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To cite this article: Evgeny Pankratov *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **869** 062010

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IOP Conf. Series: Materials Science and Engineering **869** (2020) 062010 doi:10.1088/1757-899X/869/6/062010

The blockchain technology in real estate sector: Experience and prospects

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Abstract. Based on the study of existing practice and specific examples of the use of innovative blockchain technology in real estate transactions and its management, the article gives the basic concepts of this technology, analyzes foreign and domestic experience of its application, examines its sphere of use in the real estate market, substantiates main advantages and shortcomings, as well as the process of various mechanisms for financing real estate transactions. It was revealed that when using the blockchain system, all real estate transactions proceed faster, safer and cheaper. Thus, the objectives of the article include studying and summarizing the Russian and foreign practices of using blockchain technology, as well as determining the main ways and options for its further development and improvement, as a highly effective and promising financial and economic mechanism for participants in real estate transactions.

1. Introduction

Real estate activities have always been popular, because intermediary services for the sale of real estate bring a high income. This type of business is perspective, but to increase competitiveness, it is necessary to introduce modern digital innovative technologies, including blockchain technology [1]. Initially, blockchain technology was used as a verification of transactions that occurred in the Bitcoin cryptocurrency. Currently, as a result of the evolution of the development of blockchain technology, it is distinguished three stages in the development of this technology. Blockchain 1.0, like a payment system. These are mainly cryptocurrency transactions that are used in different applications related to financial transactions. Blockchain 2.0 uses smart contracts /clever contracts/ namely, applications in the economics and finance that work with various types of economic tools, such as stocks, bonds and legal titles. Blockchain 3.0 is applications that have gone beyond the scope of financial transactions and extend their effect the fields of government, energy, healthcare, education, real estate and other industries [2].

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2. Literature review

Many scientists, such as Asaul A.N., Grobovoi P.G., Gryaznova A.G., Goremyka V.A., Rahman I.A., Resin V.I. and others, have devoted their researches to real estate transactions and management, as well as to improving the efficiency and regulation of these projects. As for the actual state and prospects for the development of the blockchain technology in real estate sector, there are articles by P. Viniya, V. Grigoriev, V. Dorohov, D. Zimin, M. Keisi, M. Svan, D. Tapskott, E. Tarasenko, D. Shustov and others. Analysis of research by these and other scientists has shown that, the greatest development of blockchain technology is found abroad, which in the real estate sector is a very new financial and economic mechanism, in which all real estate transactions are faster and cheaper. The use of this system makes it possible to eliminate all fraud, get rid of paperwork, switch to electronic transactions, increase their transparency, security, and eliminate the risks of loss of property rights. In Russia the technology of the blockchain in real estate transactions is also increasingly active in its study, development and dissemination.

3. Materials and methods

Materials for this article were the existing foreign and domestic experience in using the innovative blockchain technology in the real estate sector and in the performing many other operations. The information base for studying this problem includes the scientific treatises and literary sources of foreign and domestic scientists (articles, monographs, electronic resources, legal reference system, legal sources, and others) on the usage of the blockchain system in the United States, Sweden, the United Kingdom, the United Arab Emirates, India, Russia and other countries. In the preparation of this article, summarizing the available materials, justifying a number of conclusions and provisions for the development and improvement of the blockchain network, general scientific research methods are used, such as analytical economic and statical methods, methods of complex economic and logical analysis, of system approach, of comparison, of generalization, and others.

4. Results

Areas of use of blockchaihn in the real estate market.

In practice blockchain in real esate used mainly inthere areas: firstly, in registration systems when registering real estate and transactions with them. Secondly, including smart contracts in the blockchain, which are an agreement on the performance of an action without the necessity for trust between the parties; this technology is already used in the implementation of real estate transactions. Such an opportunity appears because a smart contract is a code that is checked and executed automatically. In this case, the blockchain is used as an automatic transfer of property rights, as well as any verification of the legitimacy of the transaction. Thirdly, any real estate transaction can be tokenized, that is, use cryptocurrency to complete the transaction, as payment for services or the received object.

The rationale for the use of blockchain in real estate arises from the advantages of the technology itself, namely high transaction speed, low costs and security. The need for realtors, lawyers and companies to deposit funds is reducing, therefore, fees and payments to intermediaries, as well as the possibility of other people's mistakes are excluded.

5. Discussion

Foreign experience in using blockchain in the real estate market.

About 50 major US financial institutions, in particular large companies such as Barclays and JP Morgan, have pooled their resources to study and further introduce new digital technologies, including blockchain technology, ignoring of which can lead to unpleasant consequences for the welfare and prospects of the financial organizations. Some participants in the financial market even talk about the possibility of abandonment of the bank payment system SWIFT in favor of the new blockchain technology [3]. The American projects ATLANT and Propy are focused on creating blockchain platforms for the sale of real estate using smart contracts. With their help, private and legal entities conclude transactions without intermediaries and guarantors. You can rent real estate without intermediaries on the sites LiquidSpace,

Blandlord, Airbnb, Rentberry or Bee Token. All of them use smart contracts to accompany transactions, "freeze" the guarantee payment and automatically charge monthly payments [4,5].

