

## BLOCKCHAIN TECHNOLOGY USING FOR REAL ESTATE TRANSACTIONS IN UKRAINE

### ВИКОРИСТАННЯ БЛОКЧЕЙН-ТЕХНОЛОГІЇ У СФЕРІ ОПЕРАЦІЙ ІЗ НЕРУХОМІСТЮ В УКРАЇНІ

*Specific features of the implementation of blockchain technology in real estate transactions were investigated in the paper. The international experience of the real estate business regulation based on blockchain technology's using was presented. Main problems and challenges of the blockchain technology's using in the real estate sphere were analyzed. In particular, the main stages of realization process (beginning from searching the buyer, preparing documents to making agreement between buyer and seller, identification of the most common payments for transferring the real estate rights) were investigated. Methodological approaches to the realization of pilot project aimed on the implementation of the blockchain technology in real estate sphere were elaborated. Main ways of blockchain technology implementation (based on LeaxCoin methodology) were proposed.*

**Key words:** blockchain, real estate, property rights, Leaxcoin, ecosystem.

*У статті визначено специфічні особливості запровадження технології блокчейн у сфері операцій із нерухомістю. Представлено міжнародний досвід регулювання ринку нерухомості, який базується на використанні технології блокчейн. Проаналізовано основні проблеми та виклики застосування технології блокчейн у сфері нерухомості. Зокрема, розглянуто основні етапи реалізації процесу (починаючи від пошуку покупця, підготовки документів для укладання угоди між покупцем і продавцем, ідентифікації найпоширені-*

*ших платежів за передачу прав на нерухоме майно). Розроблено методологічні підходи до реалізації пілотного проекту, спрямованого на впровадження технології блокчейн у сфері нерухомості. Запропоновано основні напрями впровадження технології блокчейн (на основі методології LeaxCoin).*

**Ключові слова:** блокчейн, нерухомість, права власності, LeaxCoin, екосистема.

*В статье определены специфические особенности внедрения технологии блокчейн в сфере операций с недвижимостью. Представлен международный опыт регулирования рынка недвижимости, основанный на использовании технологии блокчейн. Проанализированы основные проблемы и вызовы применения технологии блокчейн в сфере недвижимости. В частности, рассмотрены основные этапы реализации процесса (начиная от поиска покупателя, подготовки документов для заключения сделки между покупателем и продавцом, идентификации самых распространенных платежей за передачу прав на недвижимое имущество). Разработаны методологические подходы к реализации пилотного проекта, направленного на внедрение технологии блокчейн в сфере недвижимости. Предложены основные направления внедрения технологии блокчейн (на основе методологии LeaxCoin).*  
**Ключевые слова:** блокчейн, недвижимость, права собственности, LeaxCoin, экосистема.

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**Problem setting.** Real estate is the one of basic sectors that indicated the conditions for enabling economic growth in country. Therefore, attraction of investments into real estate sector can push on economic development not only separate region but also country in whole. It had a high value of investment's multiplier that defined a short payback period for investments that had been done before. During the last two years, there are significant changes in the different spheres of social and economic development have occurred, and the real estate is not an exception. The case of Ukraine is a bright example how changes could happen. Until now the process of selling or buying apartments in Ukraine are accompanied by significant difficulties, especially for foreigners. That is why for the providing an enabling environment in real estate sphere it is necessary to improve process for getting and protection of property rights.

**The latest researches and publications analysis.** Analysis of recent scientific materials devoted to the investigation of modern information technologies as an important basis for the development of digital society, had indicated the strengthening of scientific interest to these problems. Research of the prob-

lems of blockchain technology's implementation, specific features of its using in the financial sector were conducted by foreign and domestic scientists: Devetsikiotis M., Fitzgerald J., Friedmaier M., Gupta V., Laaper S., Konstantinos C., Maupin J., Quasney E., Tumasjan A., Yeh W. and Rubanov P., Panycar G., Panteleeva N., Stetsenko O. But until now the problems and prospects of blockchain technology's using in different spheres of economy remain non-sufficient studied. Some issues need to be more investigated, it related to the necessity of the development of conceptual approach to the implementation of blockchain technology in real estate sector, the elaboration of main ways of its improvement. Generally speaking, it stipulates the necessity of the research of such problems, the elaboration of methodological approaches to the realization of pilot project on regional level that had been proposed by author of paper.

