract. The entire procedure is carried out electronically, using a mobile application.

Consequently, smart contracts differ from traditional contracts in the speed of the transaction, the absence of intermediaries, cheapness and no need of physical presence of the parties making the transaction. At the present time there is an evolution of the traditional contract system, which is centralized and requires the participation of intermediaries, into a decentralized unmediated system. In our opinion, the most promising sectors for the implementation of smart contracts are international logistics and supply chain management, accounting, financial management and insurance. For example, the scheme for implementing smart contracts in logistics can be presented as follows: the company plans to conclude a transaction for the transportation of goods. For this purpose, the specialized code on one side is tied to the customs base, on the other side to the bank account for which the money for transportation will be received, the system will consider the transaction completed when the cargo is in the possession of the consignee, and the logistics company gets the money for the services provided.

The simultaneous introduction of several information technologies capable of increasing the efficiency of managing international cargo transportation is proposed. The information environment, built on the technologies of blockchain and smart-contracts, which will be available to all participants of the transportation: the sender, the payee, the carrier, the bank, the terminal, the insurance company, controlling bodies, etc. The implementation of the smart-contract technology based on blockchain will create an open database that will allow the logistics company - the client to work without intermediaries. Electronic registration of the trailer, insurance companies, as well as companies involved in the certification of goods will be included. The development of special GPS-sensors that are attached to a transport container provides the company-client with the ability to track the movement of goods in real time, so there is no need for agent compensation. It is provided to logistic intermediaries, informing the company about the stage of the transportation.

As an example, consider the process of international shipping, which can be represented in the traditional contract system in the form of a sequence of 10 steps:

1) The exporter sends a notification to the importer, the notice states that the goods are ready for shipment;

2) The exporter signs an agreement with the owner of the vessel, submitting an application for freight;

3) Upon arrival at the port, the ship's captain notifies the exporter;

4) Next, the exporter starts processing the accompanying documents necessary for transportation;

5) If the order for transportation of cargo is accepted, and the vessel is already in the port, then before the arrival of the cargo in the port it is considered as an idle period;

6) After loading, a copy of the bill of lading is given to the captain of the vessel, he signs it and seals;

7) The exporter is provided with all necessary accompanying documentation;

8) The captain of the vessel gives to the exporter the Manifesto confirming the transfer of the documentation;

9) Upon arrival at the destination, the captain of the ship sends a notification to the importer;

10) Representatives of the importing company arrive at the port to obtain the necessary documentation and the goods to be transported.

Integration of all participants in the chain of custody will help reduce the number of stages of the transportation process, thereby reducing the total time for transportation. Then, the process of international shipping, after the introduction of the smart-contract technology can be described in 5 steps:

1) Using the mobile application, the exporter sends the importer a notification of the readiness of the goods for shipment;

2) Smart-contract automatically enters into an agreement with the owner of the selected vessel and sends an application for freight;

3) The application helps to issue electronic documents for transportation;

4) After registration, the bill of lading is automatically sent to the captain of the ship for the electronic signature;

5) Upon the arrival of the goods at the port, the importer receives a notification, and the transportation fee is automatically transferred to the logistics company.

Thus, the number of steps performed was reduced by 2 times. GPS sensors solved the problem of the ship's idle time, because the application automatically reads out the time for documenting and, in accordance with it, chooses a vessel that will arrive at the port exactly at the time when all the data necessary for transportation will be collected. That is, the client company has information about where the ship is and how long it take it to arrive at the port. Upon arrival at the port, the application automatically sends a notification to the client company. Since the database is distributed, and all participants in the transportation have the same information and the ability to track all procedures in real time, there is no need to notify participants about the stage of the transportation. The application automatically notifies the participants and sends them all the documents necessary for transportation and signing. Integration into the chain of custody of all participants of transportation will help to reduce the number of stages of the transportation process, thereby reducing the total time for transportation.

Therefore, there are several advantages of implementing smart-contracts:

1) Conclusion of deals without intermediaries;

2) Saving money;

3) Saving time;

4) Optimization of business processes of a particular enterprise, due to reduction of paper work;

5) Openness and transparency of transactions;

6) Decentralization of the system and equitable ownership of information;

7) High level of security of transactions;

8) Accuracy - due to automation, the probability of errors related to the human factor is reduced.

Thus, with a massive introduction of smart-contract technology, in conditions of competition, tariffs for freight traffic should significantly decrease, which in turn will have a positive impact on the pricing of many products.

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