Processes in blockchain real estate are coordinated using smart contracts that are recorded in the system. As soon as the conditions of the smart contract are fulfilled, they remain valid at any time. They are also visible on the blockchain, so the terms of the smart contract remain transparent. With the help of blockchain technology, it is possible to accelerate the process of transfer and verification of ownership by using smart contracts and the availability of electronic communications with state registration authorities [6].

Even finding a home can be a lot easier. The cadastral registry has a digital identity that includes a list of former owners, encumbrances and cadastral value of flat / house /. If this digital identification is on the blockchain, and there are appropriate smart contracts, real estate transactions will be carried out automatically. Smart contracts not only automate the process of renting real estate, but also provide a smoother and faster process of managing contracts, which speeds up the processes associated with the implementation of transactions. According to the opinion of the participants of the real estate market, blockchain will facilitate the creation, authentication and audit of contracts that can be done in real time, by geographic regions and without the need for a third party. Since smart contracts have rules and instructions developed and included in the transaction, this ensures that payment can only be made if all conditions are met and in a process that complies with all the specified rules. This helps in establishing complete transparency of the exchange process and, therefore, reduces the likelihood of transactional disputes, creating confidence among the parties to the transaction with real estate.

In Dubai the Department of Land Resources of the Emirate may take the title of the first state institution to use blockchain technology in the real estate market. The government of the Emirates is looking positively at developing innovative technology, and using the blockchain to register all new transactions related to land. In 2-3 years, all real estate in Dubai will be fixed in a single decentralized system. The largest developer and world-famous bank Emirates NBD helped to create such a system. Also, government agencies took part in the development, including not only the Department of Land Resources, but also the migration service. In other words, the success of the project was ensured not only because of citizens, but also because of the government of the Emirate was interested in this. In the future, the scale of the use of blockchain technology in the country will only increase. After successful experience in real estate transactions, it is also planned to transfer other public services to the blockchain, as stated by the Prince of Dubai [7].

In 2016, the Swedish Cadastral Chamber began testing a system that registers land ownership rights and records them in a public distribution register. The platform was developed by ChromaWay with the active participation of Svensk Fastighetsförmedling, a real estate search portal, TV provider Telai Sverige, Kairos Future consulting company, local banks and the government. Under the ChromaWay system, the buyer and seller initiate the launch of a smart contract of a certain type, which may include government services, registration authorities, insurers, realtors and banks. They, along with the buyer and seller, can verify the authenticity of title documents and track all stages of the transaction, including payments.

According to a Kairos Future report, the use of blockchain in cadastral operations will save Swedish taxpayers 100 million euros per year and reduce the transfer of ownership of real estate from two months to one week. In addition to Sweden, ChromaWay is testing its developments in Georgia, India, Ukraine and Honduras. Similar projects are being developed by ArabianChain in Dubai, Propy and Ubitquity in the USA, Digital Street in the UK [8]. Smart contracts can also help eliminate real estate fraud. False listings, fraudulent documents and rental fraud will be virtually impossible if digital ownership is directly related to property in the blockchain system.

According to the Internet Crime Complaint Center real estate fraud in the US for the period from 2015 to 2017 increased by 1100%, financial losses - by 2200%. So, only because of the substitution of financial data - bank accounts - during the depositing of funds in sales transactions, Americans lost $ 1 billion in 2017, although in 2016 this figure was at $ 16 million [8]. The rapid growth of fraud is associated with three factors: 1) the high cost of real estate, - 220 thousand dollars on average in the

United States, thich gives motivation to criminals to break the law; 2) by the complexity of transactions, which creates opportunities for fraudsters who fake documents, provide false information about the state of the object, sell it to several people, steal financial data; 3) using the Internet, which creates even more opportunities for the theft of money and personal data, and also allows cybercriminals to operate from any point on the planet where there is access to the network.

In 2015, the iNation and the International Blockchain Real Estate Association (IBREA) teamed up to create a global blockchain-based database of real estate owners and transactions. IBREA believes that the use of blockchain: reduce the risks of fraud to a minimum; reduce costs and accelerate transactions; internationalize markets; increase financial confidentiality. This global project can combine information about all real estate and operations with them into one database, providing all market participants with access to key information in real time.