**Purpose of the paper** is an analysis and evaluation of Ukrainian real estate market development, according to recordkeeping of property right and implementing new technologies into current process based on blockchain technology using.

**Key research findings.** Globalization of world economy leads to the development of information and communication technologies. During last period of time “digitization” of the economy and society tightly connected with implementation of the blockchain. According point of view of Stephen Laaper, Joseph Fitzgerald, Evan Quasney, Winnie Yeh, blockchain is a technology that can allow authenticated data communication between each player in a supply chain without the intermediation of a trusted central organization” [9].

Blockchain technology as an important basis for the development of digital society had been used mainly in the sphere of supply chains, trade finance, and financial transactions. But the majority of scientists support point of view that testified the necessity and possibility of the widening of the sphere of blockchain technology’s application as a result of technological changes [6]. Analyzing the specific features of the blockchain implementation and taking into account modern realities, scientist Rubanov P. (2017) pointed the possibility to use blockchain technology in such areas as auditing, real estate management [4]. Thus, blockchain’s potential to improve real estate market development hinges upon the efficiency of institutional framework, legislative basis, and financial management [2]. Development of blockchain’s potential in real estate sphere will decrease the cost of driving registers of real estate owners, improve the quality of real estate operations, and reduce of legal risks in asset management [3].

Foreign experience testified the possibility of blockchain’s technology using in the sphere of real estate. One of the most interesting cases of blockchain’s technology using had represented by U.S. based blockchain technology company called Leax Fondation. The company expects to record titles and ownership of real estate property rights designed by blockchain for private transactions. Leax Fondation has a roadmap for the implementation of blockchain technology into real estate system in different countries [7].

Methodology of the elaboration and implementation of pilot project foresees the analysis of the existing situation in the real estate sphere based on data collection and processing, organization of focus group discussions with main stakeholders (representatives of governmental and local authorities (especially, Ministry of Justice of Ukraine and State Register of real estate’s rights in Ukraine, private notaries and broker agents). Obtained data might be analyzed and summarized in report for better understanding of the provided information. The results of presented reports can be used for the definition of the problems and challenges of Ukrainian real estate market development, and for the finding the ways to improve the efficiency of its activity.

The information regarding the current situation at Ukrainian real estate market obtained during inter-

views and meetings with brokers, notaries and staff of government and local authorities had confirmed the existence of the interest to blockchain technology using. It stipulates the necessity of the elaboration of methodological approaches to the realization of pilot project in Kyiv city aimed on the implementation of the blockchain technology based on existing record-keeping system in Ukraine. Final report summarizes the particular goals for the investigation related to a blockchain technology using in context of real estate payments.

The architecture of the project elaborated by the Leax Fondation foresees the possibility to use such technology in a pilot project in the Kyiv city, the biggest city in Ukraine. Office buildings of governmental and local authorities, as well as luxury apartments and houses are located here. And the project will be realized in cooperation with the State register of real estate’s rights in Ukraine, private notaries and broker agencies in the real estate field.

