

THE PROSPECTS FOR IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY IN THE HOUSING SECTOR OF THE RUSSIAN FEDERATION

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Annotation: *The research paper contains the implementation analysis of a new technology known as blockchain in the housing sector of the Russian Federation. The novelty of the research is the way of new project introduction that is being discussed by experts of various sectors in Russia. The article has the operating principle of blockchain technology, analysis of its benefits and challenges, its influence on the housing market in Russia.*

Key terms: *blockchain, new technologies, technological modernization, housing sector of the country, e-mortgage.*

I. Introduction

Russia has been investigating blockchain technology for 10 years, but only now in 2018 it is been introduced at governmental level. The new project is expected to be a modern form of housing sector development in the future.

Maintaining the balance between supply and demand in the housing sector requires a number of policy measures, which determine the development of the housing market, namely, conversion of mortgage lending market into electronic format via blockchain.

The important conditions for electronic format development are possibility for client remote identification and introduction of e-mortgage in order to reduce the time for closure of a deal and the costs. In early 2018 Rosreestr¹⁷⁰ is going to start using blockchain system. The system is expected to be a self-sufficient tool of development in state management system, economics and construction.

This technology can be deservedly called a breakthrough in the modern world. However, despite high expectations, there are some contradictions that cause numerous debates.

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II. Operating principle of blockchain

Blockchain is a rules-based continuous coherent chain of blocks (linked list) that contains information. Typically, copies of chains of blocks are stored on numerous different computers, independently of each other [1].

The main operating principle of the technology is the transparency of operations with no chance to change them without authorized access. Information in blocks is unencrypted and it is open, but ‘no change’ state is verified cryptographically through electronic signature element. It ensures the prevention of data theft, fraud, property regulations violation etc.

Blockchain is formed as a continuously growing chain of blocks with records about all the transactions; its volume is increasing as soon as new data received. Transaction is to be confirmed when its format and signature are verified. All blocks make up a chain with information about all operations from database. If one of these blocks fails, it is being automatically replaced by another.

The process of transaction, Image 1 [2].

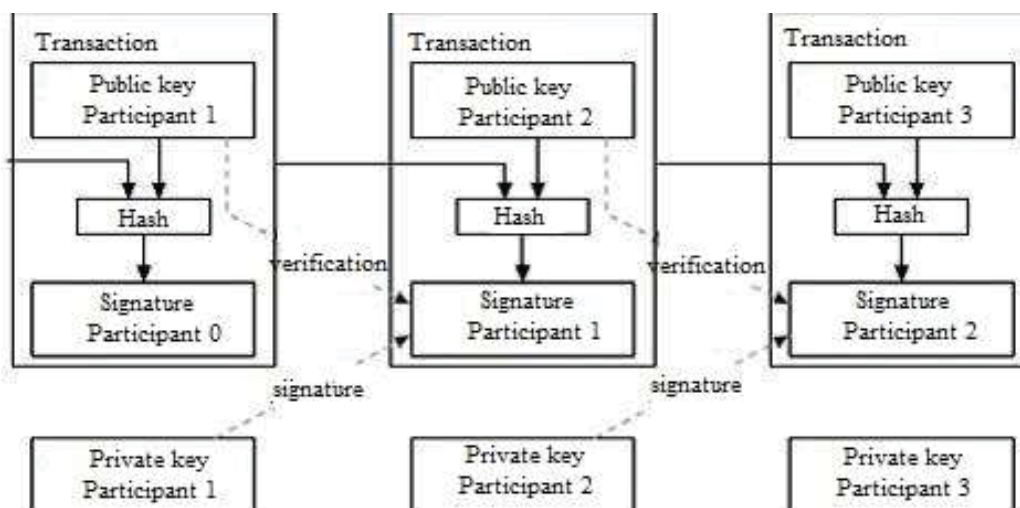


Image 1. Transaction legitimacy confirmation scheme

In order to put data into database, a new participant is required to install new software and then he gets two types of cryptographic keys: the public one– for verification and confirmation of data, the private one– for encryption of transaction.

