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Research Full Article

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DOI: <http://doi.org/10.15350/2409-7616.2022.3.24>**SMART CONTRACTS AS A TOOL TO ENSURE THE ECONOMIC SECURITY OF AN
PERSON- A SUBJECT OF A MORTGAGE CLUSTER IN THE CONTEXT
OF DIGITAL TRANSFORMATION**

M.S. Shemyakina, A.V. Burkov

Marina S. Shemyakina,

Candidate of Economic Sciences, Associate Professor
of the Department of Accounting, Taxes and Economic
Security, Volga State University of Technology,
Yoshkar-Ola, Russian Federation.

ORCID iD: 0000-0003-3515-2680

sh.marina.s@gmail.com

Aleksey V. Burkov,

Doctor of Economic Sciences, Professor of the
Department of Applied statistics and informatics,
Mari State University, Yoshkar-Ola, Russian Federation.

ORCID iD: 0000-0003-3188-2862

alexey.burkov@gmail.com

Abstract. *The article studies the mechanism for ensuring the economic security of the person - the subject of the mortgage cluster in the context of digital transformation. The relevance of the topic of the article is due to the peculiarities of the current economic situation in the country and its regions. The decrease in the key rate of the Central Bank after the policy of maintaining it at a high level at the beginning of 2022 and state support through the implementation of cluster mortgage programs necessitates, according to the authors, the need to assess the economic security of the subjects of the mortgage cluster. This is primarily due to an increase in the share of mortgage transactions in the total number of real estate purchase and sale agreements. The article is devoted to the problem of the development of theoretical provisions in terms of ensuring the economic security of the individual in the context of interpreting the individual as a subject of the mortgage cluster. The authors use an approach based on advanced digital transformation methods, developing methodological tools to neutralize emerging threats using such an end-to-end technology as a smart contract. The author's definition of the concept of «mortgage cluster» is given. The subjects of the mortgage cluster are defined, which are classified into three groups: direct participants, auxiliary participants and the state. A brief description of each of the groups is given. The author's definition of the category «economic security of subjects of the mortgage cluster» is developed, on the basis of which the architectonics of the concept under study is built. The risks of economic security of the individual - the subject of the mortgage cluster, are identified, which are classified into two groups: insured and not insured. For each group of risks, tools for their neutralization are identified. The role of a smart contract as a risk reduction tool has been explored. The structure of a smart contract, an object of a mortgage cluster, has been developed.*

Keywords: *digital transformation, smart contract, end-to-end technology, person economic security, mortgage cluster, risks, threats.*

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Научная статья

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СМАРТ-КОНТРАКТЫ КАК ИНСТРУМЕНТ ОБЕСПЕЧЕНИЯ ЭКОНОМИЧЕСКОЙ БЕЗОПАСНОСТИ ЛИЧНОСТИ - СУБЪЕКТА ИПОТЕЧНОГО КЛАСТЕРА В УСЛОВИЯХ ЦИФРОВОЙ ТРАНСФОРМАЦИИ

М.С. Шемякина, А.В. Бурков

Шемякина Марина Сергеевна,

кандидат экономических наук, доцент кафедры бухгалтерского учета, налогов и экономической безопасности, Поволжский государственный технологический университет, Йошкар-Ола, Россия.
РИНЦ SPIN-код: 9684-5229 / ORCID iD: 0000-0003-3515-2680
sh.marina.s@gmail.com

Бурков Алексей Владимирович,

доктор экономических наук, профессор кафедры «Прикладной статистики и информатики», Марийский государственный университет, Йошкар-Ола, Россия.
ORCID iD: 0000-0003-3188-2862
alexey.burkov@gmail.com

Аннотация. *В статье проведено исследование механизма обеспечения экономической безопасности личности - субъекта ипотечного кластера в условиях цифровой трансформации. Актуальность темы статьи обусловлена особенностями современной экономической ситуации в стране и ее регионах. Снижение ключевой ставки Центрального банка после политики ее поддержания на высоком уровне в начале 2022 года и государственная поддержка через реализацию кластерных ипотечных программ обуславливает, по мнению авторов, необходимость оценки экономической безопасности субъектов ипотечного кластера. В первую очередь это связано с увеличением доли ипотечных сделок в общем количестве договоров купли-продажи недвижимости. В статье приводится авторское определение понятию «ипотечный кластер». Определены субъекты ипотечного кластера, которые классифицированы на три группы: непосредственные участники, вспомогательные участники и государство. Приведена краткая*