*Main Research questions:*

- What is the main purpose for implementation blockchain technology in Ukrainian real estate market
- How the blockchain technology will be used on the Ukrainian real estate market
- How the blockchain solutions will operate on the Ukrainian real estate market
- How the solutions from blockchain technology could affect the speed and trustworthiness of records
- What are the main advantages and benefits of blockchain technology implementation

Nowadays, Ukraine has a lack of integrated systems of land management. Until now, there are a lot of discussions around a moratorium of land selling in Ukraine. Moreover, in Ukraine investor can see the difficulties in purchasing of a real estate in terms of obtaining the true ownership documents in the form of hand written certificate. Otherwise, there are new rules to register property rights due to online register that is maintained by the State register of real estate’s rights in Ukraine. In accordance to that, the Leaxcoin foundation could realize the pilot project in Ukraine, locally in Kyiv.

Due to the LeaxCoin methodology, the process of registering the property rights becomes simpler and less costly. In the long term time horizon, we face with new opportunities for recording property rights using the blockchain technology. It allows getting ownership of real estate for foreigners all over the world in a safe and fast way. During some time, this technology substitutes the common and original recording type by digital manner.

The real estate investigation was already done in cooperation with private and government notaries; the data was obtained from the public relations of these authorities. This investigation was done in according to the legislation of Ukraine, especially directives and orders issued by the Ministry of Justice of Ukraine.

There are two main activities that the registry faced with:

- Requests for property information requested to the certification of real estate unit from side of the State register of real estate's rights in Ukraine.
- Property registration procedure, which initiates in the Protocol unit and then sent to the Registration office, afterwards a client receives the ownership certificate

Consequently, the certificate of ownership is issued in the digital form from the State register of property rights to real estate of Ukraine. That document consists of the owner's information as well as general properties and personal number from government register of real estate. At the same time, it experienced the issuing the ownership certificate in handwritten form by cards. Regarding to the blockchain technology, it used to write down the transactions number of purchasing property rights in register's database.

All documents might be stored in a Google cloud and in GitLab have an advantage of being checked at anytime from anywhere. Now there are not many documents in digital form stored inside the cloud but if the amount of data is enough it will upload immediately.

The overall data concerning the data of investigation were collected and stored on Google Drive and in GitLab as well on local flash-drive in the form of a database. Otherwise, it's not necessary to use professional archival systems for a small quantity of inner documentation. However, it foresees the urgency of national and international standards' using in internal audit and management accountancy.

The blockchain technology will be used for the authentication of real estate's information consider the property rights for a particular person. In that case, the State register of real estate's rights in Ukraine try to implement recording for real estate in digital form [1]. All information consists in blocks and anyone can read it from anywhere. That's why storing data in blocks is more secure and easy to transfer. The blockchain technology might be used for creating new smart contracts to record transactions for property rights. This technology created on Ethereum protocol that is the most advanced and famous platform for storing chains with data [5]. The smart contracts have aim to securitization and transparency for transactions made by cryptocurrency. The example of these types of contracts can benefit person in one

part of world who wants to do business with third party on another part of world. The evolution of Leaxcoin foundation leads to creating of tokens that are main currency for making payments for real estate on own platform.

During the purchasing of real estate's property rights there are partakers defined in Figure 1:

Right now investors suffer with high requirements for capital, regulations for financing from the bank side, high transaction costs and it time consuming. Each of these elements has already been solved with a Leaxcoin methodology by making selling / buying of a real estate easily and more secure. In addition, it opens access for foreign investors that increase the liquidity of the local market.

Developing the ecosystem from the Leaxcoin platform makes records more user-friendly, secure and less time consuming in compare with traditional investment process using cryptographic. The new user-friendly ecosystem for real estate based on blockchain stimulates communicating and collaborating in this decentralized platform by easy way (Figure 2).

Recording to the last question we can identify five main elements of the Leaxcoin ecosystem:

- Property registry
- Smart contract
- Real estate Contracts
- Property Listing
- CrowSale
- Wallet
- Global support and Community

The main goal of property registry Leaxcoin is to assure the ability of the real estate transfer [XXXX]. The process is safe, fast and predicted by the Blockchain technology. Each transaction should be carried out by the global Leaxcoin community to secure the users' data and trustworthiness of recordkeeping. Finally, the environment of the Leaxcoin platform dedicates for communities, applications, tools, and solutions to integration with real estate registry offices, notaries and governmental institutions, proved by the jurisdiction of each place.