The next step for the participant is to confirm data files of the previous transaction (hash) and the public key, and put this information at the end of the transaction. Since the data is confirmed, each participant of the network is able to control and verify every chain of transactions.

The experts, who study blockchain technology, bring out the following key features of it:

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- decentralization;
- open data;
- mathematically cryptographical information security;
- prevention of unauthorized data change in database.

According to Melanie Swan, the author of the book *Blockchain Blueprint for a New Economy*, blockchain can be a reliable storage for records of value to society: registers of documents, events, personal data and assets. Each asset in blockchain is encrypted with a unique identifier, which provides monitoring of this asset, its control and exchange, sale or purchase. It means that it is possible to register any types of tangible (e.g. houses, automobiles etc.) and digital assets and perform transactions via blockchain [3].

Thus, new technology can serve as a new means of registration and tracking in government, economic, construction and other sectors in the Russian Federation, and can perform exchange of tangible (property) and intangible (e.g. items of intellectual property, goodwill) assets.

III. Blockchain as a tool for development of the housing sector in the Russian Federation

Blockchain system now is being introduced into mortgage lending segment of the housing sector of Russia. Banking sector will be able to issue applications for mortgages; brokers and originators will be able to conduct automated underwriting of lende's application and all buyers of mortgages at the same time. Thus, the lende immediately receives all the offers, having sent only one application.

The creation of mortgage credit could be made online with the help of *smart contracts* – self-executing commercial contracts in blockchain. All the deals with property will be conducted online, so intermediaries like notary officers, lawyers, brokers, and agencies might no longer be necessary.

The backup process of contracts and signatures of the participants of the deal in blockchain (distributed ledger) already can guaranty a fair deal due to one of the main features: prevention of unauthorized change in database – the data (e.g. property owners, land size or buildings) can only be edited. This promises to solve such issues like documentation fraud, and reduce possible corruption risks.

The database with all real property items, deals, registrations, and property rights are going to be transparent with the access via mobile applications. Every land property or real property will have a blockchain-passport with specifications. It will facilitate the process of collecting of all documents: there will be no need to inquire a fact sheet from the Bureau of Technical Inventory or any other document; property evaluation process will be accelerated.

The development of e-mortgage has been pursued by Russian Association of Cryptocurrencies and Blockchain (RACB). The working group has representatives of major banks and Housing Mortgage Lending Agencies (HMLA); their aim is to elaborate the process of creation of mortgage credit in blockchain system. Besides, they shall solve technological, lawmaking and consulting issues for quicker and more efficient leap of mortgage market to the newest technological concepts. The main challenge for the experts shall be the creation of the system that reduces operating risks for lending banks. The technological solution on a *smart contract* base shall ensure the security of all records from mortgage history and transparency of the chain of lenders and lende's activity [4].

Furthermore, the United Institute of Development in the housing sector, established on the base of HMLA, launched a couple of pilot projects with the blockchain technology. The following data is transferred now to Rosreestr via blockchain system:

- remote identification;
- closure of a deal;
- registration of partnership agreements;
- monitoring of EGRN¹⁷¹ information;
- securitization;
- acquisition of e-mortgage.

Thus, it can be stated that in case of successful implementation of e-mortgage interest rates on mortgage credit can hit the low percentage by means of cost saving and reduction in operational expenses associated with document circulation.

The consistent reduction in interest rates on mortgage credit will allow to enlarge the mortgage market. In terms of real wages increase and steady prices for property it favorably affects the housing affordability of citizens in Russia. Thus, for example, in January 2018 the total number of credits created was 78,000 with total amount of 148.3 bln RUB that is twice as much as it was in February 2017.

In order to confirm it, we would like to give the diagram of weighted average mortgage interest rates of HMLA in January 2014-2018 in Image 2, according to given analytics [5-9].