характеристика каждой из групп. Статья посвящена проблеме развития теоретических положений в части обеспечения экономической безопасности личности в контексте интерпретации личности как субъекта ипотечного кластера. Авторы используют подход на основе усовершенствованных методов цифровой трансформации, разработки методического инструментария нейтрализации возникающих угроз с использованием такой сквозной технологии как смарт контракт. Разработано авторское определение категории «экономическая безопасность субъектов ипотечного кластера», на основе которого построена архитектура исследуемого понятия. Идентифицированы риски экономической безопасности личности – субъекта ипотечного кластера, которые классифицированы на две группы: страхуемые и не страхуемые. Для каждой группы рисков определены инструменты их нейтрализации. Исследована роль смарт-контракта как инструмента снижения рисков. Разработана структура смарт-контракта –объекта ипотечного кластера.

Ключевые слова: *цифровая трансформация, смарт - контракт, сквозная технология, экономическая безопасность личности, ипотечный кластер, риски, угрозы.*

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INTRODUCTION

The current economic situation in the country and its regions, characterized by a decrease in the key position of the central bank after its sharp increase in 2022 and the introduction of cluster mortgage programs of state support, determines the assessment of the economic security of the subjects of the mortgage cluster. This is primarily due to the share of mortgage transactions in a large number of contracts for the sale of real estate. Blockchain has broad application prospects in various sectors of the economy [1, 2, 3]. The problem of blockchain implementation goes hand in hand with the issue of ensuring economic security [4, 5].

The purpose of the study is to develop theoretical provisions in terms of ensuring the economic security of an person as a subject of a mortgage cluster based on improved methods of digital transformation, to develop methodological tools for neutralizing emerging threats using such an end-to-end technology as a smart contract.

To achieve this goal, the following tasks are defined in the work: to identify threats to the economic security of a person-subject of a mortgage cluster and to develop a smart contract architecture as one of the tools for neutralizing identified threats.

The theoretical and methodological basis of the study is the scientific works of Russian and foreign scientists on the problems of ensuring the economic security of the individual.

It should be noted that the issues of identifying risks and threats of the subjects of the mortgage cluster in the works of Russian and foreign scientists are mainly considered from the standpoint of identifying the risks of a credit institution issuing mortgage loans.

Smart contracts are being explored as robust schemes for dynamic target detection and automatic mortgage loan monitoring [6], and some studies provide their possible structure [7].

A number of authors also reveal important socio-economic aspects of this technology [8, 9]. In addition, the blockchain is considered as a potentially unified standardized system, which allows it to be applied to an unlimited number of organizations in the banking sector [10, 11]. Significant prospects for this technology are opening up in the banking sector of the economy [12]. Data in the blockchain system is protected from falsification [13]. We can also agree with the authors who name low transaction costs as an advantage of the blockchain system [14, 15].

METHODOLOGY

A mortgage cluster, in our opinion, should be understood as a group of interrelated organizations: public authorities, banks, individuals, as well as auxiliary participants that provide a synergistic effect in the process of issuing a mortgage (housing) loan. The mortgage cluster model is shown in Figure 1.

