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SMART CONTRACT AS AN INNOVATIVE TECHNOLOGY FOR MANAGING RELATIONSHIPS WITH CONSUMERS OF LOGISTICS SERVICES

Smart contracts in economic relations of entities act as elements of the management system that automatically control production, service, financial and information flows of movement of material and intangible assets arising in the operational activities of logistics companies. The involvement of smart contracts in the regulation of economic relations of businesses is today a popular innovation in practice-oriented contracting, algorithmically developing and complementing the theoretical and methodological principles of managing logistics systems. The focus on proven solutions is due to the increased level of maturity of existing logistics technologies, the adaptation of which to digital Industry 4.0 [1] and smart contracts can be carried out with minimal financial costs and market risks. From the standpoint of management theory, smart contracts formalize the boundaries of logistics business processes and ensure that in each transport and warehouse chain the company fulfils the identifiable terms of the digital contract attached to the full life cycle of the product or to its individual stages. The essence of the smart contract is tied to blockchain technology. It can be used as a real contract for concluding agreements between logistics companies and consumers when selling products or providing services in the era of digital transformation [2–4].

The main advantage of smart contracts is the exclusion of intermediaries, such as lawyers or representatives of legal entities, from the negotiation process. Contract parties can personally create smart contracts that will be automatically executed when pre-set conditions are met. This allows counterparties to significantly save time and money when making transactions, whether it is renting apartments, exchanging currency, registering cars or even holding presidential elections. There are many areas where smart contracts are used, and many companies are already actively using this innovation. For example, Slock.it provides its users with the ability to automate sharing, payments and rent using smart contracts. Fizzy AXA is implementing blockchain technology to automate flight insurance compensation processes. Populous facilitates the process of buying and selling unpaid invoices using smart contracts. In addition, smart contracts are a key element of decentralized exchanges (DEX) such as Uniswap, SushiSwap, PancakeSwap and others.

A smart contract is built on two key concepts – logical templates and blockchain technology. Blockchain ensures the execution of smart contracts and guarantees their fairness for all parties. This means that the parties to the contract can be sure that the agreement is executed according to pre-established rules, and no one can change them or remove them from the system. Logical templates are represented by statements in the style of “if/when...then...”. These statements describe the conditions under which contracts are executed. For example, if the buyer confirms on the receipt that the goods have been delivered, the smart contract automatically transfers money to the seller.

Smart contracts can include simple statements or complex systems of conditions that are necessary to satisfy both parties to the contract. In this regard, both parties to the contract must actively participate in the creation of a smart contract. They must agree on the rules governing the transaction, carefully consider all possible exceptions, and develop dispute resolution mechanisms.

Let’s look at five steps that contract participants must take to successfully implement smart contracts:

1) *Creation* (the user or developer creates a smart contract, defining its terms and execution logic);

2) *Placing on the blockchain* (after writing the smart contract code, it is placed on the blockchain. This is done by creating a transaction that embeds the contract code into the blockchain. The contract receives its own unique address by which it can be called and interacted with);

3) *Event trigger* (smart contracts can be activated by various triggers, such as receiving a certain amount of cryptocurrency, expiring a time limit, or meeting other established conditions);

4) *Smart contract regulation* (when a smart contract is activated, it automatically executes the predefined conditions);

5) *Blockchain recording and completion* (the execution of a smart contract is recorded in the blockchain as a new block. This confirms the change in the state of the contract and makes it immutable. Participants can check the blockchain entry to ensure that the terms of the agreement are met).

Many logistics companies are currently actively implementing smart contracts and blockchain technology in order to improve the efficiency, security and transparency of their operations. In logistics, for example, smart contracts are used to automate the conclusion of agreements with various suppliers. Blockchain technology, in turn, provides the ability to track the history of specific vehicles, monitor the delivery of goods in real time and find the best routes between the sender and the recipient of goods.

Some companies in the supply chain management field are implementing smart contracts to effectively resolve issues with suppliers and manufacturers. Blockchain technology greatly simplifies tracking the flow of goods from their source to store shelves, providing transparency in the processes. In addition, smart contracts allow for the automation of routine operations related to payment and document management. In addition to automating supply chain processes, smart contracts are particularly in demand among suppliers due to their ability to speed up document-related processes. For example, in the context of COVID-19, which led to delays in contract execution and caused many uncertainties, smart contracts played a key role in maintaining the stability of concluded deals, as they allowed additional contracts to be quickly created to meet all new requirements.

Creating a smart contract requires attention and understanding of the specifics of blockchain platforms. The main stages by which you can successfully create a smart contract and implement it in the blockchain ecosystem are: choosing a blockchain platform; defining the purpose of the contract; defining a programming language; choosing a development environment; writing the smart contract code; testing; deploying on the blockchain; monitoring and maintenance. Some of the key benefits that companies can gain from using smart contracts include the following:

1) *Economic benefit* (with smart contracts, companies save on notary procedures, because intermediaries are excluded from concluding a contract. In addition, smart contracts automate many manual processes, significantly reducing operating costs);

2) *Time saving* (using smart contracts, companies save their time on numerous paperwork associated with concluding all agreements);

3) *Autonomy* (smart contracts are executed automatically and do not require confirmation from lawyers and notaries);

4) *Backup capability* (blockchain technology ensures that each smart contract is available to all participants in the system. Thus, it is almost impossible to lose a contract or its data, as they are duplicated many times, ensuring reliable and long-term storage of information);

5) *Security* (once a smart contract is approved, it becomes impossible to change its structure, as it is strictly defined by the features of the blockchain. This means that when changes are made to the data of the blockchain blocks by any participant, this data no longer corresponds to the information of other participants);

6) *Accuracy* (smart contracts reduce the likelihood of human errors that may occur during contract preparation. All smart contract terms and conditions are recorded in the blockchain and remain unchanged).

Conclusions. Thus, smart contracts are an innovative technology for managing relationships between a company and consumers based on blockchain. Currently, this technology is widely used in various industries around the world, including logistics and transportation. Many companies turn to the use of smart contracts in their logistics activities, as they simplify the management and processing of documents, contribute to improving the quality and level of service to customers and various stakeholder groups, transforming the customer relationship management system, and also provide reliable data protection and help companies save time on routine operations, which ultimately reduces operating costs.

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