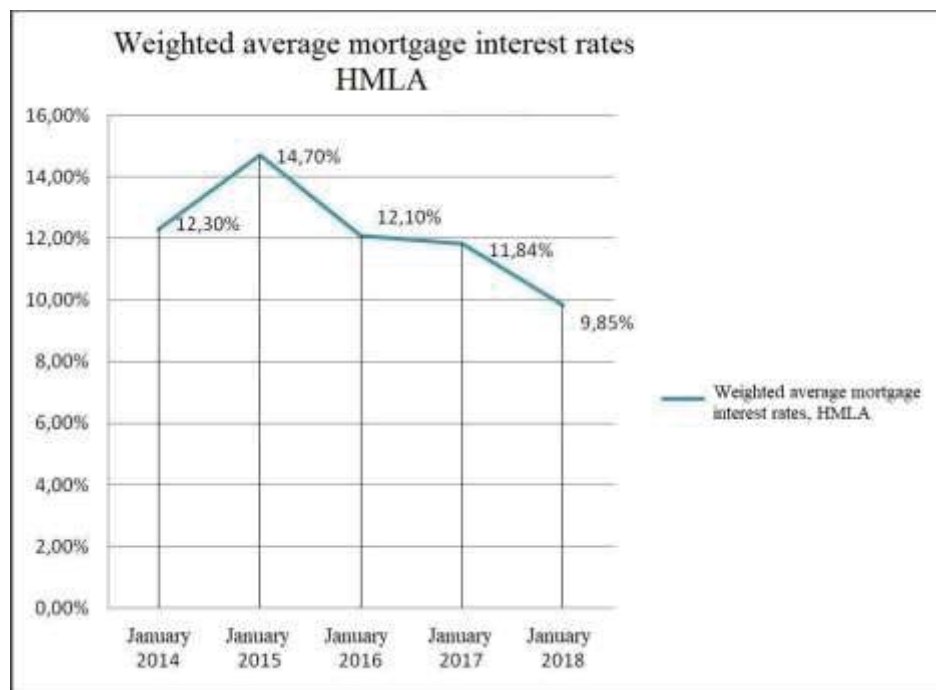


Image 2. Diagram of weighted average mortgage interest rates of HMLA in January 2014-2018

Having analyzed the weighted average mortgage interest rates of HMLA in January 2014-2018, we would like to give the diagram of comparison of mortgage credit creation in January 2014-2018 [10], Image 3.

¹⁷¹ Unified State Register of Taxpayers (the Russian Federation)

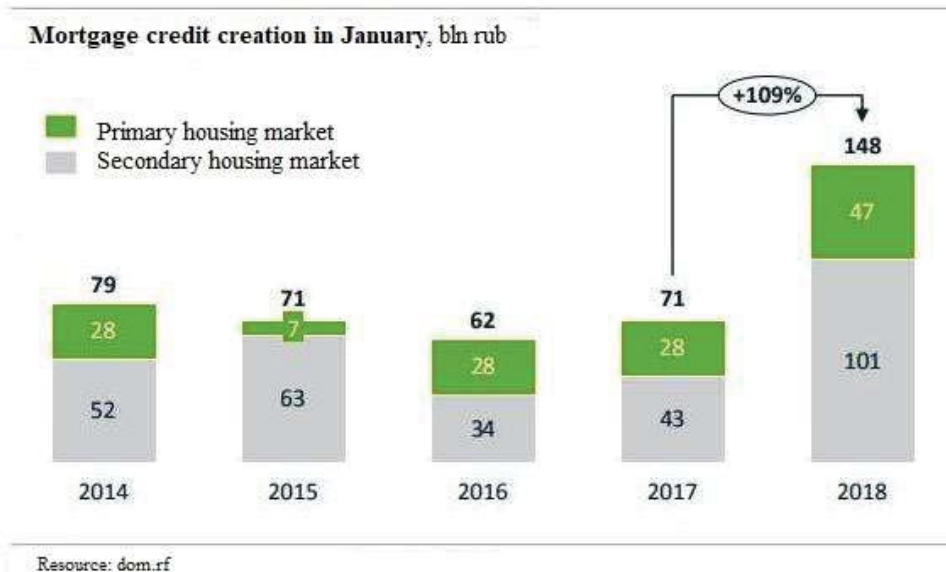


Image 3. Mortgage credits creation in January 2014-2018, bln RUB

Along the clear advantages, the technology has some strong challenges. Firstly, it requires complex technological modernization. Project implementation is divided into three stages: research and development, experimental development and production. The research and development works would take 2-3 months and a group of 3 specialists; at the end the client has the task formalization. It would cost 10,000-90,000 USD, depending on scope. The pilot of *smart contract* system would cost 100,000-500,000 USD for an enterprise, including a group of 6-10 specialists (developers, UI/UX designer, analyst etc.) working for 3-6 months. The developers of open platform for blockchain-auctions *eAuction* have spent on development 30,000 USD [1].