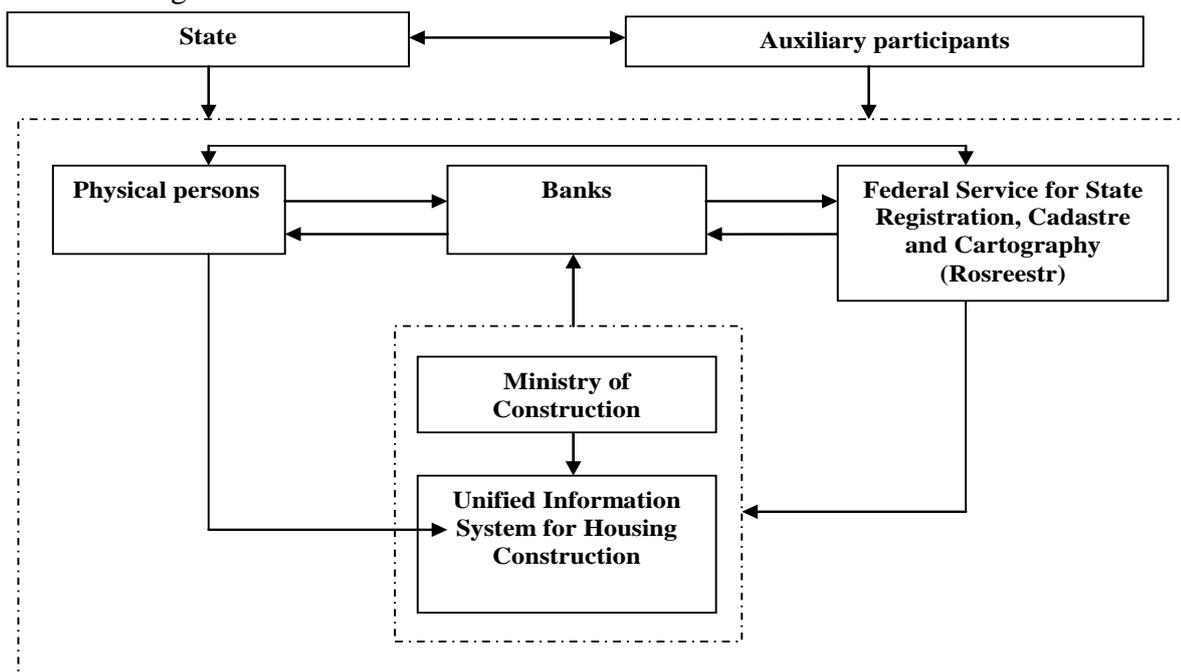


Figure 1 - Mortgage cluster model
Source: developed by the authors.

The subjects of the mortgage cluster can be conditionally divided into three groups: direct participants, auxiliary participants, the state (represented by various state authorities that are not directly involved in the process of issuing a mortgage loan). As direct participants, we include individuals receiving a mortgage loan, a credit institution (bank) issuing a mortgage loan, Rosreestr registering a transaction, as well as the Unified Housing Construction Information System, which ensures full transparency of shared construction. We include self-regulatory organizations, whose members are developers, notaries, real estate appraisers, to auxiliary participants. To the group of state authorities that are indirectly related to the process of obtaining a mortgage loan, we include: 1. The Federal Tax Service of Russia, which decides on granting individuals a property deduction when buying real estate. 2. The Pension Fund of the Russian Federation, which makes a decision to repay a mortgage loan with maternity capital. 3. Centers of state and municipal services that are intermediaries between individuals and Rosreestr. 4. Other public authorities that partially subsidize individuals for the purchase of real estate using mortgages, implementing the programs «Military Mortgage», «Young Family», «Renovation» and others.

Based on the composition of the subjects of the mortgage cluster, in our opinion, the economic security of the subjects of the mortgage cluster should be understood as such a state of the economy and personal finances that ensures the sustainable development of a group of interrelated organizations participating directly or indirectly in the process of issuing a mortgage (housing) loan.

The architectonics of the economic security of the subjects of the mortgage cluster developed by us (Figure 2) is a combination of 4 blocks: the economic security of the state, the economic security of the individual, the economic security of banks, and the economic security of the developer. In accordance with each block, we have identified possible risks. In this study, we will dwell in more detail on the threats to the economic security of the individual - the subject of the mortgage. cluster and the identified risks.