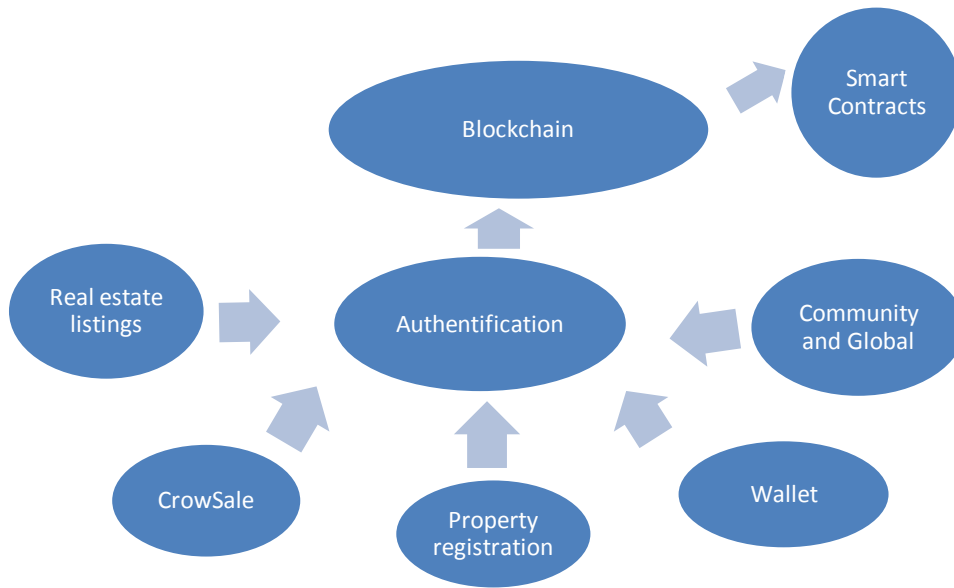
The global Leaxcoin contract consist a system that allows managers to use a smart personalized contract for satisfaction of specific needs of real estate transactions, according to local law and rules.

Figure 3 represents the general picture of smart contract processing. Firstly, from seller's inner incentive to sell real estate and preparing contract for this transaction. Further, transfer this contract to buyer,



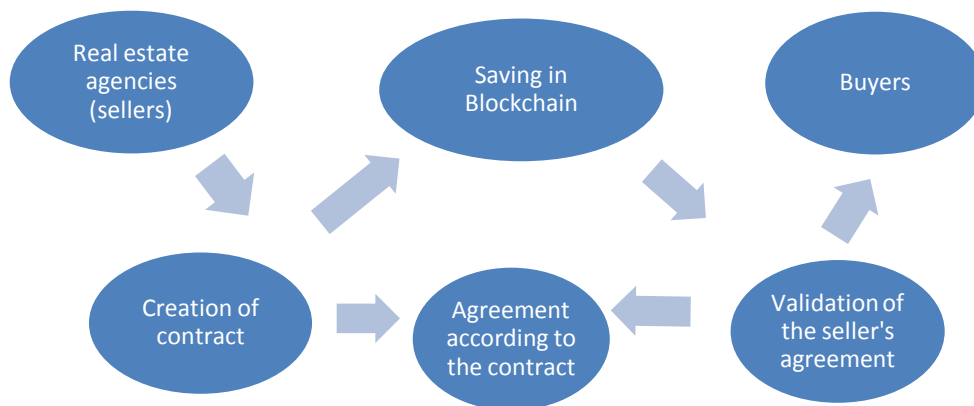
**Fig. 1. Participants of the process of property rights' purchasing in the sphere of the real estate**

Source: systematized by author based on [7]



**Fig. 2. Elements of Leaxcoin ecosystem**

Source: Systematized by author based on [7]



**Fig. 3. Process of smart contracts execution for real estate**

Source: Systematized by author based on [7]

using recordkeeping in blockchain block and receiving the acceptance of the transactions from the Ethereum network.