From the very beginning lots of resources are to be required in order to introduce the new system into informational technical sector of Russia. Lack of information on economic viability of the project results in numerous debates upon blockchain introduction.

Expenditures connected with energy consumption also matter. Considerable use of power and combination of factors might result in operational slowdown of blockchain or system malfunction, and it will stop the processes. Emerging issues and prompt response shall be managed by qualified personnel.

The reasons mentioned above do not imply only considerable expenses, but also labor shortage and high pay for specialists, working with blockchain. Understaffing is worldwide. Lack of skilled workers in distributed ledger technology is being experienced by banks, startups, manufacturing companies and state entities.

Without stable legal and technological framework process of conversion will cause financial losses and loss of confidence in promising and efficient tool. Consequently, there should be created such elements like trade floors, registry holders, and e-courts, united in the verification web for each transaction. The participants of the system shall have clear regulations on whom to contact, how to qualify errors, and know how to record the status of contract liabilities, deliveries and settlements.

The highest risk is to suffer loss of confidential data and collapse of system stability. The efficiency of blockchain system security, with the help of cryptographic keys, does not take off the risk for it to be hacked or attacked. Nonetheless, protection and security of data are the most important issues while operating, regardless of what means or how many efforts have been put into development and implementation of the technology.

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In addition, it should be admitted that evaluation of the technology is rather contradictory. On the one hand, some experts reckon that, infrastructure will be simpler with the help of blockchain. Considerable expenses at the beginning can be paid off in a short period of time and balanced out with advantages while operating without intermediaries. On the other hand, some of them assume that the switch to digital economics will cause a lot of difficulties and losses.

IV. Conclusion

Maintaining the balance between supply and demand in the housing segment requires a number of policy measures that determine the development of the housing market.

Cooperated Ministry of Construction, Housing and Utilities of the Russian Federation, Centre of Strategical Developments, and Centre of Macroeconomic Analysis and Short-Term Forecasting, with the results of public opinion surveys conducted by VCIOM¹⁷², they have elaborated the Housing Sector Development Strategy till 2025 (hereinafter – Strategy). The document has a list of major aims of the Strategy, which one of them is “to raise the housing affordability by means of development of mortgage credit market” [12]. It is assumed that the aim can be reached by conversion of housing mortgage credit market into electronic format.

It is necessary to launch a widespread blockchain program with the help of Russian companies and research IT-centers, entrusted with its development and implementation. There are numerous reasons for introduction of this system; it would solve many tasks.

In the first place, blockchain system implies cost minimization associated with large amount of paper records; in the second place, it will result in risk mitigation associated with information loss of paper records; in the third place, it provides reduction of mortgage interest rates with the following acceleration of closing process of deals. Buyers save not only their money, but their time, and, looking forward, it might lead to a Russian ‘housing token’ invention, equivalent of a certificate for apartment purchase or lease.

The widespread launch of blockchain is held back by a number of factors: legal uncertainty, lack of specifications and awareness, knowledge about the technology. In order to adopt and use it as a central registry, it will be indicated to revise or amend some parts of legislation of the Russian Federation. It will take a lot of time and efforts to settle the issues from the both sides – Government and qualified specialists. While developers are in search of new ways of application of the technology, the Government shall prepare its legal support.

¹⁷² Russian Public Opinion Research Center (the Russian Federation)

The analysis of blockchain technology and its adoption into the housing sector of the Russian Federation give reasons to believe that blockchain is highly likely to take the housing construction market on advanced technological level, and require a lot of means and efforts to implement the project without risk and losses.

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