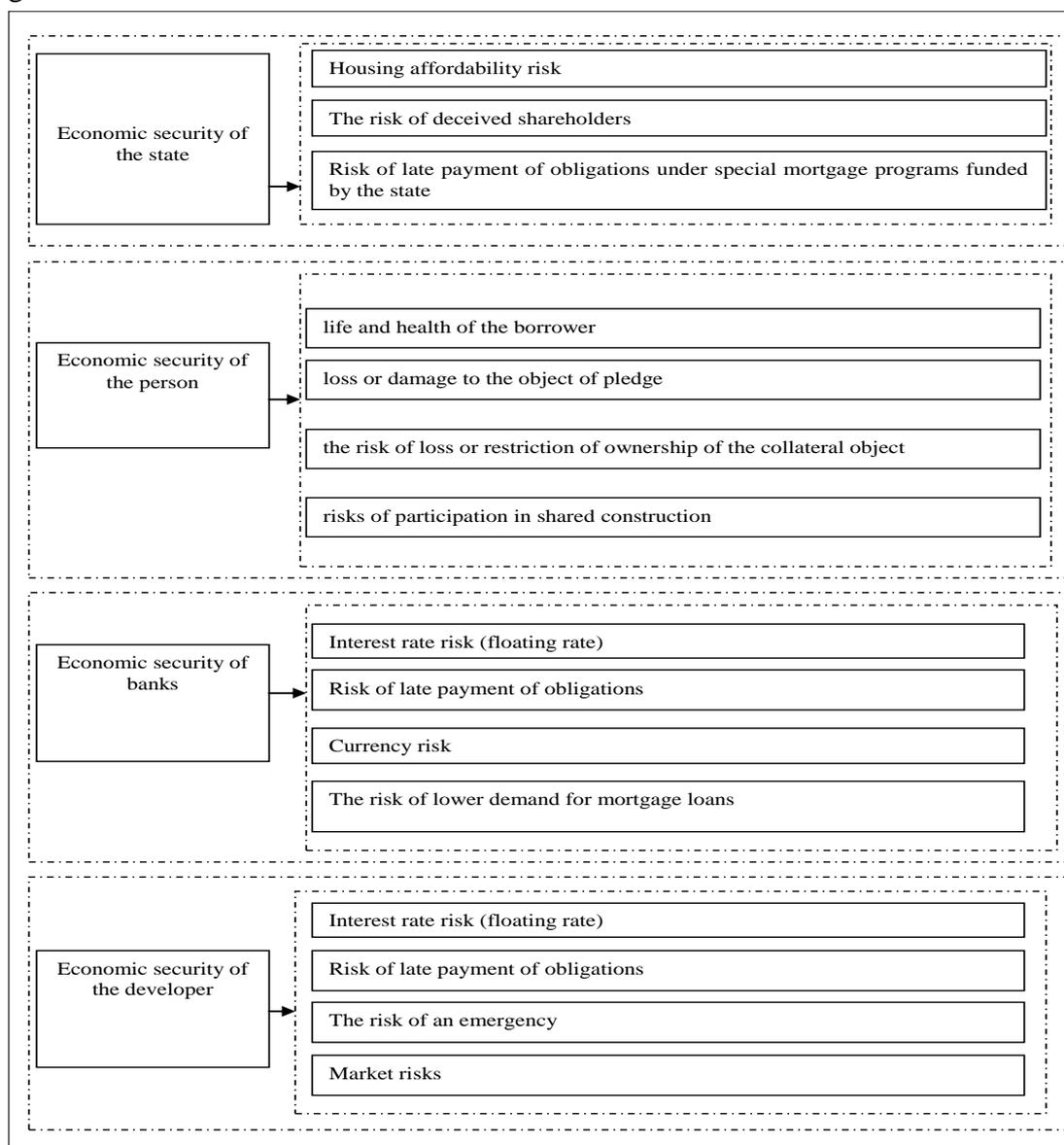


Figure 2 - Architectonics of the economic security of subjects of the mortgage cluster
Source: developed by the authors.

Risks should be identified depending on the source of their occurrence. An individual can currently apply for a mortgage on finished housing, housing under construction, suburban real estate and land, as well as a garage or parking space. Accordingly, the identification of a particular

risk will depend on the type of property being purchased. However, regardless of the type of real estate, all risks can be divided into insured and non-insurable.

The first group includes risks, the level of permissible losses for which we can easily determine, and therefore the insurance company is ready to reimburse them: the life and health of the borrower; loss or damage to the collateral (property insurance); loss or restriction of ownership of the object of pledge (title insurance); bankruptcy of a bank (the deposit insurance agency currently insured funds of equity holders on escrow accounts up to 10 million rubles).