Using blockchain technology, developers will launch for each new construction a separate ICO with their tokens and sell them in the financial markets. Thereby: the market will become global; the liquidity of real estate investments will increase; the number of potential investors will expand; the investment threshold will decrease. Any person anywhere in the world will be able to invest $ 1,000 or $ 10,000 in construction in Moscow, Paris, Beijing, Saratov, Vladivostok and other cities. Without the need to come to the location of the investment asset, paperwork, expectations and intermediaries. An investor simply buys an object token and sells it after the rate increases, as traders with stocks, gold or currency do in the financial markets.

In 2017, the BitRent startup ICO ended. The mission of the project is to provide everyone with access to real estate investments in the early stages of construction in order to benefit from leasing or selling the constructed property. BRent installs RFID tags on structural details to track the state of architecture and monitor the progress of construction online. BRent also uses the Building Information Model (BIM) in order to simplify the design and evaluation of architectural projects [9]. The combination of blockchain, BIM and RFID will create an investment platform on which:

- there is no minimum investment threshold;
- investors control the construction process;
- special dividends are paid automatically;
- investors control the quality of construction work and materials.

Investing a small amount of money in real estate is also possible on platforms such as NEST, Slice, ATLANT and Propy. Their functionality is generally similar, the only difference is in popularity and listing of objects available for investment. Brokers, owners, tenants, buyers and sellers of real estate, as a rule, use several multi-listing platforms to search for information about an object of interest or the state of the market as a whole. Such platforms have several significant disadvantages: they usually work by subscription; what information to provide and in what format decide platform holders; there is no way to verify the accuracy and reliability of the information; low database update speed.

As a result, the information on such sites is inaccurate, determined, incomplete and has a dubious level of reliability. Therefore, you need to use several multi-listing platforms to compare information from different sources and get the most accurate and reliable information. Such an approach reduces search efficiency and leads to delays in decision making.

If you improve this platform, then it will have the following form. A multi-listing database based on an open decentralized blockchain will provide an opportunity to create a platform where:

- users decide what information to collect;
- there is no need to maintain expensive infrastructure (servers, security, large attendants, etc.);
- you can check the system code;
- it is impossible to fake data.

Thanks to this, market participants will have access to more reliable data at a lower price. As an example of a working draft, we can use the Rex MLS platform, an Ethereum smart contract blockchain platform that provides listing services to search for real estate information: location, legal address, comparable prices and rental rates, ownership history, information about the owner, age of the property and title documents.

Rex MLS rewards third parties - Oracle Professionals - for searching, entering into the system and checking information about real estate and market participants. By verification is meant a comparison of the data entered into the system with the real state of affairs: object evaluation, comparison of the presented data with information from public services and other sources. Settlements for the sale, purchase or rental of real estate are carried out according to one of two schemes - in cash or by bank transfer. In the first case, everyone is risks, as one side can use fake money, and the second can commit robbery. Therefore, cash payments take place in several stages with the involvement of third parties, usually notaries. Bank transactions are less risky, but they are performed more slowly, require additional workflow and are expensive in international operations. In addition, if something goes wrong, the money can only be returned in court. Both options imply an increase in the transaction price by 1-3%, as you need to pay a commission to a notary and / or bank [10].

If the property has a digital certificate of ownership on the blockchain, transactions during the transfer of property rights can take place according to the following algorithm: 1) the parties agree on the price and terms of the transaction, and then prescribe them in a smart contract; 2) a smart contract accepts both values from the participants, checks them and becomes the owner of both money and property rights to real estate; 3) when the authenticity of the values is established, the smart contract transfers the certificate of ownership to the buyer and transfers the money to the seller [11,12]. This is a standard scheme that takes up to 60 minutes depending on the speed of the blockchain. For example, for a Bitcoin blockchain, this is 30 minutes, since it needs confirmation of three blocks (performed according to the above algorithm) in order for the operation to be considered completed.

Another scheme of buying and selling real estate involves the tokenization of the object and the sale of all its tokens to one person, which can be faster and more effective if the object is initially tokenized. For example, if funds for construction were collected in this way. Using such schemes, a lot of time is saved, as without blockchain financial transactions require from 1 to 5 days for internal bank transfers and from 3 to 7 days for international ones. In addition, this saves commission [12,13]. The first blockchain real estate purchase and sale transaction was carried out on the Ripple site in 2017: a buyer from New York bought a house in Kiev (Ukraine) for 60 thousand dollars. This is the most popular platform for concluding real estate purchase and sale transactions.

Another perspective project in this regard is the development of the Dutch bank ABN Amro and it giant IBM. Together they create a system that will accompany real estate transactions through smart contracts, linking all market participants and providing them with the necessary information on the transaction. The project is developed on the basis of Hyperledger [14,15].

To manage property and cash flows when renting real estate, you can use Midasium. CRM and smart contracts of this platform allow you to check documents of title, conduct financial transactions, “freeze” guarantee fees and carry out many other operations. Moreover, relations between counterparties can be made transparent or closed.