The Leaxcoin platform allows to list real estate with particular properties on special online platform. Users can distribute a proposal to sell / rent their real estate on web. On the Leaxcoin platform registered this property using API on special list and sending it to web sites when this property can sell / rent.

The crowdSale practice uses for funding the projects that are launching for future development and future investment attraction. Leaxcoin platform allows companies; developers and personal investors make investments for real estate due to purchase of Leaxcoin tokens. Investors getting the fraction in pool of investments according to their contribution.

At this first stage, the investments into real estate usually are more profitable comparable with secondary selling. Previously only huge funds and developers can invest into large real estate projects; nevertheless, everyone can invest into this property on different stages with low amount of capital.

The Wallet of Leaxcoin that has already developed on Ethereum blockchain network has following functions [5]:

- *Receiving* payments from anyone on the Leaxcoin platform
- *Purchasing* the Leaxcoin during the ICO company
- *Transactions* that are registered on the Ethereum blockchain network and need to be verified by each of user in blocks

- Fees that are distributed between users who accepted and verified transactions in Ethereum blockchain network and for Ethereum blockchain network maintenance, safety, running and fully distributed.

Payments between market participants will fulfill by Leaxcoin technology. It used the Leaxcoin cryptocurrency for inner payments through the own platform for buying or selling of real estate. It can be user-friendly environment when any investor can purchase real estate from any part of the World without bureaucracy and paper work. Specialists in cyber security and real estate familiar with all processes and regulations across the world and can register property right for real estate in blockchain. Moreover, using of own cryptocurrency with combination of fast growing virtual currency market can benefit purchasing of a real estate in distant future.

Leaxcoin community [8] organizes for helping investors and users get support on the most demand questions regarding the Leaxcoin ecosystem. The Leaxcoin community based product is open source project that was driven by developers, engineers, executives, designers, academics, economists and blockchain enthusiasts, who responsible for implementing Leaxcoins into cryptoworld and making decentralized technologies able for anyone.

On the chat users have a chance to ask questions and also propose some advantages for improving the performance of Leaxcoin foundation and helping to clear up doubts and worries in general. There is staff in each of country where the Leaxcoin operates, it helps to solve difficulties from technical and administrative side when the purchasing of real estate's property rights processes. The community is organized and driven by Ambassadors, Developers and Managers.

The session represents some related legal and financial issues associated with the blockchain platform for recording.

The recording of data for real estate doesn't have placed directly in the State register of property rights to real estate of Ukraine [8]. The record-keeping in own register of Leaxcoin foundation under blockchain technology based on Ethereum won't be consistent with law issues of Ukraine. The smart contracts should be accepted by personal sign of participants in blockchain blocks. When the contracts are signed and accepted by users on blocks then there is recording in special blockchain-based land transaction. There is currently no state regulation recognizing blockchain-based land registration in Ukraine. Right now in Ukraine starts the company of cryptocurrency legislation on government level [2]. Therefore, the payments with Leaxcoins tokens as well with ETH or BTC could be legal for the Ukrainian law in distant future.

Data localization laws are not defined in any jurisdictions and there are not specific rules for running

cryptographic recording of transactions in blocks. In most cases the data localization, data protection and privacy laws and rules setting up by particular platforms. In the case of the Ukrainian pilot, the platform's data files includes details of property's transfers are kept on a server located in US.

In case of Ukraine, there is no regulation for blockchain use yet. Governments in general hesitate about using of this modern technology because blockchain and cryptocurrencies could be used for money laundering and erosion of profits that could be identified as illegal activity for financial compliance. Nevertheless, Ukrainian government has a project for using cryptocurrency as legal payment for goods and services. Moreover, in the case of purchasing property rights using the blockchain technology really simplify the process of getting property for ordinary people. When blockchain transactions are authenticated between parties, it gives approved information both of them. In addition, it enables transmission of financial information instantly around the world at minimal costs.