The second group includes a large group of risks of participation in shared construction. An analysis of the main indicators of housing construction, presented in Figure 3, allows us to conclude that most of the housing construction is accounted for by the use of escrow accounts.



Figure 3 - Main indicators of housing construction ¹

This necessitates the identification of the risks of participation in shared construction when using escrow accounts, as well as the development of effective tools to neutralize them.

RESULTS

The mechanism for acquiring real estate using escrow accounts includes the following steps: depositing funds by a shareholder to a special escrow account, obtaining permission by the developer to put the building into operation, transferring funds from the escrow account to the developer's accounts. At the same time, during construction, the developer can use the bank's borrowed funds on special terms, depending on the amount of cash flows generated by the project.

Registration of transactions with real estate is possible electronically, through multifunctional centers and with direct interaction with Rosreestr. Electronic registration of real estate transactions is possible on the Rosreestr website or through electronic registration services (DOM.RF, Sberbank, etc.).

Reducing risks and neutralizing threats to the economic security of the individual - the subject of the mortgage cluster, in the case of shared construction, in our opinion, is possible with the simultaneous fulfillment of the following conditions:

1. *The use of a smart contract to check the availability of additional agreements in which the buyer undertakes not to demand a penalty from the developer for late completion of construction.*

Smart contracts can be thought of as digital programs based on blockchain consensus architecture that will be executed automatically when the terms of the agreement are met, and due to their decentralized structure, they are also self-sustaining and tamper-proof. That is, a smart contract, upon the occurrence of certain circumstances (checking the terms of the contract) and their full execution, makes a decision to terminate the contract and issue the required transaction to the

¹ Electronic resource. URL: Наш.дом.рф

parties. It should be noted that at the legislative level, the term «smart contract» appears as an end-to-end technology.²

If the conditions for the developer to require individuals to conclude additional agreements on conditions that are unfavorable for the latter are identified, ensuring the economic security of the individual, the guarantor of which in this case can be the bank, is possible when using the tool for a significant increase in the project financing rate for the developer (it will reduce the risks that in this case, it is borne by the bank when financing investment projects).

Currently, with project financing, the covered part of the funds in escrow accounts is taxed on average from 3% per annum, uncovered by cash - from 5-6% per annum. The rate primarily depends on the financial model and the risk of the project. However, at the initial stage of concluding an agreement between the bank and the developer, it is practically impossible to foresee the occurrence of such a risk. In this regard, it is possible to encode (and prescribe in the contract) the conditions in the smart contract, upon the occurrence of which the rate on the uncovered part of the funds will increase several times. From the point of view of an individual, if the developer intentionally plans not to meet the deadlines for the completion of the finished construction, then such a condition may stop the developer due to the economic inexpediency of such an action. From the side of the bank, such a situation should draw attention to its client in terms of business reputation. Because in fact, on the one hand, borrowed funds are used at low interest rates (up to 10% per annum), on the other hand, the developer is trying to deliberately terminate equity agreements in order to resell the property at higher prices (according to analysts, the cost per square meter of housing over the past two year on average increased by 30-40%.³). At the same time, the smart contract will allow you to control these conditions automatically. The developed structure of the smart contract - the object of the mortgage cluster is shown in Figure 4.