Next, the question arises of which cryptocurrencies to accept for payment. Not every person invests in bitcoin and can buy a house for him. Of course, there are exchange markets, and trading on them is open to everyone, but they have too complicated technology for the average person (especially in terms withdrawal of liquidity). You will also have to create a new platform. By the way, it will help in the conversion of currencies, but for this you need to build an exchange service into it. There are other risks, such as the collapse of cryptocurrencies. But the latest news from the cryptocurrency market suggests that the cryptocurrency market is developing, and the blockchain has already entered our lives [16].

Blockchain in the Russian real estate market.

Real estate transactions using cryptocurrency have already been completed in Russia. Apartments for 2 bitcoins and cottages for 3,000 were put up. But they were registered in rubles, since other types of payment have so far been banned.

The Agency for Housing Mortgage Lending of the Russian Federation, together with Rosreestr, have already tested blockchain technology to simplify workflow. The experiment was conducted only with some sites in the Leningrad region, but the further development of the project will become larger if the developers get the results they achieved. The project has been working since the end of 2017. This

suggests that unified software can be launched soon, and then hundreds of times more residential premises will be registered on the blockchain.

Now it is 42 sites, wherearethe the documents are duplicated in paper form [17]. The system combines the activities of Rosreestr, AHML and the fund of interest holders and excludes interference from each of the parties. Blockchain technology works on the principle of confirming the terms of a smart contract. So far, they plan to distribute the network into 6 components, 2 for each competent authority. They will confirm all transactions in cryptocurrency. Further, they plan to attach more developers. VEB is engaged in the development, so it is possible that the bank will also take part in the confirmation of transactions, and the chain will grow.

Blockchain technology can help Russia in the case of expanding sanctions against domestic credit organizations and disconnecting them from the international payment system SWIFT, by switching to a platform created on the basis of the blockchain. In turn, Russian organizations such as Rosreestr, Vnesheconombank (VEB) and the Agency for Housing Mortgage Lending (AHML) plan to introduce blockchain technology. Namely, they want to introduce this system in terms of creating a unified system for registering contracts for participation in shared construction.

Additional difficulties are created by the fact that currently the legislation of Russia does not regulate this technology in any way. Therefore, before introducing and rolling in this technology, it is necessary to create a regulation of issues related to the use of this technology. At the same time, some steps in this direction are already being taken. This can have a positive impact on the planned test "move" of the Unified State System for Real Estate Registration / USRN / to the blockchain.

The main example, promising supporters of the introduction of blockchain technology in Russia, is a joint project of Rosreestr, VEB and AHML, which aims to increase the simplicity and speed of processing mortgage and equity agreements, as well as the registration service in this process. However, for the implementation of this project, information on developers, insurance companies and the Fund for the Protection of the Rights of Interest holders will be required. However, in this part, no reliable information about the intention to cooperate under this scheme was received from these organizations.

Implementing this blockchain technology in the real estate industry is certainly necessary. Imagine how much easier it will become to live if, when making a real estate purchase and sale transaction, the parties will exchange individual keys that will provide access to the registration service and blockchain. After the entry in the Unified State Register of Real Estate about the new owner appears, the system will immediately contact the authorized credit institution and write off the funds from the client's account in favor of the seller. This eliminates the need to rent a bank cell and obtain an extract from the USRN for further submission to the bank.

6. Conclusions

The use of blockchain in the real estate market will guarantee the purity of transactions, because it is impossible to falsify what is recorded in the blockchain network. In addition, the use of cryptocurrencies will help simplify settlements between counterparties and ensure the safety of funds. Unlike IT platforms controlled from a single center, all data (documents for an apartment, money transfers, etc.) are recorded and verified in a distributed registry system. Access to data is protected by encryption, and only participants in the transaction own the key.

This will increase the transparency of the real estate market and create prerequisites for creating a rating system that will track the actions of all market participants and at the same time will give only true information about contractors, which will increase the reliability of transactions, confidence in the database and reduce the risks of fraud to a minimum. At the same time, any project created on the basis of blockchain technology can be compared with a database that allows you to store the same information on many different servers. Each transaction in this scheme is decentralized, which eliminates the possibility of changing or tampering with data [3, 18].

According to our estimates, the widespread adoption of the blockchain technology may occur in the next 6-7 years, during which it is necessary to finalize all existing problems and eliminate possible risks

in implementing transactions through the blockchain. The blockchain technology will become a system that will be able to minimize the percentage of human errors and that will make it possible to optimize transactions in the real estate market. Using this technology, real estate transactions will be faster, safer, and cheaper than they are now. As a result, the blockchain can be considered one of the most significant financial innovations that can make revolutionary changes both in the real estate sector and in the stock market [19].

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