The records present an archival theoretic evaluation of the aforementioned solution. In archival science, a record is being trustworthy if it is assessed as being accurate, reliable and authentic.

**Conclusions.** This paper presents results of the preliminary analysis of the main challenges, problems and consequences of the blockchain technology implementation in the real estate sphere, and propose methodological approaches to realization of pilot project in the Kyiv city, Ukraine. The process of getting property rights for real estate obtained due to blockchain technology is based on Ethereum. Analysis of theoretical issues of blockchain technology had testified the possibility of the receiving of significant advantages (in particular, the improvement of the procedure of property rights' setting due to shortening of the duration of the procedure and reducing the cost expenditures in comparison with common recording). Moreover, in the case of Ukraine, using of this technology would provide the openness of local real estate market for foreign investors and to improve the quality of blockchain records at all. The blockchain technology using cryptographical recording helps to improve trustworthiness of recordkeeping and written down in blocks. These blocks contain characteristics about real estate and general information about market participants. The solutions of records for real estate allow users to purchase property rights in an easy way with low transitional costs and safe data transaction from distant places. Moreover, you as investor could be sure about safety of transactions using cryptocurrency as well as encrypting of your personal data during this transaction. The transaction for purchasing real estate's property rights owing to Leaxcoin technology will finish after a few seconds, so it makes less time consuming for conformation of real estate procuration.

Summing up all mentioned information above, new technologies can afford real advantages for our ordinary life. In this sense, the real estate market also changes due to blockchain technology in written down information for purchasing property rights in a way that is more effective. Of course, many changes should be done in legal, administrative and procedural rules that shifts present technique for real estate's recordkeeping. These challenges are only expected only on the beginning of blockchain technology implementation for recording of real estate's property rights in the State register for property rights of real estate of Ukraine. The aim of raising these issues is not to put off potential adopters of blockchain real estate transaction recording systems. Nevertheless, due to obtained findings in potential blockchain solutions for real estate recordkeeping it forces further development of real estate in more modern and simply way.

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## **BLOCKCHAIN TECHNOLOGY USING FOR REAL ESTATE TRANSACTIONS IN UKRAINE**

Nowadays, Ukrainian real estate market is inefficient and non-innovative in comparison to western countries. Many restrictions for notaries limit the opportunities to purchase real estate with low transaction costs and highly time consuming. Modern technologies can shift common way to record property rights in the government register. Today the process of buying real estate on primary and secondary market could be complicated and has additional restrictions and difficulties from the side of government authorities or banks to make the transaction according to compliance of local and international rules.

Real estate sector now is facing with modern trends in development, regarding the speed and safety of getting property rights. Developers and participants on secondary market try to make process of buying property rights for consumers in more simple way. Finally, the new advantages of purchasing property rights for market participants can improve the total efficiency of that sphere.

Therefore the main purpose of the investigation is to figure out main difficulties of functioning Ukrainian real estate market in terms of recording property rights in state register and motivate the implementation of blockchain technology to improve performance of record-keeping.

The theoretical and methodology background of current investigation covers fundamental issues for real estate market development that faces in Ukrainian and foreign scientists' views. Obtained results were getting due to follow scientific methods and approaches as scientific analysis, synthesis, induction, deduction, statistical methods for grouping data and comparison analysis.

Moreover, this article examining the core results in record-keeping for real estate's property right, especially for Ukraine case. These outputs could be achieved due to blockchain technology based on Ethereum algorithm. The implementation of blockchain technology is obligatory for using in modern times to increase general openness of local real estate market for foreign investors. In addition to this, local investors also benefits in terms to crash down the borders and purchase real estate abroad without any government restrictions.