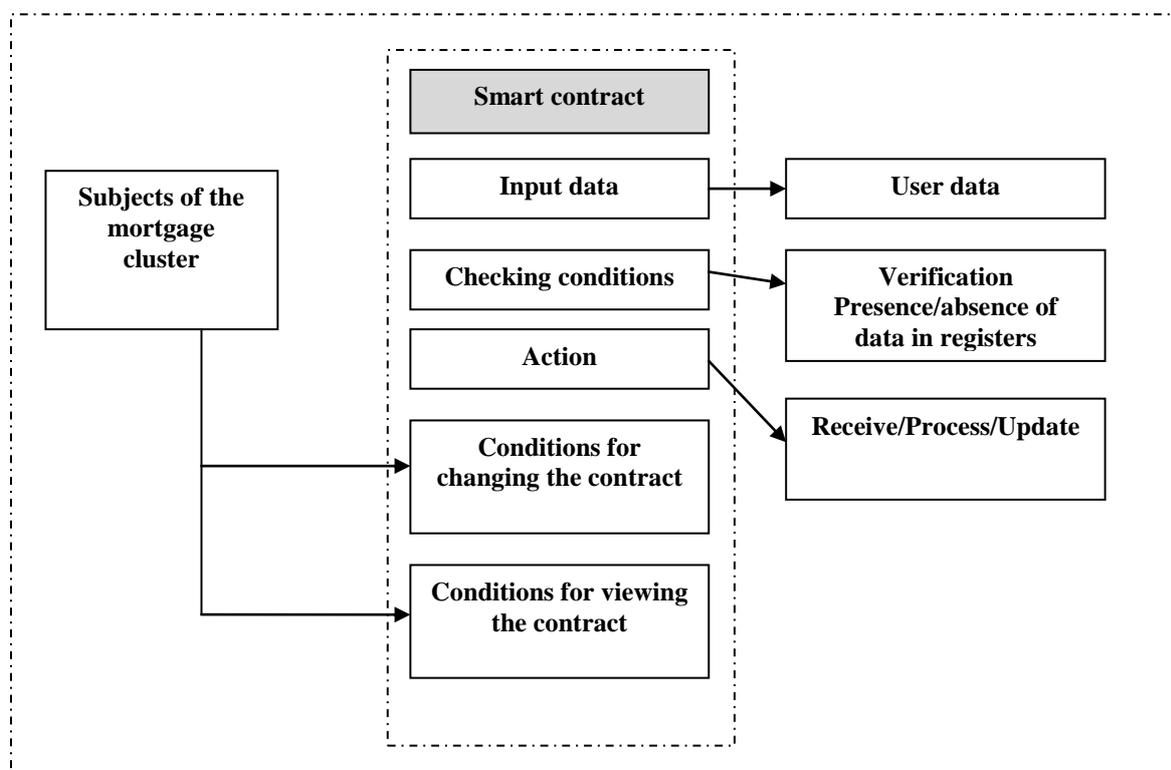


Figure 4 - The structure of the smart contract - the object of the mortgage cluster.

² Information letter of the Bank of Russia dated August 14, 2018 No. IN014-12/54 «On the National Assessment of ML/TF Risks»

³ Electronic resource. URL: <https://www.irm.ru/gd/>

Source: developed by the authors.

In addition, it should be noted that an individual in this case is at a disadvantage, because often housing construction is delayed for years, during this time the prices for a square meter of housing in the primary market grow several times, and in the event of termination of the contract or bankruptcy of the developer, the funds from the escrow account are returned to the individual in the same amount in which he put them there introduced. No interest is charged on this amount. This may lead to the risk of not being able to purchase a similar dwelling at the same price terms. Reducing this risk is possible only in the event of a change in legislation, which includes, in the event of such a situation, the accrual of interest on the funds that are in the escrow account.

2. *Application of a smart contract to verify compliance with the ban on the resale of apartments to an interdependent legal entity, including the beneficial owner of the developer.*

Currently, it is not uncommon for a developer to sell a large (or all) part of a housing construction project to an interdependent legal entity at a low price per square meter, after which the related entity resells the specified property under an assignment (assignment agreement) to individuals on a reimbursable basis. This means that the escrow account will contain the amount paid by the original shareholder, and the difference in the price for the property under the cession agreement and the original equity agreement will be the profit of the related legal entity. From the point of view of an individual subject of a mortgage cluster, such a settlement scheme can be a direct threat to his economic security, especially if the developer is declared bankrupt, and also if the price of real estate is more than 10 million rubles (the limit value of DIA insurance).

In our opinion, such a situation can be avoided by changing the current legislation: a complete ban on the sale of a part of a housing construction object to related parties and a partial ban (no more than 10% of the total area of housing under construction) for other legal entities. At the same time, these conditions can also be controlled using smart contracts. To do this, the conditions check block must be supplemented with procedures for comparing data with registers. For example, the list of beneficial owners of the developer in accordance with the current legislation is mandatory in the project declaration for the construction site.

CONCLUSION

Thus, the risks identified by the authors can be neutralized by using end-to-end digital technologies, in particular, by using smart contracts, the architecture of which is presented in this study. The effectiveness of the application of these technologies is interconnected with changes in the current legislation.

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